VOLODYMYR DAHL
EAST UKRAINIAN NATIONAL UNIVERSITY
Department "Logistics management
and traffic safety in transport»

PJSC «UKRZALIZNYTSIA»
Regional branch «Donetsk railway»

MANAGEMENT UKRTRANSBEZPEKA
IN LUHANSKAYA REGION

GLOBALIZATION OF SCIENTIFIC AND EDUCATIONAL SPACE. INNOVATIONS OF TRANSPORT. PROBLEMS, EXPERIENCE, PROSPECTS

THESES
OF INTERNATIONAL SCIENTIFIC CONFERENCE
3-12 May 2017
Dresden (Germany) - Paris (France)

ORGANIZING COMMITTEE

Executive editor: Chernetska-Biletska N., Head of Department "Logistics management and traffic safety on transport" of the Volodymyr Dahl East Ukrainian National University.

Recommended for publication by the Academic Council of the Volodymyr Dahl East Ukrainian National University (protocol № 9 from March 31, 2017)

Globalization of scientific and educational space. Innovations of transport. Problems, experience, prospects: thesis, 3-12 May 2017, Dresden (Germany) - Paris (France) / Executive editor: Chernetska-Biletska N. – Severodonetsk: Volodymyr Dahl East Ukrainian National University, 2017.

CONTENTS

Albeschenko D., Popchenko E, Sotnikov D.
OPTIMIZATION METHODS FOR DETERMING NOISE IN THE PROCESS OF CERTIFICATION OF WHEELED VEHICLES 13

Antonova G.
ENGLISH FOR SPECIFIC PURPOSES WRITING SKILL FORMATION 15

Arsentieva O.
DEFINITION OF THE NATURE OF LABOR LAW PRINCIPLES 17

Artemenko O., Volodarec N.
HEATING OF THE DIESEL LOCOMOTIVE IN WINTER 19

Asmankina A., Loria M.
AUTONOMOUS APARTMENT ENERGY CONTROL AND MANAGEMENT ENERGY SUPPLY COMBINED SYSTEMS..... 21

Babushkin G., Kuz'kin O., Kaplunovska A.
FORMALIZATION OF MICRO-LOGISTIC INDUSTRIAL TRANSPORTATIONS CONTROL SYSTEM 24

Baranov I., Baranova V., Taratoryna A., Korolenko T.
INCREASING CONSUMER PROPERTIES REGULATED CROSSROADS OF CITY STREET AND ROAD NETWORK..... 25

Baranov I., Bragin N., Korsun T., Pasechnik O.
SELECTION RATIONAL VARIANT NETWORKING PLAN FORMATION OF ONE-GROWING TRAINS 27

Barvina N.
EXTRACURRICULAR ACTIVITY OF THE STUDENTS OF NON-HUMANITARIAN SPECIALTIES IN THE UNIVERSITY THEATRE STUDIO..... 29

Belovol A., Vasilenko O., Tkachenko M., Gorobets V.
MAJOR TRENDS OF THE DEVELOPMENT OF SOLAR ENERGY IN CONDITIONS OF TRANSITION PERIOD OF UKRAINIAN ECONOMY 32

Bilokin J., Popov A.
SOLVING OF THE TRANSPORT ROUTING PROBLEM
USING THE GENETIC ALGORITHM 34

Bragin N., Ganja S., Pshikun A., Baranova V.
INVESTIGATION EFFICIENCY DISTRIBUTION PASSENGER
TRANSPORT IN CONDITIONS FUNCTIONING
OF RAILINGS RAILWAYS COMPLEXES 35

Bulgakova J., Khavalits S.
MODEL OF CHOOSING THE OPTIMAL ROUTE
OF RAW MATERIAL DELIVERY FOR METALLURGICAL
PRODUCTION 37

Bourtseva J.
LE RÔLE DES FACTEURS HUMAINS SUR LA SÉCURITÉ DU
TRAFIC FERROVIAIRE..... 39

Butko T., Prokhorchenko G., Moskalenko O.
IMPROVEMENT OF CONSTRUCTION AND ANALYSIS TRAIN
SCHEDULE BASED MODELING PROPOGATION DELAYS
ON THE RAIL NETWORK..... 41

Butko T., Prokhorchenko A., Muzykin M.
IMPROVED METHODS DEFINITIONS SCHEMES
CIRCULATION LOCOMOTIVE..... 43

Vakoulenko V.
LES CONDITIONS DE LA FORMATION DE LA CULTURE
MORALE DES FUTURS SPÉCIALISTES DU TRANSPORT
DANS LE SYSTÈME ÉDUCATIF DES ÉTABLISSEMENTS
D'ENSEIGNEMENT SUPÉRIEUR DE L'UKRAINE 45

Voznenko S., Vihopen I., Falendysh A.
PROBLEMS OF WHEEL AND RAIL CONTACT..... 46

Voronkov O., Rogovskii I.
ANALYTICAL PREREQUISITES TO TRANSPORT AND
TECHNOLOGICAL SYSTEMS OF TRANSPORTATION OF
PRODUCTION OF CROP PRODUCTION 47

Gatchenko V., Falendysh A., Kletska O., Ivanchenko D.
COMPARISON OF THE EMISSION STANDARDS
OF POLLUTANTS FROM EXHAUST GASES
DIESEL LOCOMOTIVE ENGINES 50

Gorbunov M., Nozhenko O., Kara S.
ABOUT CREATION OF NEW BOGIE
OF THE RAILWAY FREIGHT CAR..... 52

Davidenko N.
PROFESSIONAL FOREING LANGUAGE COMPETENCE AS
THE IMPORTANT QUALITY OF A SPECIALIST
IN THE FIELD OF TRANSPORT TECHNOLOGUIES..... 55

Davidenko N.
CERTAINES CARACTÉRISTIQUES DE L'ENSEIGNEMENT
DES LANGUES ÉTRANGÈRES DES ÉTUDIANTS
DE LA DEMAINE DE TRANSPORT..... 57

Danilyeva J.
CURRENT AREAS OF COOPERATION OF UKRAINE
AND EU IN THE TRANSFER BRANCH 59

Datsun Y.
NONCONFORMANCE RATING
FOR LOCOMOTIVE REPAIR FACILITIES..... 62

Degtyareva L., Miroshnykov V.
INFORMATION SYSTEMS IN TRANSPORT LOGISTICS..... 64

Demina V.
THE FORMATION OF THE INTERCULTURAL
COMMUNICATIVE COMPETENCE OF STUDENTS
OF TECHNICAL UNIVERSITIES BY MEANS
OF FOREIGN LANGUAGE..... 66

Zhuchenko E.
THE HUMANITARIAN COMPONENT IN THE PROCESS
OF VOCATIONAL TRAINING OF STUDENTS OF HIGHER
TECHNICAL EDUCATIONAL INSTITUTIONS 68

Zelenko O., Steganets S.
FEATURES OF FORMATION OF MARKETING AND LOGISTICS INFRASTRUCTURE FOR TOURISM ENTERPRISES 70

Kliuiev S.
ANALYSIS OF GETTING INFORMATION METHODS FROM THE ROLLING STOCK 73

Kliuiev S., Bleznyuk O.
THE HIGH-SPEED RAIL TRANSPORT IMPLEMENTATION FOR PASSENGER TRANSPORTATION 76

Kliuiev S., Zamota P.
NAVIGATION SYSTEMS IMPLEMENTATION IN TRANSPORT TRAFFIC CONTROL 78

Kliuiev S., Kravchenko S.
THE TRANSPORT COMPLEX EFFICIENCY INCREASE 80

Kliuiev S., Lopata O.
USING DRONES IN THE DELIVERY OF SMALL-SIZED SHIPMENTS AND POST 82

Kliuiev S., Smolkov V.
EFFICIENCY OF CORN EXPORTS BY SEA 85

Kliuiev S., Ushakov D.
POSSIBILITIES FOR THE USE OF ROAD FREIGHT 88

Kozmenko O.
INNOVATIVE METHODS IN TEACHING ENGLISH TO TRANSPORT DEPARTMENT'S STUDENTS 90

Kramskiy S.
RISK-ORIENTED INSTRUMENTATION UNDER CONDITIONS OF UNCERTAINTY OF MANAGEMENT OF A SPECIFIED INHOMOGENEOUS PROJECT 92

Krasheninin O., Ponomarenko O., Yakovlev S.
PROVISION OF THE MAINTENANCE SERVICE OF THE DEPOT WITH THE OPTIMAL SIZE OF REPAIR STOCKS 96

Krokhmaleva O.
LEISURE AS CONSTITUENT OF THE SPIRITUAL AND MORAL WORLD OF STUDENT OF CLASSIC UNIVERSITY 98

Krsek O.
INTERACTIVE TECHNIQUES IN THE PROCESS OF TEACHING TRANSPORT TECHNOLOGIES STUDENTS PROFESSIONAL TERMINOLOGY 101

Kuimova A.
THE KEY FACTORS OF FORMATION OF SUSTAINABLE DEVELOPMENT OF TRANSPORT ENTERPRISES 104

Labuta A., Kryvoruchko T.
RESEARCH METHODS IDENTFY INCONSISTENCIES ENVIRONMENTAL REGULATIONS WHELED VEHICLES IN THE PROCESS OF CERTIFICATION 107

Lashkov O., Lashkova T.
IMPLEMENTATION OF TRANSPORT COMPONENT FOR CONSTRUCTION 108

Lebid I., Anufriyeva T.
RELIABILITY PERISHABLE GOODS OF DISTRIBUTION CHANNELS 110

Luzhanska N., Lebid I.
WAYS OF IMPROVING OBJECTS TRANSPORT AND CUSTOMS INFRASTRUCTURE 113

Liamzienko V., Kotova L.
SYSTEMATIZATION OF PRINCIPLES OF MODERN UKRAINIAN LABOR LAW 115

Martynov I., Trufanova A., Aulova N.
THE WAYS TO ENSURE A RATIONAL LOAD DISTRIBUTION ON THE BEARINGS BY CREATING AN AXLE BOX 120

Marchenko D., Sydnyev V., Maksimov D., Sydnyev I.
IMPROVING ORGANIZATION CAR TRAFFIC ON NETWORK TRAIN 123

Medvediev Ie.
IN REGARD OF TAKING INTO ACCOUNT THE WEATHER CONDITIONS AT ORGANIZING AND PLANNING TRANSPORT PROVISION IN AGRICULTURE 125

Medvediev Ie., Blezniuk O.
USING THE GAME THEORY IN AGRICULTURE TRANSPORT SUPPORT TASKSING 126

Mikhailov E., Bondarenko G.
TRANSPORTING OF THE FLUIDIZED HYDROCARBON GASES IN TANK-CONTAINERS 128

Mikhaylov E., Semenov S., Shepit'ko O.
ANALYSIS THE PROBABILITY OF DERAILMENT WHEEL PROMISING DESIGN SCHEME WITH RAIL 131

Mikhailov E., Smaliy M.
PERSPECTIVE TYPE OF GROUP PACKAGE TO IMPROVE THE TECHNOLOGY MOVING OF PACKAGED GOODS 133

Mikhaylov E., Fesenko D.
ANALYSIS OF THE DEPENDENCE OF THE PRODUCTIVITY OF THE CAR FROM THE TIME IT HAS BEEN IDLE FOR LOADING/UNLOADING OPERATIONS 136

Nesterenko G., Kuzmenko A.
IMPROVEMENT OF THE TRANSPORT COMPLEX OF UKRAINE BY USING THE LOGISTICS PRINCIPLES 139

Nesterenko H., Muzykin M., Avramenko S.
EVALUATION EFFICIENCY IN FORMATION OF GROUP TRAINS 142

Nesterenko H., Muzykin M., Horobets V., Avramenko S.
STUDY OF CAR TRAFFIC FLOW STRUCTURE AT THE MARSHALLING YARD 145

Nosulko A.
CURRENT STATE REFORM OF RAILWAY SECTOR 147

Olhovskaja T.
METHOD OF CALCULATION OF SPARE PARTS FOR MAINTENANCE OF SERVICE OF LOCOMOTIVES 149

Panchuk O., Aleksahin O., Pogoreliy
INTENSIFICATION OF HEAT EXCHANGE WITH THE HELP OF A FLOW SPIN 152

Pasichnyk A., Klen E., Mirohnichenko S.
EVALUATION METHOD TRANSIT POTENTIAL UKRAINIAN TRANSPORT SYSTEM 153

Pasnak I.
JUSTIFICATION POSSIBILITY OF USING DRONES TO STUDY THE PARAMETERS OF TRAFFIC 156

Pidipryhora A., Kletska O., Yevtushenko E.
WAYS OF ENERGY SAVING IN RAILWAY TRANSPORT 158

Postranskyy T.
IMPACT OF TRAFFIC CONDITIONS ON THE BUS DRIVER'S FUNCTIONAL STATE 160

Prokhorchenko A., Panchenko A.
INVESTIGATION INTO SURVIVABILITY OF THE SYSTEM OF CAR FLOWS AND TRAIN FORMATION ON THE BASE OF THE PERCOLATION THEORY 161

Ramazanov S.
INTELLIGENT INFORMATION LOGISTICS MANAGEMENT SYSTEM PRODUCT LIFE CYCLE TECHNOGENIC TRANSPORT COMPANIES 163

Rudenko N., Bezsmertna A., Pushynska O.
SHIPMENT TRACKING AND TRACING SYSTEMS 164

Rudenko N., Falendysh O.
THE CHOICE OF A RATIONAL ROUTE OF DELIVERY OF BRAKE EQUIPMENT OF CARS ON FOREIGN ENTERPRISE 166

Sapronova S., Bulich D., Tkachenko V.
MAIN FAILURES AND DAMAGE OF CARRIED STRUCTURES
OF FREIGHT CARRIDGES MEANT
FOR THE EXTENSION OF SERVICE LIFE 168

Sapronova S., Tkachenko V., Zub E.
RESTORING OF RAILWAY ROLLING STOCK WHEELS..... 171

Svitlichna O.
CASE STUDY METHOD IN THE CONTEXT
OF PROFESSIONALLY ORIENTED FOREIGN LANGUAGE
TEACHING TO STUDENTS OF TRANSPORT TECHNOLOGIES
DEPARTMENT 173

Semenov S., Kravchenko S., Shepit'ko L.
ANALYSIS OF CARGO DELIVERY
IN INTERNATIONAL TRAFFIC 175

Sydorenko V.
DEVELOPMENT AND IMPROVING TRENDS OF LOGISTICS
SERVICE IN THE WORLD AND UKRAINE..... 176

Solodenko Y.
ANALYSIS ACOUSTIC POLLUTION
OF KYIV ON TRAFFIC FLOW..... 179

Solopova T.
PROFESSIONALLY-ORIENTED LEVEL OF TRAINING
A FOREIGN LANGUAGE IN NON-LINGUISTIC HIGH SCHOOL.... 182

Solyanik T., Osolikhin N.
ORGANIZATION AND MODELING OF THE LOGISTIC
SYSTEM OF THE ENTERPRISE (GERMAN AUTO)
USING THE MEDIUM 1C. ENTERPRISE AND ANYLOGIC 184

Tarasenko A., Kuz'kin O.
INFORMATION SUPPORT OF RESULTS
TOPOGRAPHIC ANALYSIS OF ROAD ACCIDENTS 185

Tartakovsky E., Gorobchenko A., Antonovych A.
THE EVALUATION OF THE "DRIVER-LOCOMOTIVE"
ERGATIC SYSTEM PERFORMANCE QUALITY 187

Tartakovsky E., Sumtsov A., Artemenko O., Bragin N.
CONDITION AND TRENDS RENEWAL
OF DIESEL LOCOMOTIVES IN UKRAINE..... 190

Tkachenko S.
USE OF GENETIC ALGORITHMS FOR SOLVING
THE PROBLEM OF OPTIMIZATION OF INTERCITY FREIGTH
TRAFFIC USING ROAD TRANSPORT 193

Troyan A., Muzykin M.
ENERGY EFFICIENCY MANAGEMENT
OF TRAIN TRAFFIC VOLUME AS A MEANS
OF IMPROVING TRANSPORTATION PROCESS..... 195

Turpak S., Vasilyeva L., Lebid H.,
Padchenko O., Sidorenko Yu.
OPTIMIZATION OF THE RAILWAY TRANSPORTATION
SCHEDULE OF METALLURGICAL ENTERPRISE 197

Fomin A., Braykovska N., Nechyporuk A.,
Kovalchuk G., Fomin V.
ECONOMIC EVALUATION OF USING UPGRADED HOPPER
CARS FOR TRANSPORTATION OF HOT PELLETS
AND AGGLOMERATE OF 20-9749 MODEL..... 199

Fomin O., Logvinenko O., Burlutskyi O.
SYNOPSIS OF THE THERMAL METHOD FOR STRAIGHTENING
TECHNOLOGICAL-DEFORMED CAR PARTS..... 201

Fomin A., Stetsko A.
THE STRUCTURING POSSIBILITIES OF RESISTANCE OF USE
TATINIUM LOAD WAYS THE OPPOSITE OF THE STRESS
AND/OR STRAIN STATE OF WAGON DESIGNS 204

Kharlamov P., Kharlamova E.
ROLLING STOCK MAINTENANCE
SCHEDULING OPTIMIZATION 206

Khmelyov I.
ECONOMIC-TECHNOLOGICAL MODELS FOR TRUCK ARGUMENTATION 208

Chernetskaya-Beletskaya N., Baranov I., Ostapenko V., Miroshnykova M.
INVESTIGATION RHEOLOGICAL AND HYDRODYNAMIC CHARACTERISTICS OF WATER COAL FUEL 211

Chernetska-Biletska N., Golovina Yu.
MODERN PRINCIPLES OF MARKETING IN THE RAILWAY TRANSPORT ENTERPRISES 213

Chernetskaia-Biletskaia N., Plotnikov D.
INTERMODAL SHIPMENT:
EXPERIENCE, FAULTS, PROSPECTS 216

Shvornikova A., Barabash V., Marchenko A.
PERSPECTIVES AND PROBLEMS OF USING THE INTEROPERABILITY PRINCIPLES
ON RAILWAYS OF UKRAINE 219

Shevchenko S., Denisova N., Polupan E.
INCREASE IN OVERALL PERFORMANCE
OF LOAD-LIFTING CRANES 221

Yanovski P., Nesterenko H., Ozerova O.
OPTIMIZATION OF TECHNOLOGY OF TRANSPORTATION
OF PASSENGERS IN LARGE CITIES
USING MATHEMATICAL MODELING 223

Yarovoy R.
THE EFFECTIVENESS OF COMBINED STORAGE
OF ELECTRICAL ENERGY ON SHUNTING LOCOMOTIVES 225

Drevetskyy V., Klepach M.
DEVELOPMENT OF INFORMATION SYSTEM CONCEPT FOR MONITORING THE MOVEMENT OF PUBLIC TRANSPORT 227

Bekh P.
OPTIMIZATION OF TRANSPORT SERVICES FOR INDUSTRIAL ENTERPRISES 229

OPTIMIZATION METHODS FOR DETERMING NOISE IN THE PROCESS OF CERTIFICATION OF WHEELED VEHICLES

Albeschenko D., Popchenko E, Sotnikov D.
National Transport University

Determining the level of external and internal noise wheeled vehicles requires specialized equipment available test site or special facilities and skilled personnel. Check the vehicle for compliance with internal noise also requires favorable weather conditions, as in the rain or snow can not make accurate measurements that would meet the standards.

Check external noise is performed according to [1-3]. To test using special devices "Noise". With sound level meter analyzes the noise levels at different operating conditions of the vehicle, a comparative analysis of the vehicle, the internal surface is coated proofing materials and car without them. Measurement provodyatya while driving at each transmission speed at certain crankshaft of the engine. The test should be conducted on a straight, dry, smooth and clean area paved with concrete or asphalt in good condition. Longitudinal slope measuring area must not exceed 1%. At a distance of 20 m. From the longitudinal axis of the measuring sites should not be large objects that could reflect sound.

The microphone should be installed at a distance of 0.5 m from the exhaust pipe, the main axis of the microphone must be parallel to the road and be at an angle (45 ± 10 degrees) from the vertical plane of the axis of the exhaust pipe, height of the microphone should match the height of the exhaust pipe, but not below 0 2 m. from the road surface. The vehicle must be technically serviceable, go run. Tests conducted at the operating temperature of the engine of the vehicle.

When measuring noise speed of the crankshaft of the engine should be 3/4 of the nominal frequency. Noise is measured from the time of constant speed and deceleration until full rotation of the crankshaft of the engine with a sharp transfer accelerator pedal position that corresponds to the minimum fuel. When measuring noise sound level meter must be in the "fast" measurement. The measurement of the noise made at least three times. The measurements are considered valid if the difference between the three results do not exceed 2 dB. By measuring noise accepted most important of the three dimensions.

The data is entered into the table and checked on their compliance with approved standards. The vehicle did not pass that does not meet these standards can not be used on public roads.

Measurement of noise on the inside. While driving the car, the driver is constantly feeling the sound pressure level is excessive capable adversely affect his status. Need to study to measure the level of internal noise and identify methods to reduce it. The vehicle inspected must meet all the requirements described above. Also, when tested in the vehicle should operate ventilation equipment (air conditioning, climate control) at maximum capacity. The microphone is placed near the driver's seat according to the following scheme.

Measurements carried out 3 times, the results are entered in the table. The rules of internal noise specified in [4]. Vehicle not been tested can not be used on public roads.

To optimize the process of checking the vehicle to external noise should purchase new portable sound level meters, which is easily installed on the vehicle and that can give results directly during the test. Noise should be set not only at the exhaust pipe of the vehicle. Portable sound level meters should be placed in the engine compartment, outside the car, near the wheel arches and inside the vehicle. The test vehicle should be on public roads, during normal movement of the vehicle. Firstly, it will speed up the review process. Secondly, the results will be more accurate because the sound level meter will record information during the movement, the most typical operating conditions of the engine. Best in this method is that we get the information directly in the "human movement" of the vehicle.

Based According to the tests, the vehicle that has been tested to external noise is always tested on interior noise. Therefore, to test for internal noise is inappropriate and how survey data are uninformative and increase the complexity of the certification process.

References:

1. Standart E3R51 00
2. Nakaz Ministerstva infrastrukturi Ukraïni №521 vid 17.08.2012
3. Nakaz Ministerstva infrastrukturi Ukraïni № 710 vid 26.11.2012.
4. GOST 27435-87

ENGLISH FOR SPECIFIC PURPOSES WRITING SKILL FORMATION

Antonova G.
Volodymyr Dahl East Ukranian National University

Recent world events have underscored the need to increase understanding and to improve communication among all citizens. To meet these communication needs, more and more individuals have highly specific academic and professional reasons for seeking to improve their language skills, particularly, the communicative competence in writing.

Writing is probably the most problematic use of English for non-linguistic university students. Writing tasks vary from writing short answers in examinations to taking notes, writing essays, abstracts, reports, projects, dissertations, theses, journal articles.

Two distinct approaches have historically characterized the efforts to develop the skill to write in a foreign code. The first, the product approach, focuses on the forms of the language; and the second, the process approach, focuses on the necessary stages to transform thought into written language. Nevertheless, neither of these has been able to cope with producing competent writers.

In the 1960s, cognitive psychology studies of competent writers' processes brought about what today is known as process writing. This approach focuses on the necessary steps to produce a text. The process approach pays no attention to the forms of the language, and so writing pieces are very rich in ideas, but not accurate.

Since the mid-1980s, considerable attention has been paid to the genre approach to teaching writing. It is claimed that “knowledge of genre is a key element in all communication and especially significant in writing academic or professional texts” [1]. A genre is "a recognizable communicative event characterized by a set of communicative purpose(s) identified and mutually understood by the members of the professional or academic community in which it regularly occurs" [2].

Language, then, in a genre perspective, is both purposeful and inseparable from the social and cultural context in which it occurs.” The goals and objectives of genre-based approach pedagogy are to enable learners to use genres which are important for them to be able to participate in, and have access to a particular discourse community” [3]. In addition, it takes into consideration the essential steps to produce a written professional text with the necessary degree of correctness.

Developing writing skills involves skills of planning, drafting and revising so that the end product is appropriate both to the purpose of the writing and the intended readership. So students find composing in English difficult because the writing process demands to use various strategies such as cognitive, linguistic, logical, and critical. There are certain conventions that have to be followed in writing. It means that a different level of formality is used depending on the context.

There are a number of reasons why students find language production difficult: students do not have the minimum language to perform a task; there is no spontaneity in writing; the topic or genre might create some difficulties because of the lack of knowledge or lack of literacy. Furthermore, conventions in one's native language are frequently non-transferable to a second language.

Thus, as the quality of written work depends on students' general proficiency, aiming to perfect learners` writing skills, first, students need to increase their reading rates. The idea of introducing extensive reading in the ESP programme might help students to succeed in reading faster and efficiently. Second, "it might be beneficial to train learners in using metacognitive reading strategies with the view of teaching to distinguish important information from nonessential details and selecting the right register in "read-to-write tasks"[4].

References:

1. Dudley-Evans, T., Jo St. John, M., 1998. Developments in English for Specific Purposes. CUP
2. Bhatia VK. Analyzing genre: Language use in professional settings. New York C: Longman. 1983.
3. Rafael Forteza Fernández, Paul Gunashekar A socio-psycholinguistic model for English for specific purposes writing skill formation diagnosis. Online resource http://www.bvs.sld.cu/revistas/aci/vol20_6_09/aci041209.ht
4. Galina Kavaliauskienė, Lilija Anusienė. Online Reading and Writing in English for Specific Purposes Classes // STUDIES ABOUT LANGUAGES. 2010. NO. 17

DEFINITION OF THE NATURE OF LABOR LAW PRINCIPLES

Arsentieva O.
Volodymyr Dahl East Ukrainian National University

The question of the essence of the principles takes central place among theoretical and applied problems of labor law science. This is stipulated above all by their importance in the system of legal regulation of labor relations and their leading role in certain future tendencies in development of labor law science. Currently, the only doctrinal approach to understand their nature has not been made. The reason for this is the continuous development of social relations, accompanied by the improvement of scientific and legal ideas, which are the basis of legal regulation. Legal science is not static, but it is true that the transition to each new level of development is accompanied by viewing the past achievements. We can review this issue in one of the laws of dialectics (denial law). So let us consider some scientific approaches to the definition of concept of law's principles as genitive category in relation to the principles of labor law.

According to A. Kolodiy, the principles of law are starting ideas of its entity, which express the most important regularities, the foundations of this type of the government and law, they constitute its main features, they differ in versatility, the highest imperative form and meet the objective necessity of building and strengthening a certain social order [1, p. 43]. The scientists V.V. Moldovan and L.I .Chulinda believe that the principles of law are the main ideas and assumptions, which are enshrined in law, have common significance, the highest imperative form (commandments) and reflect the essential positions of law [2, p. 45].

Comparing these two definitions, we can see both common and different in their content. In particular, the difference is evident that scientists have different approaches to the idea of mandatory consolidation of principles in the law. In this regard, it should be noted that in practice there are two possibilities: 1) a clear consolidation of the principles in legislation; 2) the principle implies in the relevant rule law. For example, in Art. 8 of the Constitution of Ukraine the rule of law is clearly defined. Instead, only the principle of legality is mediated by meaning of Art. 6 of the Constitution. [3] Of course, for greater efficiency is desirable that the principles of law should find their consolidation in the law, although the level of implementation of relevant principles in legislation does not diminish their importance.

Returning to the analysis of scientific definitions of the principles of law, we can also conclude that the scientists are unanimous in understand-

ing the purpose and role of these principles, which is not only a regulatory impact as to provide the ideological basis of law.

Many definitions of the principles of labor law are offered in scientific literature. Tracing the development of scientific approaches to the definition of concept of labor law principles, we conclude that the new tendency is to supplement the definition of the characteristics of principles. While supporting this view we define them as implemented in national and international legal norms basic ideas and conceptual provisions of all labor law sector and its individual institutions, on which labor relations are based and considering which acts and labor laws are adopted, including local; labor contracts and collective agreements are adopted, labor disputes are solved and minimum social guarantees are set.

Features of the principles of labor law are reflected in its most characteristic features, which include:

1) They can be consolidated in laws of labor legislation or follow from the content of the law.

In this regard, there are reasonable concerns of V.V. Eromenko, who proves that the division of basic principles of legal regulation of labor relations and specific legal requirements at this time is not only of academic interest, but also has a significant practical importance. According to the scientist, Ukrainian legislative experience indicates that regulations of different level of generalization get legal consolidation – from the specific legal provisions, which express deep differentiation of legal regulation of labor relations and related to limited number of workers to the basic principles of labor law of the highest level of generalization. Between these two poles wide range of legal requirements, which are different in levels of generalization, is placed. It is impossible to delineate basic principles and specific legal requirements for the generalization of these criterion regulations that are articulated because of the uncertainty of the criteria [3, p. 173]. To summarize we can mention that the characteristic feature of principles of labor law is that they are difficult to distinguish from regulatory law, since they are closely related. And we can see the following sign of labor law principles:

2) define minimum standards in the sphere of regulation of labor relations, in particular the wage, requirements on conditions of employment, social security and so on. It shows close relations of principles regulatory laws.

3) have subject certainty, it means that the content of each particular principle of labor law is clearly defined and ideally is reflected in the legal principles;

4) they are obligatory, that should be considered in process of adopting labor legislation, during providing of labor and collective agreements, adopting of labor house rules and other local regulations. The principles are based not only on the law regulations, but also determine the order of their adoption. In particular, one of these principles is participation of labor collective in developing and adopting of local acts, its right to form trade unions, etc.;

5) have regulatory and axiological meaning.

Thus, the principles of labor law have several important functions in the regulation of labor relations. Species diversity of institutions of labor law and labor relations determine the existence of a system of principles that necessitate their systematization. Conducting of such systematization may be the focus of further researches in this sphere.

References:

1. Kolodii A. M. Pryntsypy prava: geneza, poniattia, klasyfikatsiia ta realizatsiia / A. M. Kolodii // Almanakh prava. – 2012. – Vyp. 3. – S. 42-46.
2. Pravoznavstvo. 2-he vyd. navch. posib / V. V. Moldovan, L. I. Chulinda. – K. : Tsentr uchbovoi literatury, 2010. – 184 s.
3. Eromenko V. V. Poniattia pryntsypiv trudovoho prava ta yikh zastosuvannia / V. V. Eromenko // Vcheni zapysky Tavriiskoho natsionalnoho universytetu im. V. I. Vernadskoho. Seriia: Yurydychni nauky. – 2009. – T. 22 (61). – № 2. – S. 163-176.

HEATING OF THE DIESEL LOCOMOTIVE IN WINTER

Artemenko O., Volodarec N.

Ukrainian state university of railway transport

Analysis of measures to improve the efficiency of technical operation of shunting locomotives showed that a large percentage of the fuel consumption is warming up on diesel in the winter. The existing systems of heating, though reduced fuel consumption, but not fully at the moment solve this problem. The new locomotives use modern systems of heating. But they are expensive and adapted for new locomotives. Therefore, the development of rational system of heating of fuel is important.

For preliminary evaluation of different systems of heating have developed a mathematical model that describes the process of warming up of diesel locomotive chme3 dynamics. Therefore thermal processes are con-

sidered as discrete and continuous. They are measured in units of power. It was decided that at the beginning of heating diesel heating temperature of the diesel was equal to the water temperature at the outlet of the diesel engine. During the warm-up water temperature at the outlet of the diesel tvikh is determined using the following formula 0K:

$$T_{вих}(\tau) = T_{вх}(\tau) + \frac{Q_B^{\partial}(\tau) + Q_B^{N^2}(\tau)}{G_B C_{pm}} \quad (1)$$

where G_B - the second water flow through the engine, kg/s, $Q_B^{\partial}(\tau) = Q_T q_B(\tau)$ - energy dissipation in water from diesel, kW, $Q_B^{H}(\tau) = P_{ТЭМ}$ - energy dissipation in the water from the diesel heater, kW.

The water temperature after the refrigerator, K,

$$T_{хол}(\tau) = T_{вих}(\tau) - \frac{Q_M^{акк}(\tau) + Q^{хол}(\tau)}{G_B \cdot C_{pm}}. \quad (2)$$

Numerical determination of process variations in the dynamics warm-up was performed by the method of elementary balance, whereby the water content in the process of heating for step bills on time has a discrete temperature value are equal.

At the beginning of the warm-up water temperature at the inlet to the diesel matters $T_B = T_{вхід} = T_B^{\min}$. The water temperature at the outlet of the diesel and the water temperature after the refrigerator is determined from the expressions (1) and (2). Setting the water temperature at the output of the diesel in the new value of the outlet temperature from the fridge, finish the calculation of duration $\tau_ц = M_B / G_B, c$, where M_B is the mass of water in the cooling system of a diesel engine, kg; G_B - performance water pump on the warm-up phase, kg/s.

The temperature of the coolant is determined at discrete cycles, which gives the possibility of calculation by setting the dependence $T_B = f(\tau)$.

To reduce the amount of calculations and experiments and most economical of their conduct, applied the method of mathematical planning. Mathematical planning of experiments were performed according to the orthogonal plan of the second order in three variables are varied at three levels.

Verification of developed model for the calculation of heating diesel is based on the main provisions of the thermal transfer of the masses. The

adequacy of the model was carried out by matching the experimental and theoretical dependencies for different ambient temperatures T0 and the rotational speed n of the crankshaft of a diesel engine with a power and a diesel heater $P_{тэн} = 0$.

The simulation values of power of the diesel heater to warm the diesel engine of the locomotive CHME3 should be in the range of 35-70 kW as the most rational for Ukraine with the medium seasonal air temperature during the cold period of the year within 263 0K.

AUTONOMOUS APARTMENT ENERGY CONTROL AND MANAGEMENT ENERGY SUPPLY COMBINED SYSTEMS

Asmankina A., Loria M.
Volodymyr Dahl East Ukrainian National University

Tariffs increase is one of main modern Ukrainian problems, therefore there is a necessity for the energyindependent, autonomous systems creation which will be controlled and managed remotely. The combined systems creation, able to work remotely and regardless of direct energy resorses, will result in the considerable protected level increase from tempreture overfalls and overfalls in the electric system instability.

The aim of research is suggested to combine a few systems types, with the distance control. We will consider the systems in the differentiated kind. The first is dwelling apartment heating system. The dwelling apartment heating and cooling system is exactly that buildings engineering providing industry, in which principles «Intelligent building» or «clever house» began inculcated at first, because it is a main buildings exploitation expenses item. An expencive equipment and editing must be counted on enough large burn-time on a refuse. The heating system must provide correct temperature in a house, reacting on a drop in temperature or thaw. Taking into account a temperature outside a house, the system must regulate work of all heater elements so that in an apartment a temperature remained a maximally comfort and optimum. The space-heating system with a built-in intellect will allow substantially to save money facilities. The heating market equipment makes gaudy advantageous price suggestions, and prices on energoresursy grow steadily. Warm is given by a pump through distribu-

tors to every device individually, that provides any radiator heat emission adjusting possibility.

Heat-pump works principle is simple enough. It's essence is taken to the most essential work detail - compressor. A heat-pump is squeezed by the dissipated heat (lowpotential) by a compressor. Thus, thermal cool water energy or air due to more compact volume has more high concentration and, consequently, temperature. And in practice it looks so: under earth there are waters. The such water temperature is stably high - about 10 °C. Since a heat-pump will do the work (compression), a water temperature on an output in a heating contour will be already 60°C. It is necessary to notice that directly water is not added a compression. A mediator - freon which is temperature-sensitive compresses. It easily will take away warmly at ground-water through a vaporizer (from 10°C through a freon contour it will be selected about 4 °C and also well gives the got heat a heating contour through a condenser.

The second system is the autonomous power supply system. A energy consumption problem was and will be actual at any time. Adding to the system a few autonomous energy (for example, sun panels, wind turbines) and accumulator sources is increased by the systems work stability. The photo-electric elements and sun collectors production develops in various directions. Sun batteries are different size: from built in microcalculators to the occupying roofs cars and buildings. The Sun - ecologically clean energy source which does not contaminate an environment. Sun panels exploitation does not result in the extrass of hotbed gases or wastes formation, sun energy is inexhaustible, unlike the traditional fuel types, sun batteries after setting require minimum service and produce energy without man participation, similarly among other dignities of batteries on sun energy it is needed to mark the protracted service term. It makes - 25 years and more without operating descriptions worsening. And yet the sun energy use is subsidized the state. For example, in France for house battery setting compensated to 60% from a cost.

A necessity to set a wind turbine near a private house can arise up in two cases - if the centralized power supply is not present quite or it abandons to wish the best or you decided substantially to economize on payment for electric power. Wind - ecologically clean endless source energies which humanity uses already thousands years. Technique progress trends simply specify on the use perspective for the complete or partial house supply electric power and heat of various alternative sources: sun panels, wind generators, thermal konvectors, new effective materials for thermo-insulation.The inexpensive and effective system for the fully creation energyindependent dwelling from science fiction gradually grows into an enough widespread

technical decision, and a wind turbine can appear in it meaningful elements.

Another system is offer wind generator, as additional electric energy source. Power that wind generator depends on current power of air, by the determined wind speed and blown area. Wind turbine possible with lightness to use for autonomous feed providing various domestic users for the irregular central energy supply serve or at his absence. Except for it, is necessary to know that such devices can be used everywhere: for apartment illumination, for functioning various kitchen electric devices, audio- and TVtechnique, technical means and equipment, domestic electric appliances, pumps. On the average for a year a low-powered wind generator (to 5 kWt) is able to produce 12000 kW. This energy, got from such wind turbine, will be enough for small production providing, middle dwelling-house, technical service, farm, shop station.

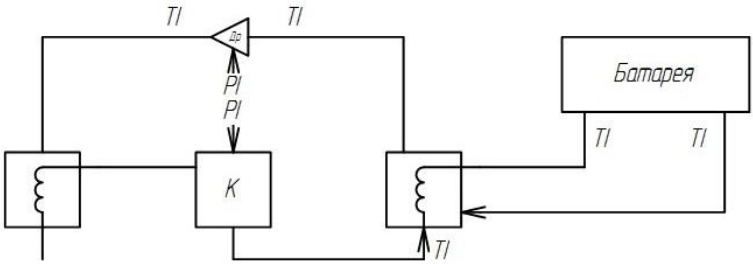


Fig. 1. Trial laboratory setting

For the leadthrough of alpha tests setting which consists of compressor K, batteries, was developed, throttle Dr, temperature sensors systems Ti and pressductors PI. For liquid motion on pipes a pump is foreseen on the laboratory setting entrance. Water, entering setting passing through a compressor, where a compression and coolagent steams moving is, as in the refrigeration settings. At the steams compression there is not only pressure increase but also temperature. After a compressor the compressed refrigeration agent enters condenser, where the compressed gas cools down and grows into a liquid, a liquid after through a choke device enters vaporizer (its pressure and temperature goes down thus), where it boils, passes to the gas state, the same taking away warmly from surrounding space. After it the coolagent pair enter again compressor for the cycle reiteration. Thus, on an output water will have a temperature much higher, than on an entrance, what provides radiator heating. The liquid further used and reducing a temperature passes through a throttle, for hydraulic resistance creation the

liquid stream. Additional hydraulic resistance is created due to the liquid stream communicating section change. The hydraulic resistance change is create the necessary pressures overfall, that results in the yet greater stream temperature decline.

Conclusion. This job performance is the development and pilot laboratory plant testing. Sun and wind power technologies, environmentally clean and accessible, fully can replace or complement the traditional energy receipt methods. The autonomous energy supply systems existent developments analysis and producible equipment descriptions allowed to expose this area trends basic progress, form perspective direction testimonies fluidizer removal practical realization from sensors.

FORMALIZATION OF MICRO-LOGISTIC INDUSTRIAL TRANSPORTATIONS CONTROL SYSTEM

Babushkin G., Kuz'kin O., Kaplunovska A.
Zaporizhzhia National Technical University

Delivery process of cargoes in the industrial transport is organized by workshop workers, supplement and management departments and other structural units of the plant. Providing the operative information about the delivery process, electronic documenting and control of the stock levels is needed. There is a necessity in the development of theory and solving methods in the logistic management of the industrial transportations with taking into account their features. Nowadays the experts and scientists discern several types of logistic: procurement, industrial, distribution, commercial, storage and other. Transport logistic is also considered [1, 2].

One of the functional areas of transport logistic is the control systems of cargo delivery process in industrial enterprises. The main task of these systems is providing of the production process by required materials, fuel and accessories just in time with determined quantity, range and readiness for usage in production workshops and sectors on condition of minimal consumption of workers, material, and energy resources.

It is recommended these steps to design of micro-logistic industrial transport systems:

1. The framework of the basic logistic chain with differentiation of departments which involved in cargo delivery transportation control process in current conditions.

2. Detection (researching) logistic system components by each subdivision: technical facilities, functional processes, control actions, logistic operations and tasks and their performers.

3. Technological and organization analysis of delivery process for the base logistic chain.

4. Development of principles for prospective system transformation in information flows and documentation.

5. The composition of a framework for the prospective micro-logistic system.

6. Exploring the micro-logistic system and design of prospective control strategy.

Due to operational planning and scheduling of gather and delivery process, the required transport fleet size was decreased to 32-38% as well as dwell time of transport vehicles was reduced to 38-43%.

Implementation of a micro-logistic system named "Delivery process of small-part cargo consignments to workshops of OJSC "Zaporizhzhstal" made possible to reduce the operational transport fleet size on 14 vehicles and decreased the daily fuel consumption on 0,5 tons. At the same time, the level of transport service of industrial workshops had been improved; cargoes safety and work culture had been refined. Micro-logistic control system named "Inter-department transportation of technological cargoes" implementation on two engineering plants resulted in reducing the electric car fleet size in 2-2,5 times.

References:

1. Anikin B. A. Logistika / A. B. Anikin. – M. : IN-FRA-M, 1997. – 326 s.
2. Sokur I. M. Transportna logistika / I. M. Sokur. – K. : Centr uchbovoi literaturi, 2009. – 222 s.

INCREASING CONSUMER PROPERTIES REGULATED CROSSROADS OF CITY STREET AND ROAD NETWORK

Baranov I., Baranova V., Taratoryna A., Korolenko T.
Volodymyr Dahl East Ukrainian National University

In last decade, as level motorization has increased, many cities in Ukraine have faced problem congestion and long delays in vehicles on street-road network (UDS). On UDS large cities, the places of occurrence

such problems are, as a rule, regulated intersections (RP) that determine carrying capacity and other consumer properties, streets and roads of regulated traffic. Obviously, with further increase in level of motorization in Ukraine, these problems will worsen, therefore one tasks transport strategy of Ukraine until 2030 is to eliminate "bottlenecks", which include isolated regulated crossroads (IRP), where conditions, regimes and Composition traffic flows. The above points need for development theory and practice of methods for improving consumer properties regulated intersections.

The values theoretical throughput (saturation flux) lane on the RP used at present in Ukraine were adopted more than 30 years ago.

Estimating the throughput traffic lanes in RP significantly affects adoption of optimal solutions for both design streets and roads regulated traffic, and for detailed planning RP.

In this regard, study and improvement methods for assessing and improving consumer properties urban-urban IDU on basis research on current composition and modes of traffic flows is very relevant.

To the consumer properties as parameters traffic management number requirements are presented [1]:

• they must be quantifiable;

• allow for accounting with eligible costs;

• Significance - time required to take into account these criteria should lead tangible economic, environmental or other (established in specific conditions) effect;

• susceptibility changes in parameters traffic flow;

• cover maximum possible number factors affecting traffic conditions.

In order determine what consumer properties in which cases belong one or other group, it is necessary consider domestic and foreign experience assessing consumer properties at regulated intersections.

To determine practical throughput disturbance, taking into account all factors influence, a large amount initial data is required. The most difficult and ambiguous is calculation bandwidth of lanes for conditionally compatible flows. Modern methods calculating bandwidth band for conditionally compatible turns right in American and German regulations give similar values throughput. The difference in calculating lane bandwidth for conditionally compatible left turns in HBS 2001 and HCM 2000 is significant [2,3]. To substantiate methodology for calculating bandwidth band for conditionally compatible flows in the conditions of Ukraine, an additional study is needed.

The main parameters determine bandwidth bands on disturbance are the time intervals between vehicles and effective (used) duration resolving

signal. The study time interval dependencies for modern road transport conditions in Ukraine and determination theoretical bandwidth lanes on SRI with their help are main tasks of this work.

The throughput IRP has significant impact on such consumer properties as road safety, environmental and economic indicators [4]. As main consumer properties regulated crossroads on street-road network cities, both in Ukraine and abroad, bandwidth, loading rate, delay time, queue length are used. All these indicators, which can be attributed transport consumer properties, calculated and dependent on saturation flux.

References:

1. Bahtina O.N. Razrabotka metodov rascheta i ocenki zatorovyh sostojanij transportnogo potoka na ulichno-dorozhnoj seti gorodov: avtoreferat dissertacii na soiskanie uchenoj stepeni kandidata tehnicheskih nauk / O. N. Bahtina, Volgograd, 2006.
2. Kobbelör D., Dissertation, Dezentrale Steuerung von Lichtsignalanlagen in urbanen Verkehrsnetzen, Institut für Verkehrswesen, Universität Kassel, Schriftreihe Verkehr, Heft 18, 2007.
3. Küchler R., Verkehrsplanung, Teil: Strassenverkehrstechnik, FH Köln, Fakultät für Bauingenieurwesen und Umwelttechnik, 2003.
4. Lagemann A. Vorrang für Busse und Straßenbahnen an Kreisverkehren, vom Fachbereich Architektur / Raum- und Umweltplanung / Bauingenieurwesen der Technischen Universitat Kaiserslautern zur Verleihung des akademischen Grades Dr.-Ing. genehmigte Dissertation, 2004.

SELECTION RATIONAL VARIANT NETWORKING PLAN FORMATION OF ONE-GROWING TRAINS

Baranov I., Bragin N., Korsun T., Pasechnik O.
Volodymyr Dahl East Ukrainian National University

Railway transport is characterized by uneven operation. Uneven operation is caused by large number factors. They can be divided into three groups: economic, technical and organizational.

Economic factors include fluctuations in output enterprises associated with seasonality production, changing links between production and consumption areas, customs operations, concluding transactions for supply products and goods, etc.

Technical factors include random nature of train formation at train formation stations, routing shipments by kind cargo, which entails an increase in unevenness approach wagons for unloading, failures of technical means. Organizational factors include established operating modes enterprises (breaks at weekends and holidays), provision "windows" for repair and reconstruction works, thickening supply trains points of delivery before reporting hour, availability passenger trains in traffic schedule, etc.

The sustainable operation rail transport and economy our country are closely interrelated. At same time, reforms carried out on railway transport brought number tasks to industry. One most important problems is the reduction cost transportation, in which system of rational organization car traffic flows occupies key position [1,2].

The system organizing traffic flows both at network and road levels is one most important technological tasks, from correct solution which depends not only load technical stations and network sections, but also delivery time, which is fundamentally important for operation railway network in modern market Conditions.

To date, sufficiently large number methods have been developed solve problem choosing rational version plan for formation one-group trains. However, all methods known date do not take into account main factors that can significantly affect obtained version plan formation of single-train trains [3].

Among most important limitations that should be taken into account when choosing rational plan for formation one-group trains are following:

- the total train traffic on district link design assignment network should not exceed given capacity this link allocated for passing through single-group and district trains.
- wagon flow, entering processing, should not exceed processing capacity slide.
- the number trains passing through park of departure transit park should not exceed capacity this park.
- the number assignments one-group trains should not exceed number of sorting routes allocated for accumulation wagons.

The following information is required initial information:

- estimated transport network and its technical and economic characteristics;
- chess (matrix) initial carload streams;
- a variety acceptable assignments.

The calculation should be carried out on network schedule appointments, number of appointments which include not only assignments through

single-group trains current formation plan, but also virtually any number additional appointments that are determined by expert procedure [4].

The settlement network railways is determined not only by its spatial configuration, but also technical and technological characteristics, including those necessary for calculating network plan formation single-train trains.

References:

1. Vorob'ev H.A., Skripnikov B.E. Racional'nye shemy dvizhenija passazhirskih poezdov. «Zheleznodorozhnyj transport», 2007, №2.
2. Polyncev E.P. Tehnologicheskie osobennosti prigorodnyh zheleznodorozhnyh perevozok v uslovijah rosta krupnyh gorodov. LIIZhT, 2010.
3. Vozmozhnosti snizhenija izderzhek pri jekspluatacii prigorodnyh uchastkov na zheleznyh dorogah Germanii..-l996.-45, №9.-c.535.
4. Beshheva N.I. Sravnenie otdel'nyh vidov tjagi v prigorodnom passazhirskom dvizhenii. M., «Transport», 1996. Tr. VNIIZhT, v'sh.358.

EXTRACURRICULAR ACTIVITY OF THE STUDENTS OF NON-HUMANITARIAN SPECIALTIES IN THE UNIVERSITY THEATRE STUDIO

Barvina N.
Volodymyr Dahl East Ukrainian National University

In the context of our modern society spiritual crisis, the upbringing of morally and culturally oriented younger generation, its ethical and aesthetic ideals formation is an extremely urgent task a higher school teacher is facing nowadays.

P. M. Yershov stated that “a man, completely devoid of spirituality is a pathological phenomenon" [1, 274]. So, for the personality all-round development it is not enough to contribute her/his training as a high-qualified professional in a certain field of science and technology. Equally important is the development of human, social and cultural qualities of a specialist, since the basis of education is upbringing, "upbringing of a man of culture, a citizen and moral personality" [2, 10].

A famous educator and philosopher S. Hessen noted that an individual is formed only through the culture. Culture is the sphere of a society spiritual life, covering, first of all, the system of upbringing, education and creative work, as well as the institutions and organizations providing its

functioning: comprehensive schools, universities, clubs, museums, theatres, etc. At the same time, culture is defined as the level of education, upbringing, as well as the level of mastering some area of knowledge or activity. The culture issue is the issue about the degree to which a man creative nature reveals itself in one or the other factors. From this point of view, perceiving the cultural traditions creatively, a man begins creating in a new fashion, not traditionally, but innovatively, heuristically creatively, productively. Culture is becoming not only the way of a man creative activity, but the form of total production. [3, p. 179].

A key principle of upbringing by culture, according to Bekh, is the principle of value orientation, the implementation of which involves attracting people to interact with the world around them and contributing to formation of valuable attitude to this world from the modern culture perspective [4, p. 14]. The process of cultural values assimilation passes through a person acquaintance with the different types of art: literature, music, architecture, sculpture, decorative-applied art, painting, choreography, and, of course, a synthetic form of art combining all the types mentioned above – theatrical art. When interacting with art, walking the path of forming modern society member, a personality accepts values expressed in culture.

The well-known French philosopher Levi-Strauss noticed that "XXI century will be the century of the Humanities, or it will not be at all. We must understand this; otherwise we will not be able to continue using the results of the other sciences." This idea confirms the existing need to humanize the representatives of different specialties, to form the art and aesthetic needs of future scientists, namely the students of non-humanitarian, technically and technologically oriented faculties of the University. Why are these students the target audience for such purpose? Typically, educational programs give out a little time for academic disciplines playing an important role in the development of aesthetic and spiritual needs. That is, during the curricular activity it is practically impossible to provide an opportunity for comprehensive development and deep, engrossing immersion in the wonderful world of art for the students of non-humanitarian faculties. In this case, such type of educational work, as extracurricular one, comes to help the University teacher in dealing with this complex issue, becoming an integral part of the higher educational process. Extracurricular activities provided by the students' theatre studios and creative clubs deepen socio-cultural knowledge of the students by covering a wide range of problems and issues being beyond the curriculum and not be usually considered in the classroom. In addition, this type of work is not always regulated in time, so it allows the University teacher giving each participant the amount of time he/she needs and choosing the activities preferred by this student, necessary

for his / her personal art-aesthetic development and, in this way, achieving the desired results.

"Nowadays the need for innovative breakthrough advances those who are able to mobilize the forces, who want to sacrifice...who have enough will to exist in the mode of continuing education as an ongoing personal renovation. Readiness for such continuing education-renovation is a mobilization of personal integrity able to lead to spiritual transformation. ...Such readiness should be achieved in any educational process, so that it leads to the real change – transformation of the student's personality, placing it in a state of continuous transition from the passive consumer of knowledge to Creator, able to apply this knowledge and to develop the new ones. Student theatre can enhance and even create willingness to continuously renovated transformation."[5, 235]

The participants of the students' theatre-musical studio "Magic Pie" of V. Dahl East Ukrainian National University have the possibility of such renovation-transformation. It should be noted that the youth studying at the non-humanitarian faculties of the University are the most active studio participants. This form of extracurricular activity is of great practical use to the students, because its main **principles** are: close association with the modern life on the one hand and with the humanity history on the other; communicative activity; taking into account students' age peculiarities; combination of individual and collective forms of work; **conditions** are: voluntary participation, accessibility, originality of the content, forms and methods of work; real targets, combination of students initiative with the teacher guidance; efficient organization and preparation; **aims and goals** are: the full development of personality, including intellectual, emotional, and spiritual spheres; formation of skills to work in a team; developing skills of public communication; psychological and social adaptation; development of creative abilities; formation of art-aesthetic needs and tastes.

"The need of cognition – of the world, our lives sense and purpose - dominates in the category of spirituality....In the process of cultural-historical development the need of cognition has given birth to science and art...[1, 20]. Thus, in higher education establishment only the symbiosis of science and art is able to realize the main goal of University education: "to train for the society the specialists having such level, that they could be not only highly qualified experts able for scientific research and its results implementation in any sphere of production, but also highly cultured, creative, intelligent, moral, noble people, capable to broadcast the highest human values into the society" [2, 15]

References:

1. P. V. Simonov, P. M. Yershov, Y. P. Vyazemsky. The origin of spiritual values. – Moscow “Nauka”, 1989, 351 p.
2. Spiritual-cultural values the education of man of culture. Monograph /G. P. Shevchenko, T. L. Antonenko, A.S. Belyh, Y.A. Zelenov, I.M. Karpenko, O.Y. Krsek., S.S. Rashidova, S.F. Rashidov, N.V. Funtikova, O.O. Shykina – Lugansk: Publishing house "NOWLEDGE", 2013. – 332 p.
3. S. U. Goncharenko. Fundamental nature or narrow professionalism //Didactics of vocational schools : Collection of scientific works. — Kiev ; Khmelnitsky, 2004. — Vol. 1. — P. 179.
4. I. D. Bekh. Education of personality: In 2 books. : Personality-oriented approach: scientific and practical fundamentals. — K.: Lybid, 2003. — P. 14.
5. L. N. Koptev. Students’ theatre possibilities in forming readiness for innovations. Cultural Studies and Art Criticism. The news of Russian State Pedagogical University named after Herzen. Periodical, № 92, 2009. – P. 233-239

MAJOR TRENDS OF THE DEVELOPMENT OF SOLAR ENERGY IN CONDITIONS OF TRANSITION PERIOD OF UKRAINIAN ECONOMY

Belovol A., Vasilenko O., Tkachenko M., Gorobets V.
Ukrainian State University Railway transport

The sun, as is known, is the main source of world alternative energy. Its amount exceeds the total reserves that can be obtained using all other sources: oil, coal, gas, peat and other energy resources (only 0,0125% of the solar energy supplied to the earth is enough to meet the needs of the entire world energy sector).

Due to the exhaustible availability of traditional sources (oil, gas, coal) in the foreseeable future, and the steady growth in their value in recent decades, solar energy is entrusted with considerable hopes, and many countries are investing heavily in modernizing and cheaper existing technologies, and searching New technical solutions.

Unfortunately, in the Ukrainian energy sector over the past 15-20 years, favorable conditions for the emergence of breakthrough technologies in solar energy have not been created. At the state level, there is no possibility to stimulate their development at the proper level, as well as subsidize their introduction into the industrial and housing sectors. But an interesting analysis of the direction and dynamics of the development of the world so-

lar energy industry is of interest. Based on this, experts make assumptions about the timeframe and real prospects of ensuring all the needs of the society with solar energy along with oil, gas, etc.

Two main factors that inhibit the intensive application of technologies for obtaining electricity by the photoelectric method are well known:

- high cost of silicon technology;
- bulkiness and high cost of accumulators accumulating excessively generated electric energy.

Since the 70s, silicon technology has fallen in price by 200 times and its energy efficiency has significantly increased. Further increase in the competitiveness of solar energy is closely related to the successful solution of problems in the following areas:

1. Reducing the costs (material and environmental) associated with the manufacture of silicon photocells.
2. Increase in the conversion coefficient of photovoltaic cells.
3. Development of photoconverters of solar energy on the basis of new physical and chemical effects.

Energy accumulators and batteries are a very important component both in the energy sector and in transport. And the reduction in their cost, significantly increase the competitiveness of the "green" energy.

Since 2009, investments in batteries began to increase and cheaper kWh amounted to 32%. Many large manufacturers (Space X, Tesla Motors, Foxconn, LG Chem, Samsung SDI) are withdrawing large financial flows from other areas and are sending to the development of innovative technologies to improve the technical performance of batteries and reduce their cost.

As the analysis shows, the development and implementation of solar energy at the initial stage needs support and stimulation at the state level. The cheapening of batteries depends on the investment of large businesses. In Ukraine in a period of unstable, so-called transition, economy, it is important to seek opportunities for joint research and development; seek investment in large commercial firms interested in developing alternative energy; experience in the implementation of developed countries to adapt to the national energy policy.

SOLVING OF THE TRANSPORT ROUTING PROBLEM USING THE GENETIC ALGORITHM

Bilokin J., Popov A.
National Aerospace University named after N.E. Zhukovsky "Kharkiv Aviation Institute"

Necessity for efficient logistics planning delivery of goods supplied by different companies is regularly increasing. There are a lot of services that are intended to solve the traffic routing problem today. The task of transport routing belongs to some kind of combinatorial optimization problems. And the main task is to define the set of routes from vehicles placed in one or more stores to multiple remote users.

The tasks and methods of transport routing are identified in the report. The existing technologies that can be used to solve the problems of traffic routing are described. The analysis of the existing algorithms is carried out. The modified genetic algorithm is applied to solve the problem of restricted carrying capacity of vehicle routing.

The proposed method for solving the routing problem consists of several stages: the transformation of the original graph of urban transport network (UTN) to some certain type by means of specially modified Dijkstra's algorithm; routing via metaheuristics that is implemented based on genetic algorithm.

Dynamic graph that simulates the changes in bandwidth of streets, one-way traffic areas as well as permanent and periodic turn restrictions, etc. is used as a UTN model. The main factors that determine the delivery costs are route duration and length. Therefore, their linear combination for all transport units is considered as a target criterion. This results in the optimal using of transport resources and thus to the costs optimization.

The program that allows to determine the best routes for a hundred or more clients is implemented. It should be noted that the software implementation of the genetic algorithm requires the input parameters to be specified. Obviously, it is rather difficult to indicate traffic rates and daily intervals accurately. Solving these problems will make possible to detect more accurate results.

References:

1. Grigor'ev, V. P. Marshrutizacija dostavki roznichnoj produkcii v gorodskoj dorozhnoj seti na osnove geneticheskogo algoritma / V. P. Grigor'ev, K. A. Kiselev // Izvestija Tomskogo politehnicheskogo universiteta. – Tomsk, 2007. – №2 (t. 310). – S. 195-199.

INVESTIGATION EFFICIENCY DISTRIBUTION PASSENGER TRANSPORT IN CONDITIONS FUNCTIONING OF RAILINGS RAILWAYS COMPLEXES

Bragin N., Ganja S., Pshikun A., Baranova V.
Volodymyr Dahl East Ukrainian National University

The need development and implementation new management system for rail transport in Ukraine is due new economic conditions and emergence competition between different modes of transport customer, when quality transport services is at forefront. The current system centralized transportation management is oriented traditional technologies, which allow controlling implementation quantitative and qualitative indicators, but not providing an economic assessment technological decisions. The lack an objective assessment work units that affect final outcome economy transportation leads decrease in likelihood of making economically correct management decisions. Therefore, task is set to develop and implement a comprehensive program further improve profitability enterprises "Ukrzaliznytsya."

Analysis current state and operation suburban railway transport in Ukraine has shown that it is in crisis situation. To reduce loss suburban passenger traffic, it is necessary find ways improve efficiency system development suburban passenger traffic, identify set priority tasks, solution which will optimize parameters osystem for development passenger traffic on railways; Increase competitiveness suburban rail transport; Reduce cost transporting passengers while improving quality transportation and providing additional services suburban passengers. Analytical methods for calculating siz movement suburban trains, determined only by amount of passenger traffic, do not fully reflect specific features suburban transportations, do not take into account requirements stationarity, track development zone stations, and passenger losses associated with waiting for trains [1,2].

The dimensions commuter trains on section must ensure development assigned passenger traffic during hours intensive and non-intensive periods if following conditions are fulfilled: equality number "threads" arrival and departure trains for each turnover station, which is prerequisite for organization turnover of rolling stock; The correspondence number trains that are idle at traffic stations, road development these stations; Minimum costs associated with implementation of transportation.

Calculation size movement is advisable carry out comprehensively for all periods day, determining an economically advantageous option that takes into account total costs rail transport for transportation, loss time passengers waiting trains, and introduction "train" trains into the schedule [3,4].

The most effective way calculate size movement commuter trains on site is mathematical modeling. The problem minimizing function under appropriate conditions is an integer linear mathematical programming problem that can be solved by one known numerical methods. Such method calculation makes it possible increase competitiveness rail transport, reduce its losses due transition some passengers alternative modes of transport. In course research it was found that in order reduce costs rail transport for organization passenger transportation, it is advisable commission, in addition largest capacity trains (twelve-train trains), trains reduced capacity (ten-, eight-, six-tiered electric trains) during non-intensive periods day [5].

Improving management transportation process envisages implementation new management model based on economic criteria with concentration functions vertically integrated system in terms of management levels, with subsequent transition organization transportation by "solid strings" of train schedule.

Based on analysis existing management system, a structural chart organization transportations based on solid train schedule and rolling stock identification system has been developed.

References:

1. Polyncev E.P. Tehnologicheskie osobennosti prigorodnyh zheleznodorozhnyh perevozok v uslovijah rosta krupnyh gorodov. LIIZhT, 1982.
2. Vozmozhnosti snizhenija izderzhek pri jekspluatacii prigorodnyh uchastkov na zheleznyh dorogah Germanii..-l996.-45, №9.-c.535.
3. Koncepcija ta programa restrukturizaciï na zaliznichnomu transporti Ukraïni. – Kiïv: Derzhavna Administracija Ukrzaliznici, 2008. – 145s.
4. Direktiva radi Єvropejskogo Spivtovaristva vid 26.02.2001r. №2001/12 „Pro rozvitok zaliznic u Єvropejskomu Spivtovaristvi”.
5. Dovidnik osnovnih pokaznikiv roboti zaliznic Ukraïni (2005-2012 roki) / L.I.Pasechnik, O.V. Kurgans'ka, O.R. Fesovec' i dr. – K.: Golovne upravlinnja informatiki ta statistiki, 2012. – 43 s.

MODEL OF CHOOSING THE OPTIMAL ROUTE OF RAW MATERIAL DELIVERY FOR METALLURGICAL PRODUCTION

Bulgakova J., Khavalits S.
SHEI "Priazovskyi State Technical University"

Regular providing of metallurgical production with raw materials is important not only from the point of view of maintaining a continuous production process and reducing logistic costs, but also to avoid production stopping, which under certain conditions makes further production impossible without replacing equipment and assemblies.

This problem is viewed on example of iron ore supply to metallurgical enterprises of Mariupol, because of it's importance in the current political and economic situation. Earlier, iron ore was supplied to the region by rail from Kryvyi Rih. At the moment, the railway stage Kamysh-Zarya-Volnovaha does not provide the required capacity and the Donbass railway is exposed to risks as never before. There was a need to search for alternative intermodal routes for iron ore delivery included cabotage transportations.

Based on the analysis of transport infrastructure of Ukrainian sea ports, six possible delivery routes were identified. In these routes iron ore from the supplier (S) to the first transshipment port and from the second transshipment port to the consignee (C) is transported by rail: R1. S - port of Nikolaev - port of Mariupol - C; R2. S - port of Nikolaev - port of Azovstal - C; R3. S - port of Yuzhny - port of Mariupol - C; R4. S – port of Yuzhny – port of Azovstal - C; R5. S – port of Berdyansk – port of Mariupol - C; R6. S – port of Berdyansk – port of Azovstal - C.

To make a decision on the optimal delivery route it is necessary to solve a multicriterial task with quantitative and qualitative criterions.

Based on the analysis of peculiarities of existing iron ore supply chain organization, the following delivery routes evaluation criterions were chosen: 1. Transportation costs of 1 ton of iron ore (TC); 2. Transportation distance (TD); 3. Delivery risk (DR).

As a mathematical tool for solving the stated problem Mamdany's fuzzy inference (MFI) was chosen, because the decision-making process is linguistically uncertain. The reasons of such uncertainty are qualitative criterions for alternatives evaluation and the subjective component of decision makers [1].

Input data for MFI are:

1. Crisp values of input linguistic variables (which are the criterions of alternatives evaluation). In order to obtain routes rating indexes on the

criterion "transportation costs of 1 ton" and "transportation distance", TM-Map software (for calculating the distance and costs of rail transportation part), Sea Rates (for calculation of distance and costs of sea way transportation part). Routes rating indexes on criterion "delivery risk" were obtained by an expert method based on the analysis of factors: number of reloading operations in ports; possibility of an emergency route change; passing of the Kerch passage.

2. Membership functions of terms of input and output linguistic variables, which directly express the expert opinion of the decision maker regarding the problem under consideration. A Gaussian type of functions were chosen, which is specified by two parameters: extremum and concentration coefficient. Functions include three terms: good (G), satisfactory (S), bad (B). The function extremum of term "good" of linguistic variable "transportation costs of 1 ton" is set at 15% of transportation costs from the total purchase price, the extremum of term "satisfactorily" is fixed by the maximum permissible part of transportation costs, which allows maintaining a cost-effective the price for iron ore and does not exceed 40%. Extremum term "bad" is associated with the part of transportation costs of 60%, which is generally considered a break-even level. The output linguistic variable is "logistics costs" (LC). The graphs of LC membership functions are set according to the scale of qualitative indexes, as well as the graphs of membership functions of internal variable "delivery risk" [1]. The parameters of membership functions are given in Tab. 1.

Table 1

Parameters of membership functions of internal and external linguistic variables

Term	F(TC)	F(DR)	F(TD)	F(LC)
G	[1.804 7.5]	[0.02381 0.9]	[51.05 323]	[0.09181 1]
S	[2.44 20]	[0.0285 0.8]	[56.24 488]	[0.04757;0.63]
B	[1.281 30]	[0.03633 0.65]	[130 1000]	[0.0702 0.37]

3. MFI rules base, which also introduces subjective attitude of decision-makers. The rules base is defined on the basis of the logical operator "AND" [2]. An example of one of the rules: if TC is "good" and TD is "bad" and DR is "bad", then LC is "satisfactory".

The model creation and implementation of the main stages of MFI (fuzzification, aggregation, activation, accumulation, defuzzification) [2] were performed using software MatLab Fuzzy Logic Tool Box. The result

of MFI calculation is crisp values of indexes for all routes on criterion "logistics costs". The following routes values were obtained: R1 - 0.339; R2 - 0.339; R3 - 0.342; R4 - 0.339; R5 = 0.36; R6 - 0.339.

The alternative is chosen based on the maximum value of the output linguistic variable "logistics costs". The best alternative is R5 – the delivery route with transhipment in the ports of Berdyansk and Mariupol.

The research result is solution of applied problem and obtaining of scientifically grounded decision on choosing the optimal route of iron ore delivery to the metallurgical enterprises of Donbass using the methods of multi-criteria decision making and the theory of fuzzy logic. The described methodology is not universal, since it takes into account the specifics of particular supply chain, but the main stages of its implementation can become the basis for solving similar problems.

References:

1. Leonenkov, A. V. Fuzzy modeling in the environment of MATLAB and fuzzyTECH / A. V. Leonenkov. - St. Petersburg. : BHV-Petersburg, 2005. - 736 p.
2. Shtovba, S. D. Designing of fuzzy systems by means of MATLAB / S. D. Shtovba. - M.: Hot line-Telecom, 2007. - 288 p.
3. Sodenkamp, M. Models, Methods and Applications of the Group Multiple-criteria Decision Analysis in Complex and Uncertain Systems: dissertation / M. Sodenkamp. - Paderborn, 2013. - 221 p.

LE RÔLE DES FACTEURS HUMAINS SUR LA SÉCURITÉ DU TRAFIC FERROVIAIRE

Bourtseva J.

Le chargé de cours, le vice-recteur du travail scientifique de l'institut régional de Donetsk d'études supérieures pédagogique

Il est généralement admis que la sécurité routière sur le transport en général, y compris sur ferroviaire en particulier, un des problèmes les plus actuels, directement dépendant d'un soi-disant facteur humain, le poids spécifique de qui parmi les raisons des incidents de transport atteint 90 % et plus. La notion le facteur humain se caractérise par une extrême polyvalence et la complexité. Théoriquement à cette notion on peut insérer tous les

phénomènes dans les organisations de la sécurité routière d'une manière ou d'une autre liée à la personne.

Cependant l'application pratique de la notion le facteur humain est réduite, en général, vers la recherche de ses manifestations les plus simples, évidentes et grossières. D'autre part le facteur humain – le phénomène extraordinairement polyèdre et complexe cédant à l'analyse rarement assez de profonde.

Les résultats des observations et passé du modelage de la situation avec l'utilisation de l'approche fonctionnelle psychodynamique (AFPD) montrent qu'il y a trois facteurs, qui définissent dans une grande mesure la qualité des décisions des spécialistes de la composition de l'équipe de locomotive. C'est l'intérêt, la volonté et la morale.

Les facteurs – la morale, la volonté et l'intérêt sont à la base de toute la conduite professionnelle. Il est nécessaire d'examiner la triade seulement dans l'unité et la corrélation : s'il n'y a pas d'intérêt – la personne ne dirige pas la volonté sur la décision des problèmes existant ; s'il n'y a pas de volonté – on ne peut pas réaliser l'intérêt apparaissant, et s'il n'y a pas de morale – l'intérêt et la volonté conduisent aux actions dangereuses et inefficaces.

La morale, la volonté et l'intérêt, qui sont les facteurs clés pour assurer la sécurité la conduite des spécialistes de la composition des équipes de locomotive, pour l'acquisition du succès de leur activité, ne sont pas suffisantes. Si analyser les actions de tous les facteurs énumérés dans l'unité et la corrélation, on verra que seulement leur optimisation complexe peut amener à l'effet fini de la sécurité des actions faites et par cela vers un haut niveau du succès. C'est pourquoi, en formulant « les facteurs du succès », il est nécessaire de prendre en considération qu'ils ont le caractère plus inclusive et unissent tout l'ensemble des facteurs clés et secondaires de la formation de la conduite humaine. Les observations et le modelage montrent que seulement le développement harmonieux de la personne dans la relation morale résolue et la formation de ses intérêts, avec la préparation parallèle professionnelle, psychologique et physique, peut être une bonne base pour le futur succès de ses actions.

La réduction du nombre des incidents de transport grâce à facteur humain peut être atteinte :

- par voie de l'élaboration de tels équipements, qui assureraient le fonctionnement sans pannes des transports ferroviaires grâce à perfectionnement de la technique ;

- le perfectionnement de la sélection et la préparation des équipes de locomotive, l'amélioration des conditions de leur activité professionnelle.

Pour parvenir de la haute productivité et la sécurité dans n'importe quelle affaire, chaque spécialiste doit se distinguer par une haute morale, et cette morale doit être renforcée par les connaissances variées, l'expérience, la culture, la foi. La volonté doit être la constante et amener à l'obstination dans le parvenir du but posé, et l'intérêt doit être haut et amener à l'activité.

IMPROVEMENT OF CONSTRUCTION AND ANALYSIS TRAIN SCHEDULE BASED MODELING PROPOGATION DELAYS ON THE RAIL NETWORK

Butko T., Prokhorchenko G., Moskalenko O.
Ukrainian State University of Railway Transport

In terms of reform of Ukrain railway according to plan the implementation of EU Directives in the rail sector, approved by the Cabinet of Ministers of 26.11.2014 №1148-p [1], and accepted the direction of separation of infrastructure management and operation of railway infrastructure is presented to the owner topical issue of quality of transport services, one component of which is the reliability of the train arrival time at the final station of the route. Under such conditions, it is especially important the introduction of the automated system design and analysis of train schedule [2].

Under the current approach in analyzing the schedule of trains on the railways of Ukraine it is received to determine its quantity and quality, but insufficient attention is paid to accounting and the impact of delays in train stations and their spread across the ground rail. The experience of rail transport across the world, analysis of distributing schedule delay. It is important for evaluating the reliability of the train schedule and deficiencies in the development of hydraulic fracturing [3].

To solve the problem of analysis of trains' schedule in terms of propagation of trains' delays on the first stage of the work it is proposed to investigate the influence of the delay on the reliability of trains' schedule on the railway line and further impact for interfering railway lines.

For the study it isproposed to apply the optimization of mathematical model on the basis of bee colonies, which provides a efficient schedule on station for given input parameters and constraints and for minimizing the total downtime of trains at stations, the stopping time the train and the cost of fines for failure policy following trains through the station. Within the study

procedures delayed impact this mathematical model proposed to use as the basis of simulation, in which randomly generated value and delay recovery of the train and then performed construction management based fracturing failures and calculated statistical parameters of distribution delays. Found on a statistical approach parameters distribution delay laws to neighboring stations and stations on the reaction of absorption is input to the second phase of research dissemination delays at the landfill rail network.

The second stage involves propagation delays modeling on the railway ground similar to modeling spread of epidemics. The most acceptable is the use of mathematical models based on the SIR (Suspected-Infected-Recovered, eng.) [4]. This model is characterized by three types of facilities management, infected (I), in this case implied decimal delayed trains in motion; not infected (S), that mins trains follow without delay in movement; and objects that are immune and recovered (R), that trains were delayed on the stretch in the middle section, but through the use of reserve time in motion followed last scheduled polling station.

The results of modeling propagation delays enable network-level assess the impact of delayed trains, explore the dynamics of the number of detainees trains on the value of the delay and assess the effectiveness of various measures to avoid delays of trains and improve the procedure for constructing strings schedule of trains.

References:

1. On approval of the plans developed by the Ministry of Infrastructure implmentatsiyi some legislative acts of the EU rail transport (Cabinet of Ministers of Ukraine dated 26 November 2014, the. Number 1148-p) [electronic resource]. - The official website of the Verkhovna Rada Ukraine.- Access: http://zakon2.rada.gov.ua/laws/show/1148-2014-%D1%80.- name from the screen.
2. Butko TV Scientific approaches to formalize the process automated scheduling of freight trains / Butko TV, Prohorchenko H.O .// Proceedings of Ukrainian State Academy of Railway Transport. - Kharkov: UkrDAZT, 2012. - Vyp.131. - S.31-37.
3. Rob M.P. Goverde.Delay Propagation and Process Management at Railway Stations/ Rob M.P. Goverde, Ingo A. Hansen// World Conference on Railway Research (WCRR 2001). – Köln, 2001. –Document 175. –P.1-10.
4. Matt J. Keeling. Networks and epidemic models/ Matt J. Keeling,Ken T. D. Eames//Journal of the Royal Society InerFace. – Cambridge: 2005. - 2. P 295–307.

IMPROVED METHODS DEFINITIONS SCHEMES CIRCULATION LOCOMOTIVE

Butko T.[1], Prokhorchenko A.[1], Muzykin M.[2]
[1] Ukrainian State University of Railway Transport,
[2]Dnipropetrovsk National University of Railway Transport named after academician V. Lazaryan

To increase competitiveness in the market of transit transportation, the JSC Ukrainian Railways needs to improve its strategic railway directions (international corridors) by using an acceleration technology in the traffic handling process for certain specialized railcar traffic. Under such conditions, traffic schemes for traction resources are built not in a general conjunction with all types of railcar traffic but for various specific railcar-traffic groups. The analysis of the practices of independent shipping companies in the railways worldwide allows making a conclusion that when such companies can choose a route for their own railcar traffic in the network with the possibility of traction provided by locomotive depots of different types of ownership, this individual approach to the choice of traction supply for various railcar traffic under the condition of private traction and transportation rights will become increasingly used for traffic on the Ukrainian railways. Thus, the present study suggests formalizing this approach at the level of tactical planning.

The research is aimed at improving the methods of determining the schemes of locomotives' circulation in the railway network of Ukraine under the accelerated handling of individual railcar traffic in view of its technological peculiarities.

To achieve this goal, it is necessary to do the following task:

– to develop a mathematical model to determine a rational scheme of locomotives' circulation within a railway network with the possibility of finding the weight of trains on the railcar traffic route, the circulation schemes for locomotives with regard to deploying the fleet of different series at a network site, and the scheme of locomotive crews' operation [1].

Depending on the role in providing traction service, technical train stations are divided into stations with the main depot, with a turnover depot or a site of locomotives' turnover, and with a change point for locomotive crews [2].

To display the spatial availability of stations with fixed and transit locomotive depots, the set V can be divided into the following subsets: vertices V1, which simulate those stations that have the main locomotive depot

V1⊂V; vertices V2, which denote those stations that allow a turnover of locomotives V2⊂V; and vertices V3, which reflect those stations where there is a point for changing locomotive crews V3⊂V.

The choice of a traction haul from the station with the main locomotive depot is always limited by the series of an assigned fleet of freight train locomotives (for example, VL82m, VL11, 2EL4, etc.), which is essential for calculations.

To solve the complex problem of traction, it is necessary to determine the weight standard for a freight train of each railcar flow *k* to specify the speed, the rolling stock length, the number of trains on a railway route and, consequently, the arrangement of traction servicing of railcar traffic.

Given that a traction arrangement is built for each individual railcar flow *k*, the costs of moving the rolling stock and performing station operations can be calculated only for the route direction of a particular railcar flow, which makes it possible to fully evaluate the effectiveness of the selected option and to simplify calculations. Refusal to calculate costs for the opposite direction can be explained by the immutability of these costs, as the locomotive fleet, after the main technological process of transporting, can be used for servicing local traffic volumes N_s^{aft}, which in turn will cover the cost of its turnover in the predetermined pattern. However, it is important for the calculations to take into account the condition of a deviation from the constant costs in the reverse (unloaded) direction due to the presence of expenses for a reserve run of locomotives in the absence of the required number of local trains for a specific number of locomotives returning from the turn-around sites after servicing the railcar traffic *k* and after sending such locomotives to return-point sites. The described peculiarity is important to consider when choosing a rational scheme of servicing the traction at a site of a railway network.

References:

1. Butko, T. An improved method of determining the schemes of locomotive circulation with regard to the technological peculiarities of railcar traffic [Text] / T. Butko, A. Prokhorchenko, M. Muzykin // Eastern-European Journal of Enterprise Technologies. – 2016. – Vol. 5, Issue 3 (83). – P. 47–55. doi: 10.15587/1729-4061.2016.80471
2. Nekrashevich, V. I. Teoreticheskie aspekty vybora vesovyh norm sostavov gruzovyh poezdov i sistemy tyagovogo obsluzhivaniya napravlenij [Text] / V. I. Nekrashevich, A. I. Ignatov // Sbornik nauchnyh trudov Ros. gos. otkr. tekhn. un-t putej soobshcheniya. – 2008. – Vol. 8. – P. 98–106.

LES CONDITIONS DE LA FORMATION DE LA CULTURE MORALE DES FUTURS SPÉCIALISTES DU TRANSPORT DANS LE SYSTÈME ÉDUCATIF DES ÉTABLISSEMENTS D'ENSEIGNEMENT SUPÉRIEUR DE L'UKRAINE

Vakoulenko V.
Le docteur des sciences pédagogiques, le professeur de l'institut régional de Donetsk d'études supérieures pédagogique.

On sait que la plupart des avaries sur le transport se passe à cause "du facteur humain», par la faute des travailleurs de pas assez qualifié ou responsables. Notamment ces circonstances incitent les professeurs travaillant aux facultés de transport des écoles supérieures de l'Ukraine adresser à la décision d'un important problème pratique – la formation de la responsabilité sociale et professionnelle des futurs spécialistes. Dans ce plan, tout à fait justifié la logique de l'éducation professionnelle des étudiants a l'air :

sont primaires – les normes morales, qui, comme la loi, le contenu et le caractère des relations entre les gens définissent;

ensuite dans cette logique – les sentiments, permettant d'éprouver aux étudiants de l'état du confort, la satisfaction, la joie de l'accomplissement des actes moralement-précieux, les biens, les miséricordes, les compassions;

enfin, l'élément terminant du système – comportemental, permettant de traduire maîtrisé et intériorisé (senti profondément!) Les normes et les règles aux clichés stables et les algorithmes de la conduite et les relations.

Le développement de la responsabilité professionnelle des futurs spécialistes des transports ferroviaires dans le système d'éducation de l'école supérieure se réalise par la cultivation chez les étudiants de la volonté aux conditions de travail sur le transport, les problèmes réels et les moyens de leur décision dans les conditions complexes et tendues du travail du convoyeur moderne de transport.

L'analyse de l'activité du système d'éducation des écoles supérieures de l'Ukraine et les documents reçus empiriques a permis de définir l'influence des conditions pédagogiques sur l'efficacité de l'éducation professionnelle des futurs spécialistes du transport.

Les conditions psycho -pédagogiques assurent l'atmosphère favorable de l'état de santé psychologique et le confort des étudiants est une humanisation des relations dans le système d'éducation de l'école supérieure; la garantie de la motivation socialement précieuse du développement professionnellement-personnel des étudiants ; le compte des

particularités d'âge et individuelles des futurs spécialistes; le professionnalisme, la maîtrise pédagogique, l'exemple personnel des professeurs etc.

Les conditions organisationnelles-pédagogiques prévoient la définition et l'application des voies les plus effectives et les moyens de l'influence du système d'éducation de l'école supérieure sur le devenir social et professionnel des futurs spécialistes. C'est le développement des formes collectives de l'activité, l'expérience de la perception commune et l'estimation de la vie ambiante ; le réglage "vertical", les coopérations entre les différents âges ; développement des valeurs, les traditions, les normes de la communauté professionnelle des travailleurs du transport et les autres.

Les conditions sociales-pédagogiques contribuent à l'étude par les professeurs et les organismes de l'autogestion d'étudiant au milieu d'éducation de l'école supérieure qui influence activement au devenir de la relation responsable des étudiants vers la future activité professionnelle, vers les réalités de l'être social et professionnel des travailleurs du transport; l'introduction au système d'éducation des affaires collectivement-créatrices de la tendance socialement signifiante et professionnelle; le comptabilité des particularités individuelles des étudiants, le niveau de leur développement personnel professionnel; la garantie de la différenciation et l'individualisation du développement personnel.

PROBLEMS OF WHEEL AND RAIL CONTACT

Voznenko S., Vihopen I., Falendysh A.
Ukrainian State University of Railway Transport

The problem of decreasing the deterioration of wheel pair of rolling stock has been very important lately. In 70-80 years the life cycle of tyre reached 5-6 years,now these indicators consist 2-2,5 years. In this connection, the researchings on a problem of decreasing power and functionalcooperation in the system wheel-rail influence a lot on a safe train traffic. There is the national program of reformation the railway transport of Ukraine for 2007-2015 years, that is aimed to solve this problem.

We suppose that the solution of this problem is impossible without choosing the right working model wheel-rail.

The interaction of awheel pairwith a rail in all known works is being solved like aflat task. The contact spot is submitted like a flat. Though in re-

ality in the result of deterioration of a wheelpair and a rail the contact spot is submitted to be volumetric.

The fact that the features of metal in the zone of harding as a wheel pair and a rail significantly different from the features of metal of rail and wheel pair out of the zone of harding. In the result of deterioration we have interaction both in the zone of harding,a wheel pair,a rail and in the zone of usual metal.

The task of describing the contact spot of a wheel pair with tread of head of the rail seems to be a task, which must take into consideration the next facts. The contact can be in the spot where a wheel pair and a rail are not worn out; in the zone of deterioration either a wheel pair or a rail or in the zone, where a rail is worn out and a wheel pair is not, or a wheel pair is worn out and a rail is not.

Also we can't ignore the presence of different pollutions. They can be both on the tread of a rail and on the tread of a rail pair. The availability of water, pieces of metal, oilyslicks, abrasive dirt. The depth of deterioration of a rail and the depth of deterioration of a rail pair also influence on the character of the contact. Also the characteristics of metal in the worn outzones of the contact as a rail and a wheel pair.

We can make a conclusion: When both a rail and a wheel pair are new and they are in good conditions the contact spot is a flat. But in all other cases this is volumetric, three-dimensional task.

ANALYTICAL PREREQUISITES TO TRANSPORT AND TECHNOLOGICAL SYSTEMS OF TRANSPORTATION OF PRODUCTION OF CROP PRODUCTION

Voronkov O., Rogovskii I.
National University of Life and Environmental Science of Ukraine

Transport, being one of the main components of agro-industrial complex, represents the difficult system consisting of the interconnected elements. Therefore at the choice of a method of optimization of transport and technological process it is necessary compromise between two, at first sight, mutually exclusive provisions, on the one hand, taking into account requirements imposed to problem definition she has to reflect adequately contents and specifics of the studied process. On the other hand, if to consider a

large number of the defining factors at creation of model, her analytical or graphic decision becomes almost impossible.

Thus, at a research of transport and technological process it is impossible to develop a universal method of optimization as the large volume of initial information, assumptions and restrictions lead to obtaining results with a big error. Therefore it is necessary to develop such method of optimization of transport technological support of agro-industrial complex which, being rather simple, will allow to consider a technical and economic basis of a solvable task rather fully.

A number of scientific works is devoted to questions of a research of transport process with application of cost indexes as criterion of an optimality [1, 2]. In favor of natural indicators authors speak, proving the position by imperfection of pricing owing to what, in their opinion, cost indexes depend on market condition and therefore can estimate the actual expenses insufficiently truly. Application of natural indicators can be justified only if they result in the best result on cost criterion. So, at the solution of a problem of definition of optimum completing of harvest and transport group by method of statistical modeling of transport and technological process, recommends to choose for criterion of efficiency a minimum of the given costs of unit of volume of the transported freight in the established agrotechnical terms. In this case the full specific given costs (hryvnia/ton) can be determined by the following criterion function:

$$Z = M_k \cdot \left[\frac{C_{k\bar{l}_e}}{h} + \frac{C_k(\bar{t}_{k0}+t_k)}{\varepsilon_b}\right] + M_a \cdot \left[\frac{C_a\bar{l}_e}{\beta} + \frac{C_a(\bar{t}_{a0}+t_a)}{q_b \cdot \varepsilon_b}\right] \to min.$$

where: M_k – number of combines; M_a – number of vehicles; C_k, C_a – constant expenses for one hour of work of the combine and the vehicle, hryvnia/hour; $C_{k\bar{l}_e}$ – variable costs of cleaning of unit of area, hryvnia/hectare; $C_{a\bar{l}_e}$ – variable costs of 1 km of run of the vehicle, hryvnia/km; q_b – the loading capacity of vehicles expressed in number of the loaded bunkers of the combine, t; ε_b – the mass of grain in the bunker of the combine, t; $\bar{l}_e$ – the average length of an trip, km; β – efficiency of a run.

Approbation of theoretical researches on rational completing of harvest and transport groups on cleaning and export of grain from fields has in actual practice allowed to increase productivity of vehicles by 2–2,3 times and to reduce cost of transportation by 20–30% [3].

In case of restriction of resources in labor, vehicles, it is expedient to time of performance of work to use the criteria of an optimality expressed by natural indicators as they allow:

– to increase labor productivity and to reduce work expenses;

– to increase productivity of the rolling stock and to reduce the need for him.

So, by optimization of an element of transport and technological process – definitions of technically necessary value of duration of idle time of the vehicle waiting for loading of the bunker, as criterion of an optimality accept coefficients of idle time of Q_k combines and the Q_a vehicles.

$$Q_k = \frac{M_l}{M}; \qquad Q_a = \frac{n_l}{n}.$$

where: M_l – the average length of turn of the combine waiting for service; M – the number of combines in crew;n_l – average of the unoccupied vehicles which are in the field; n – total number of the vehicles which are in the field and combines, ready to service.

The received dependences of coefficients of idle time of the Q_a vehicles and Q_k combines allow to determine necessary idle time of the vehicle waiting for loading of the bunker by grain at a preset value of coefficient of idle time of the combine. The technique of determination of duration of idle times of vehicles offered by authors waiting for loading gives the chance to specify performance standards of the vehicles serving harvest units.

It must be kept in mind that at the solution of various tasks each criterion of an optimality has the advantage in comparison with others depending on a goal.

When developing optimum plans of transportation of goods of agricultural purpose one type of transport in similar service conditions it is expedient to apply pro-running criteria of an optimality have relative simplicity and accuracy of their definition that allows to receive the greatest economic result.

Authors of numerous researches have come to a conclusion that it is possible to increase efficiency of functioning of transport technological support of agro-industrial complex due to reduction of transport works that will allow to lower transport expenses and to reduce the need for the rolling stock. So for determination of the maximum productivity of the same rolling stock as criterion accepts a minimum of a total run. According to the author, the plan, optimum on a run, respectively will be optimum on expenses of time and cost under identical traffic conditions of transport.

However at operation of vehicles in various conditions (climatic, road, etc.) use of pro-running criteria of an optimality is inexpedient. Whereas temporary criteria can be accepted by optimization of use of various type of transport in unequal conditions of operation.

References:

1. Role, Usage and Motivation for Contracting in Agriculture // Pavel Vavra / OECD, France. – 36 p. http://www.oecd.org/tad/agricultural-trade/43057136.pdf.
2. Rogovskii Ivan. Analysis of model of recovery of agricultural machines and interpretation of results of numerical experiment / Ivan Rogovskii // Scientific Bulletin of National University of Life and Environmental Science of Ukraine. Series: Equipment and Energy of Agrarian and Industrial Complex. – Kyiv, 2016. – Issue 254. – P. 424–431.
3. Oleksiy Voronkov. Classification signs of vehicles in transport and technological processes of agricultural production / Oleksiy Voronkov, Ivan Rogovskii // Theses of reports of II All-Ukrainian Scientific-Theoretical Conference "Problems with Transport Streams and Directions of Their Decision" (March 16-18, 2017) / NU "Lviv polytechnika". – Lviv, 2017. – P. 17–19.

COMPARISON OF THE EMISSION STANDARDS OF POLLUTANTS FROM EXHAUST GASES DIESEL LOCOMOTIVE ENGINES

Gatchenko V[1]., Falendysh A.[2], Kletska O.[2], Ivanchenko D.[2]
[1]State Economic and Technological University of Transport
[2]Ukrainian State University of Railway Transport

According to the Transport Strategy of Ukraine till 2020 one of the key principles is to ensure environmental safety, mandatory compliance with environmental standards and regulations when conducting activities in the field of transport [1].

In rail transport the main sources of air pollution are diesel engines (internal combustion piston engine) locomotives.

In the field of railway transport in the country has a number of standards governing the emission standards of pollutants from exhaust gases diesel locomotive engines, the requirements for gas analyzers to monitor emissions from transport and others [2-5]. In many countries, standards of pollutant emissions from engine exhaust gases of vehicles have undergone significant changes, so you need a comparison with regulations regarding the standards and methods for determining emission.

In Ukraine in terms of rail transport with environmental safety industry standard operating GSTU 32.001-94 emissions of pollutants from exhaust gases diesel locomotive engines. Norms and determination methods

[2]. Under this standard, emission standards, this value average performance specific values E_{co}, $E_{сн}$, E_{NOx}, $E_{тч}$,, g / (kWh), according to a diesel engine service life (up to two years and more than two years).

In Russia 1.07.1997. was enacted GOST R 50953-96 standard «Emissions of harmful substances and smoke of exhaust gases of main and shunting diesel locomotives. The norms and methods for determining» [6]. This standard establishes standards and methods of determining emissions of pollutants from exhaust gases and smoke new after construction and in use of locomotives to steady their work.

Normalized maximum allowable content C_{NOx} , C_{CO} , C_{CH} in the exhaust gases (volume fraction,%, or mass concentration, g / n × m^3). Tests carried out on five modes that will match the load to idling, partial and full power.

From 01/01/2009 Russia replaced the standard ГОСТ Р 50953-96 for a new standard ГОСТ Р 50953-2008. Emissions of harmful substances and smoke of exhaust gases of main and shunting diesel locomotives. Norms and methods of determination [7]. This standard establishes standards and methods of determining emissions of pollutants from exhaust gases and smoke exhaust gas of diesel locomotives to steady their work. In the updated standard normalized volume fraction of the maximum allowable content C % of nitrogen oxides NOx (converted to NO_2), carbon monoxide CO and hydrocarbons CnHm (calculated on C_3H_8) depending on the setting year in production and post - 2001, with 2006 and 2011. Tests carried out in three modes, must meet the load at idle, partial and full.

From 07/01/2014 in the countries of Belarus, Kazakhstan, Kyrgyzstan, Moldova, Russia, Tajikistan and Uzbekistan enacted interstate standard GOST 31967. Internal combustion engines piston. Emissions of harmful substances with exhaust gases. Norms and methods of determination [8]. Tse standard should be widened on the wikis of gas-suspended shkidlivyh rechovin with ventilation gases at the spent stand of the whip-buoy novices that capitally inspects the vessels, diesel locomotives and promises of piston engines in the internal zgoriannya and set the norms and methods of viznachennya. Zgidno with him normuyutsya boundary admissible value pitomih serednogozvazheni wikidiv oksidiv nitrogen (NOx) in the reduced to NO_2, e_{NOx}, g / (kW hour), carbon monoxide (CO), e_{CO}, g / (kW hour), hydrocarbons (CN) at reduced to $CH_{1,85}$, e_{CH}, g / (kW hour) in exhaust gases during engine bench testing them according to the setting, the engine production (up to that point of 2016).

So established that in different countries, different approaches to rationing maximum allowable pollutant content in the exhaust gases of diesel

engines, which in turn leads to finding ways to bring the standards and methods of calculation to common standards.

Referents:

1. Transport Strategy of Ukraine till 2020, approved by the Cabinet of Ministers of Ukraine (CMU) from 20.10.2010 g. Number 2174-p. [Electronic resource]. - http://zakon5.rada.gov.ua/
2. GOST 32.001-94. Emissions of pollutants from exhaust gases diesel locomotive engines. Norms and determination methods. Effective as of 01.01.1995 p.
3. GOST 2501-94 gases analyzer for monitoring emissions from transport. General specifications i test methods. - Rendered valid by 25.05.1994. - K .: State Committee of Ukraine, 1994.
4. GOST 30574-98. Diesel ships, diesel and industrial. Measurement of emissions of harmful substances with exhaust gases. Cycles of tests. - Enter. 2000-01-01. - Moscow: Publishing Standards, 2000. - 27 pp.
5. GOST 10448-80 Ship's diesel locomotives, diesel locomotives and industrial ones. Acceptance rules. Test methods. - Enter. 1981-01-01. - Moscow: IPK Publishing House of Standards, 1980. - 16 p.
6. GOST R 50953-96. Emissions of harmful substances and smoke of exhaust gases of main and shunting diesel locomotives. Norms and methods of determination. - Enter. 1997-07-01. - Moscow: IPK Publishing House of Standards, 1996. - 17 p.
7. GOST R 50953-2008. Emissions of harmful substances and smoke of exhaust gases of main and shunting diesel locomotives. Norms and methods of determination. - in exchange for GOST R 50953-96; Enter. 2009-01-01. - Moscow: Standardinform, 2008. - 12 p.
8. GOST 31967 - 2012. Engines of internal combustion piston. Emissions of harmful substances with exhaust gases. Norms and methods of determination. - Enter. 2014-07-01. - Moscow: Standardinform, 2014. - 28 p.

ABOUT CREATION OF NEW BOGIE OF THE RAILWAY FREIGHT CAR

Gorbunov M.[1], Nozhenko O.[2], Kara S.[1]

[1]Volodymyr Dahl East Ukrainian National University, Ukraine

[2]University of Zilina, Slovakia

Over a decade, the world's leading research centers have been engaged in improving the running gear of freight cars. For Europe, these studies are carried out within the framework of the EU Road Map, according to

which, in order to reduce the energy dependence of the transport sector and to reduce emissions of harmful substances into the atmosphere, it is planned that by 2030 30% of goods transported by road will be redirected to river and railway transport, and by 2050 50% of freight will be transported by river and railway transport [1].This background requires the introduction of significant innovations and modernization of the fleet of cars, for example, the working program Shift2Rail [2] aims to achieve:

- reducing the weight of the body up to 30% and the weight of the bogie (reducing unsprung weight, which allows to reduce wear, noise and vibration and will reduce by 20% the life cycle cost of the bogie);
- reducing the dynamic impact on the track through the use of active suspension;
- reducing maintenance costs by 20% through the introduction of monitoring systems, mechatronic systems, etc.;
- reducing wheel and rails wear by 25%, including when passing the curved track sections;
- increasing the speed of movement, especially for freight rail transport [3].

Abundantly used in the EU and CIS countries bogie designs, such as Y25, G-type, UIC Link suspension, Barber, have a rich history and have undergone only minor transformations during their existence. The innovation matrix created as a part of SUSTRAIL project [4] has shown that the leading research centers in Europe consider Y25 bogie as the basis of the freight bogie of the future. Within the framework of the conventional approach, it should be modified in the primary spring suspension, use two Lenoir dampers, material with good damping properties, new wheel contour and new wheel steel type. Within the futuristic concept, in addition to the outlined, the use of wedges, hydraulic dampers, and changes in the stiffness of the supports are supposed. Yet it should be noted that the Y25 bogie is very sensitive to the track irregularities, and also requires the improvement of the dynamic qualities for the passage of curved track sections [5].

Unlike the authors [4], S. Stichel and P. A. Jonsson consider it promising to use Link suspension bogie with hydraulic dampers [6], which allows to achieve speeds of up to 160 km/h.

In the countries of Central and Eastern Europe, a three-piece bogie is widely used (18-100 type or Barber) which is no better: maximum operating speed does not exceed 90-100 km/h, the high dynamic impact on the railway track is one of the main causes of its wear and damage, high dynamic loading of the supporting members, absence of the pedestal bogie primary suspension, cast bogie frame [7, 8]. In different years, attempts have been made to optimize the characteristics of bogie suspension [9, 10], the use of

elastic elements in the pedestal [11 - 13], transition from cast to welded elements [14], but no significant breakthrough.

Thus, it is necessary to introduce breakthrough ideas, to develop fundamentally new bogie design, with the implementation of advanced construction techniques, such as multi-functional components, design modularity, the use of new materials, the creation of the bogie with limiting parameters, the use of pre-stressed structures. In the immediate future, it is hardly possible to introduce drastic changes in the design of widely used bogies due to the repair base, but at the same time work on the creation of a fundamentally new design should be carried out now.

The authors of the article suggest a number of ways to improve freight car bogies of different types on the basis of the approach outlined above:

- using of pre-stressed structures;
- using of rolling materials, the creation of a specialized profile;
- using of elastic-damping multifunctional elements with modularity units.

The next direction of modernization of the freight car bogies is the upcoming use of rolled stock which is close to equally-stressed. Strength characteristics of such profiles are significantly higher than those of cast parts, and also have advantages over welded structures. Having higher indices of permissible stresses in the rolled product and its optimum profile, it is possible to reduce the weight of the bogie, increasing the energy efficiency of the rolling stock.

References:

1. WHITE PAPER Roadmap to a Single European Transport Area – Towards a competitive and resource efficient transport system /* COM/2011/0144 final
2. Shift2Rail. Joint Undertaking. Multi-Annual. Action Plan. Brussels, November 2015. 818 p.
3. PER-ANDERS JÖNSSON: Dynamic Performance of Freight Wagons and their Influence on Cost for Track Deterioration. KTH Rail Vehicles, Teknikringen Royal Institute of Technology SE-100 44, Stockholm Sweden
4. S.D. IWNICKI, et al.: The 'SUSTRAIL' high speed freight vehicle: Simulation of novel running gear design, in 23rd Symposium on Dynamics of Vehicles on Roads and Tracks (IAVSD 2013)2013: Qingdao, China
5. JÖNSSON P-A: Dynamic vehicle-track interaction of European standard freight wagons with link suspension. Doctoral Thesis, Report TRITA AVE 2007:36, ISBN 978-91-7178-727-9, KTH Rail Vehicles, 2007.
6. STICHEL S, JÖNSSON P-A: Is there a future for freight wagon with link suspension? Proc. of the 9th International Heavy Haul Conference, IHHA'09. Shanghai, China, June 22-24, 2009.

7. GORBUNOV N.I., MOKROUSOV S.D., NOZHENKO E.S., KRAVCHENKO E.A., KARA S.V.: The question of the truck freight cars. Vestnik V. Dahl East Ukrainian National University, No.18 (207), 2013, 87-93 . (In Russian).
8. GORBUNOV M. I., KARA S. V., NOZHENKO O. S., ANOFRIEV A. D.: Perspective directions of increasing strength side frames freight wagon bogie. Proc. of the State University of Economics and Technology of Transport, No. 26- 27, p. 148–152. (In Ukrainian).
9. DOMIN R.YU.; GORBUNOV M.I.; KARA S. V.; DOMIN YU.V.; CHERNYAK G.YU.; NOZHENKO O.S.: Patent for Utility Model No. 105480, Method of increasing strength and improving dynamics 3-element freight bogie, kl. B61F 3/00, B61F 5/00, publ. 25.03.2012, bul. No. 6/2016 (in Ukrainian).
10. ORLOVA A.M.: Hierarchical-iterative method of choosing parameters of power characteristics and constructive solutions for hanging freight wagon carriages. Transport of Ural, No. 2(17), 2008, p. 35-42. (In Russian).
11. DOMIN R.YU.; GORBUNOV M.I.; DOMIN YU.V.; NOZHENKO O.S.; CHERNYAK G.YU.; KARA S.V.; MOSTOVICH A.V.; KRAVCHENKO K.O.: Patent for Utility, Model No. 104542, Freight car bogie kl. B61F 3/00, publ. 10.02.2016, bul. No. 3/2016 (in Ukrainian).
12. KOMAROVA A.N., 2015: The impact on the energy efficiency characteristics of carts of freight cars: PhD Thesis, Sankt-Petersburg, 2015. 88 p. (in Russian).
13. ORLOVA A. M., RUDAKOVA E. A., TURUTIN I. V., SAIDOVA. A.: The choice of the design of the first stage of suspension of three-element bogie of innovative freight cars, Izvestiya Petersburg University of Communications, 2011, No 3, p. 88-99. (in Russian).
14. MAKHNENKO O.V, SAPRYKINA G.YU., MIRZOV I.V., EMPTY A.D.: Prospects for the creation of welded structures of load-bearing elements of a freight wagon bogie. Automatic welding. 2014. No. 3 (730). P. 36-42. (in Russian).

PROFESSIONAL FOREING LANGUAGE COMPETENCE AS THE IMPORTANT QUALITY OF A SPECIALIST IN THE FIELD OF TRANSPORT TECHNOLOGUIES

Davidenko N.
Volodymyr Dahl East Ukrainian National University

The relevance of this study is that Ukraine's accession to the European Union is impossible without serious reform of the foreign language training. The reform of training specialists system with knowledge of foreign languages is being held in collaboration with leading universities of Ukraine and foreign countries, cultural and educational centers of Germany, China,

Britain, France, the United States, Belgium and South Africa. There is a need for training a person to life in a globalized, where do significant dynamic changes and significant impact on personality.[1]

In modern conditions the foreign communication has become an important component of future professional activities, in view of the significantly increased the role of the "foreign language" in the nonlanguage Higher Schools. According to the State educational standard of higher professional education, while learning a foreign language it is necessary to take into account the vocational specificity, focus on the implementation of the future professional activity tasks of graduates in the field of transport technologes.

In connection with the trends of the society development, formation of market relations, there is a demand for extraordinary professionals who are ready to take independent decisions and are able to think outside the box to create an atmosphere of mutual understanding in the team, to establish business contacts with partners, in foreign languages, culture, business communication, media culture, skills of professional and personal communication.

In the field of employment and training there are important research works of the formation of the personal developed approach in the researches

A.M. Aleksjuka, G. A. Balla, V. A. Kozakov, G. S., Kostyuk, S. D. Maksimenka, and others. The researcher Y.Y Solodovnìkova convinces that improvements to professional training specialist is a complex personal resource, providing the possibility of effective interaction in the process of using a foreign language as a means of solving professional tasks. [3] Analysis of the pedagogical scientific-methodological sources revealed that there is a large number of methodological directions and technologies in teaching foreign languages in nonlanguage universities, and the end of result has to be not only the acquisition of students communication skills in a foreign language, but also receiving special knowledge by profession.

The traditional educational process is based on the logic of the subject areas where the main is to obtain knowledge, and the main aim is the formation of professional abilities and skills. The personality of the specialist is the main in the new learning process, and the main goal is the allround development. The contents should promote the holistic formation of the student personality and prepare him for future professional activity.

The essence of professionally oriented teaching foreign languages lies in its integration with special disciplines in order to obtain additional professional knowledge and professionally important traits of personality [4]. Foreign language in this case is a means of enhancing the professional competence and personal professional development of students and the pre-

requisite for successful professional activity specialists-graduates of contemporary higher education, who can build and maintain business contacts with nonlanguage partners. The ultimate goal of learning is active ownership of a foreign language as a means of articulating and expressing thoughts in everyday and professional communication, preparing students to work in an environment of rapid update technology and equipment, creating in them a high level of professional competence, mobility, informativity.

Foreign language student communication is the achievement of professional foreign language communicative competence, level of development, which should provide the ability to communicate effectively in professional sphere of the future specialist life.

References:

1. Common European Framework of Reference for Languages: Learning, Teaching, Assessment. Available at: http://docplayer.net/16490-Common-european-framework-of-reference-for-languages-learning-teaching-assessment.htm
2. English for Specific Purposes (ESP) National Curriculum for Universities.-Kyiv, Lensvit, 2005.-119p.
3. Solodlvnikova Y.Y. Formation of a foreign language communicative competence as a condition of improved training specialist. – Kursk, 2009. – 28p.
4. Opryatnyii S. M. Main directions of improvement of civil servants professional training to business English/University research note. 2005. № 1-2 (13-14). p. 312-316.

CERTAINES CARACTÉRISTIQUES DE L'ENSEIGNEMENT DES LANGUES ÉTRANGÈRES DES ÉTUDIANTS DE LA DEMAINE DE TRANSPORT

Davidenko N.

Université nationale d'est ukrainienne nommé d'après Volodimir Dahl

L'enseignement de la langue étrangère a son histoire riche. Des accents sur spects de la langue sont évolués constament. À divers moments le plus d'attention a été accordée aux grammaire, traduction, lecture, audìotion. Actuellement, la fonction d'apprentissage de la langue étrangère est l'accent mis sur la maîtrise des compétences linguistiques et de communication. C'est parce que la nécessité pour les spécialistes avec les connaissances et les compétences de communication professionnelle

devient autant plus pertinente dans le milieux d'affaires de la société moderne.

À l'heure actuelle le volume de l'information scientifique et technique d'échange s'accroît; les programmes internationaux pour améliorer le système de transport sont effectués; les étudiants sont de plus en plus sont impliquées dans des conférences scientifiques internationales et réunions, programmes d'échange d'expérience et de la formation des spécialistes. Cela augmente ainsi le rôle de la motivation pour l'apprentissage d'une langue étrangère.

Voilà pourqoi la principale tâche de l'enseignant est la capacité de transmettre aux étudiants de tous ces aspects de la motivation, qui aurait pu les convaincre que la connaissance d'une langue étrangère est un des indicateurs de compétences de haut niveau professionnel. Toutefois, les causes de l'absence de certaines connaissances de base d'une langue étrangère professionnelle ont certaines difficultés. Les étudiants techniciens commencent à apprendre de nouveau les langues étrangères liées à leur future profession et que principalement comprend l'étude des termes techniques et des concepts que les étudiants n'ont pas encore connu. En raison de la particularité de la formation des étudiants en technique un enseignant a la tâche d'apprendre aux élèves la prononciation correcte des termes.

Dans les plans d'études, vous devez sélectionner les termes spécalisés. Une orthographe de ces termes étrangères dans les langues a même chose, mais la prononciation est différente, donc la tâche de l'enseignant est enseigner des élèves les règles générales de prononciation tels termes dans une langue étrangère, parce que même la communication sur les techniques générales de sujet spéciale comprend un grand nombre de termes professionnels.

Certainement la communication professionnelle est importante. Mais le problème de la possibilité d'obtenir les informations nécessaires dans la littérature professionnelle sont d'une grande importance pour les étudiants. Ce problème est un moyen de satisfaire les besoins cognitifs. La formation de spécìalìst moderne, qui connait technologies de transport étrangères avancés, dépend comment rapidement il porrait recevoir l'information nécessaire non seulement dans leur langue maternelle, mais aussi étrangers.

À cet égard, il y a un problème de formation à l'ensceingment de lecture professionnellement orientée avec la compréhension maximale des informations du caractère spécial des étudiants des universités technique. Apprendre une langue étrangère à l'Université technique devrait être d'une part un outil d'acquérir des connaissances et d'autre part de réaliser de la fonction d'éducation pour inculquer un amour à son métier futur.

Les processus d'intégration globale, la mondialisation et la modernisation prévoient l'éducation chez les élèves le respect à leurs propres traditions, l'attitude de tolérance d'autres cultures, l'acquisition et l'élargissement de l'expérience sociale par une communication efficace professionnel-personnel, formation de leur compétence socioculturelle, le développement des compétences de travail indépendant.

Litérature:

1. Conceil de l'Europe. Des références européennes pour les langues : apprendre, enseigner, évaluer. Disponible à **:**http://docplayer.net/16490-Common-european-framework-of-reference-for-languages-learning-teaching-assessment.htm
2. English for Specific Purposes (ESP) National Curriculum for Universities.- Kyiv, Lensvit, 2005.-119p.

CURRENT AREAS OF COOPERATION OF UKRAINE AND EU IN THE TRANSFER BRANCH

Danilyeva J.
Volodymyr Dahl East Ukrainian National University

At the beginning of 2017 General Director of Mobility and Transport of the European Commission Henrik Hololey proposed to establish a regular, annual transport dialogue between Ukraine and the EU, which forms the agenda and bring in the transport sector of the country as the implementation of new infrastructure projects and the formation of the common transport strategy of Ukraine and the EU[1].

Let us select the following among the priority areas of cooperation between Ukraine and the EU in transport:

- development of transport infrastructure of Ukraine and its integration into the European transport system;
- improving transport safety and adaptation of relevant national legislation with the assistance of the EC TWINNING;
- modernization and replacement of fixed assets and rolling stock transportation;
- a Common Aviation Area between the EU and Ukraine.

Ukraine and the EU also cooperate in the framework of various regional initiatives, including TRACECA and internationally - in international transport organizations, treaties and conventions ratified by the parties.

Consider the current arrangements for cooperation between Ukraine and the EU in the transport sector.

An important step towards greater integration between the EU and the Eastern Partnership was the creation of a common transport network between the EU and its eastern neighbors in 2013 in Luxembourg.

In 2015, the project Twinning «Institutional support to the Ministry of Infrastructure of Ukraine on increasing the efficiency and competitiveness of rail transport in Ukraine" has been completed. With the support of the project a new version of the Law of Ukraine on the rail has been developed.

In 2016 the project of technical assistance of the European Union "Support to the implementation of the Association Agreement and the National Transport Strategy" has started. The project aims to promote the integration and modernization of the transport sector in Ukraine and separate during transport industry sectors in accordance with the obligations under the Association Agreement between Ukraine and the EU, as well as updating the National Transport Strategy of Ukraine in accordance with legislation, standards and EU requirements and assistance in its further implementation.

In early 2016 EU launched the project "Support to the implementation of the Association Agreement between Ukraine and the EU", abbreviated Association4U ', which means' Association for Ukraine and for you.' The main objective of the project - to increase capacity and improve the performance of public institutions of Ukraine to ensure comprehensive fulfillment of Ukraine's obligations under the Association Agreement.

In October 2016 under the Technical Assistance Twinning European Union launched the project "Support to the Ministry of Infrastructure in establishing conditions for the application of the European model railway transport services market in Ukraine". The project aims to improve the efficiency of public administration in terms of railway reform and development of competition in accordance with the Association Agreement between Ukraine and the EU. The project involves implementing a set of measures to strengthen the capacity of the Ministry of Infrastructure of Ukraine in the development of policies for a competitive rail service market, the establishment of safety requirements in the railway sector in accordance with European standards and integration of the Ukrainian railway system of trans-European transport network.

In order to implement the EU Directive 2010/65/EU and to implement maritime single window, the attraction of expert assistance in the project AnNa - (Advanced National Networks for Administrations) is considering. The project facilitates coordinated approach to simplify administrative

procedures for the implementation of international trade and exchange of information between national maritime single window system.

We expect in 2017 a new regional project on maritime safety, security and protection of the marine environment in the Black and Caspian Seas to begin. The project aims to further improve marine safety, and to improve the prevention of marine pollution, preparedness and response in the region [2].

In the road sector with the participation of experts on the basis of the draft Model Regulations on the safety management system of traffic on road transport has been completed in accordance with European practices draft Regulation on the Safety Management System.

Among the modern trends of Ukraine and the EU in the road transport sector should be mentioned the use of European accident investigation practices in the EU, including the use of modern technology. Ukrainian colleagues are given the information about the functioning of the databases accidents in Europe and examples of appropriate encryption books.

In the summer of 2016 the project Twinning «Legislation in Ukraine airworthiness of aircraft and general aviation airports in the certification / airfields Ukraine with relevant EU norms and standards and their implementation" has started. The overall objective of the project is to support the development of civil aviation of Ukraine and to integrate into the European system by harmonizing aviation regulations Ukraine with relevant regulations of the EU and their implementation in the areas of certification of aerodromes / airports and airworthiness of aircraft and their products, parts, onboard equipment, and certification design bureaus and production organizations [2].

The actual integration direction Ukraine-EU cooperation is cooperation with the thematic programs and agencies of the European Union, in particular:

- the European Agency for Aviation Safety (EASA);
- the European Railway Agency (ERA);
- the European Agency for Maritime Safety (EMSA).

Thus, cooperation between Ukraine and the EU in the transport sector aimed at reconstruction and modernization of transport systems and road networks in Ukraine, the development and interoperability of transport systems of Ukraine and the EU in the context of the creation of the Trans-European Transport Network. Priority importance to Ukraine's preparations for implementing EU legislation, recorded in the relevant annexes of the Association Agreement. Preparation and implementation of a deep and comprehensive Association Agreement with the EU provides the conclusion

and implementation of bilateral agreements between Ukraine and the European Union cooperation, including in transport, which are prepared to take into account the conditions of constant transformation of the European transport policy under the influence of intensive development of world trade and international tourism.

References:

1. Ukraine and the European Union launch vehicle dialogue [electronic resource] // Ukrinform. - Access: https://www.ukrinform.ua/rubric-economics/2157467-ukraina-i-es-zapocatkovuut-transportnij-dialog.html
2. Cooperation Ukraine - EU in transport [electronic resource] // Ukraine in the European Union. - Access: http://ukraine-eu.mfa.gov.ua/ua/ukraine-eu/sectoral-dialogue/transport

NONCONFORMANCE RATING FOR LOCOMOTIVE REPAIR FACILITIES

Datsun Y.
Ukrainian State University of Railway Transport

Inspection and observation of the technical level of rail locomotive repair facilities are conducted by the management team of the Department and the Locomotive division, audit sectors, expert groups within the production certification procedure. The faults revealed are fixed as linguistic expert reports which cannot assess their significance and identify priorities in terms of elimination. Therefore, development of methods for the locomotive facility nonconformance rating and determination of the nonconformance index is required.

Formalization of linguistic reports on the locomotive facility nonconformance takes into account the influence of a whole number of factors, their significance being determined by the expert assessment, formalized models of events when designing and analyzing the fault tree.

The analysis of results of inspection and observation of the technical level of locomotive repair facilities demonstrated a similar structure of expert reports on faults, which made it possible to present them as a vector [1]. While transforming a multi-criterion problem into a single-criterion one the most objective method, the weighted sum method, was applied [2]. The

nonconformance indices were calculated according to the results of observations on several locomotive repair facilities.

In order to calculate the nonconformance index the triple additive convolution with the weight coefficient is proposed.

$$K_d = \sum_{j=1}^{n} \alpha_j \sum_{k=1}^{m} \gamma_k \sum_{i=1}^{p} \lambda_i x_i \,, \qquad (1)$$

where α_j – weight ratio significance of the locomotive units, γ_i - weight ratio component of the locomotive repair facilities, λ_i - indicator of the degree of influence of nonconformance on the technological process, x_i - weight ratio of the repair processes.

Investigation into interrelation between the integral index and the locomotive maintenance costs was conducted by methods of the correlation and regression analysis.

The analysis of results of inspection and observation of the technical level of locomotive repair facilities demonstrated a similar structure of expert reports on faults, which made it possible to present them as a vector. While transforming a multi-criterion problem into a single-criterion one the most objective method, the weighted sum method, was applied. The nonconformance indices were calculated according to the results of observations on several locomotive repair facilities. The correlation and regression analysis proved the influence of the nonconformance index of locomotive repair facilities K_d on locomotive maintenance overconsumption S_{oc} (Fig. 1).

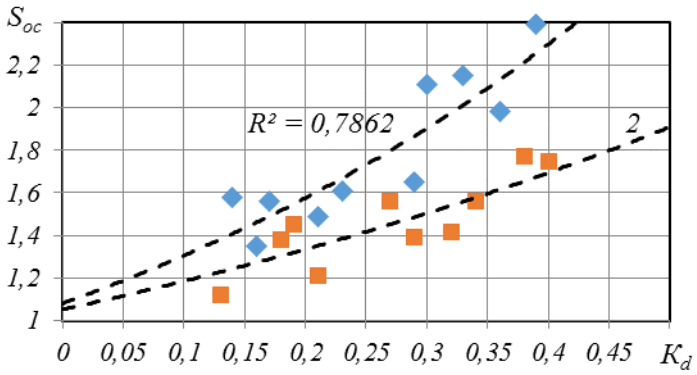


Fig. 1. Determination of the relationship between the coefficients of repair facilities (1 - heat locomotives, 2 - electric locomotives)

As a result of rating methods for a technical level of locomotive repair facilities based on linguistic expert reports which consider type of the fault detected, type of the technological process, type of the locomotive unit and type of the technical level of production have been designed. Implementation of the methods designed will help undertake assessment of the faults detected, eliminate them according to the priority and invest more effectively in locomotive repair facilities. The regressive equations obtained allow standardizing the nonconformance index and forecasting possible locomotive maintenance overconsumption by the results of inspection at repair facilities.

References:

1. V. Puzyr, Y. Datsun. The definition of the indicator of the level of mismatch of locomotive repair production / V. Puzyir, Y. Datsun // Proceedings of VIII International Conference "Transport Problems 2016" Katowice 2016. – p 474 – 481.
2. Stadler W. Multicriteria optimization in engineering and in the sciences. New York, Plenum Press, 1988. 405 p.

INFORMATION SYSTEMS IN TRANSPORT LOGISTICS

Degtyareva L.[1], Miroshnykov V.[2]
[1]Poltava National Technical Yuri Kondratyuk University,
[2]Volodymyr Dahl East Ukranian National University

Information logistics solves the problem of organizing and integrating information flows for making managerial decisions in logistics systems. Effective use of information logistics is the management of the flow of information throughout the logistics network at all hierarchical levels of the hierarchy.

However, the adoption of management decisions in the transport industry requires not only the availability of the usual technology for generating, collecting and processing data, but also creating an information infrastructure. The data collection and processing system concentrates information at certain points in the process, ensuring the network's work on information exchange between all links of the hierarchical chain.

The information infrastructure is created for rational servicing of information flows or message flows in paper, electronic or other forms gener-

ated by initial resource flows in the logistics system. A variety of information flows circulating within and between the elements of the logistical system, as well as the logistics system and the external environment, form the basis of the logistics information system.

In Fig. 1 shows the interaction of key areas of the logistical information system, where logistic information is one of the main strategic resources of transport logistics.

Some of the information system operating in real time control the constant minute-by-minute changes in a physical system, for example, in the system of reservations information for airlines. However, it is more acceptable can be a method of group information processing, in which data is updated daily, but response to the information may be provided with a delay, allowing you to get a response only after a careful analysis of the real needs of management for information.

For the correct operation of the information logistics system, a complex set of data is required, which can be manipulated and used to analyze using as many methods as required by the logistics manager. The system should have the capacity to conduct detailed analysis.

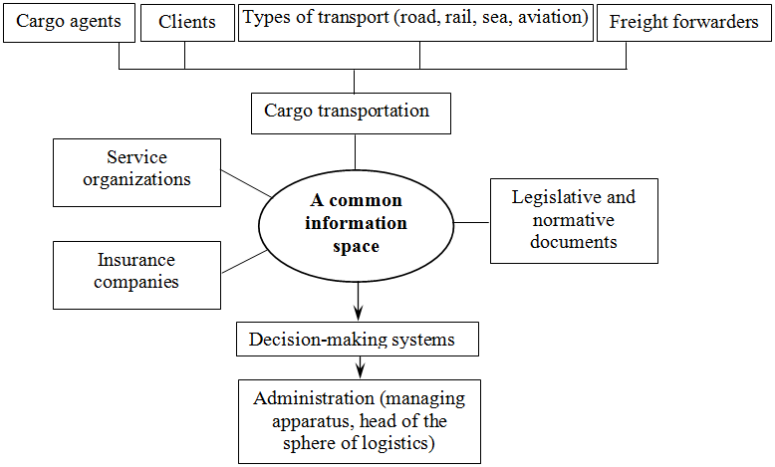


Fig. 1. Key elements of the transport logistics information system

Logistic information flow in the transport sector is quite a complex system and has the following characteristics: heterogeneity; the plurality of divisions of suppliers and consumers of information; complexity and difficulty of practical visibility of information routes; a lot of transfers of docu-

mentation units for each route; multivariate optimization of information flows.

References:

1. Glushenko T. M. Analiz rozvitku logistichnih poslug na suchasnomu svitovo-mu rinku / T. M. Glushenko // Naukovij visnik Hersons'kogo derzhavnogo universitetu. – 2014. – № 6. – S. 169 – 171. [In Ukrainian: Glyshenko T. Analysis of the development of logistics services in the global market today// Scientific Bulletin of Kherson state University]
2. Sergeev V.I. Korporativnaja logistika v voprosah i otvetah. - M.: Infra-M, 2013. - 634 s. [In Russian: Sergeev V. Corporate logistics in questions and answers]
3. Korniєc'kij O.V. Rozvitok logistiki pidpriємstva na osnovi innovacijnogo pidhodu/ O.V. Korniєc'kij// Naukovij visnik Hersons'kogo derzhavnogo universitetu – Serija: Ekonomichni nauki. – 2014. Vip 9, Ch. 4. -s. 109-111. [In Ukrainian: Kornietskiy O. The development of logistics enterprises through an in-novative approach// Scientific Bulletin of Kherson state University]
4. Bespalov R. S. Transportnaja logistika. Novejshie tehnologii postroenija jeffektivnoj sistemy dostavki. /Bespalov R. S. // - M.: Vershina, 2007. - 384s. [In Russian: Bespalov R. Transport logistics. The newest technologies for building an efficient delivery system]

THE FORMATION OF THE INTERCULTURAL COMMUNICATIVE COMPETENCE OF STUDENTS OF TECHNICAL UNIVERSITIES BY MEANS OF FOREIGN LANGUAGE

Demina V.
Donbass State Pedagogical University

The globalization process developing now leads to expansion of interactions of various countries, the people and their cultures. Influence is carried out by means of cultural exchanges and direct contacts between the state institutes, social groups, social movements, way of scientific cooperation in the sphere of the equipment and production.

Communication with foreigners becomes a reality, and collision with representatives of other culture is included into our everyday life. Even more often educational institutions carry out exchange of students, teachers will organize joint projects and pass a training abroad, participating, thus in cross-cultural communication and dialogue of cultures.

Achievement of mutual understanding in the course of cross-cultural communication is promoted by cross-cultural competence. Cross-cultural competence is called ability to carry out communication in a foreign language taking into account a difference of cultures and stereotypes of thinking.

Formation of cross-cultural competence should be considered in connection with development of ability of students to take part in dialogue of cultures on the basis of the principles of mutual respect, tolerance to cultural distinctions and overcoming cultural barriers. Cross-cultural training is directed to formation at students of ability to cross-cultural communication and promotes as awareness by students of the belonging to a certain ethnos, and acquaintance with traditions and cultural features of representatives of other culture.

The modern person knowing a foreign language is involved in process of communication with other people who are representatives of the cultures. In this regard learning a foreign language the rich lexical stock and a decent pronunciation is required not only to have, it is good to know foreign-language grammar, but also to form in itself cross-cultural competence.

This competence assumes achievement of such level of proficiency in language which will allow to react, first, flexibly to various unforeseen turns during the conversation; secondly, to define the adequate line of speech behavior; thirdly, unmistakably to choose concrete means from an extensive arsenal and, at last, fourthly, to use these means in compliance with the offered situation.

Formation of cross-cultural competence assumes interaction of two cultures in several directions: acquaintance to culture of the country of the learned language by means of the most foreign language and assimilation of behavior model of carriers of foreign-language culture; influence of a foreign language and foreign-language culture on development of the native language and behavior model within native culture; development of the personality under the influence of two cultures.

Formation of cross-cultural competence assumes also mastering the following abilities: to see in the representative of other culture not only what distinguishes us, but also what unites; to change estimates as a result of comprehension of other culture; to refuse stereotypes; to use knowledge of foreign culture for deeper knowledge of the.

Cross-cultural competence is formed in the course of training in foreign-language communication taking into account cultural and mental distinctions of native speakers and is a necessary condition for successful dialogue of cultures. Understanding of the possible problems arising in cross-

cultural communication of representatives of different cultures, understanding of values and the standard standards of behavior are quite significant factors in a learning of foreign language.

And when students are prepared for their decision as appropriate, they can avoid misunderstanding, inadequate perception of behavior and the potential conflicts which can arise because of misuse of language, wrong interpretation of reaction of the interlocutor and an assessment of current situation. And ability of the student to refraction of cultural values in the behavior promotes his formation as good expert in cooperation with representatives of the world community.

References:

1. Brooks N. The Analysis of Language and Familiar Cultures / N. Brooks // The Cultural Revolution in Foreign Language Teaching : A Guide for Building the Modem Curriculum. – Skokie, Illinois : National Textbook Company, 1975. – P. 12–31.
2. Furmanova V. P. Mezhkulturnaya kommunikatsiya i kulturno-yazyikovaya pragmatika v teorii i praktike prepodavaniya inostrannyih yazyikov : diss. … d-ra ped. nauk : spets. 13.00.02 / V. P. Furmanova. – M., 1994. – 475 s.
3. Okunevich T. G. Kultura movlennya maybutnogo vchitelya-slovesnika v umovah ukraYinsko-rosIyskoYi dvomovnostI : avtoref. dis. … kandidata ped. nauk : spets. 13.00.02. «TeorIya ta metodika navchannya (ukraYinska mova)» / T. G. Okunevich. – Herson, 2003. – 26 s.

THE HUMANITARIAN COMPONENT IN THE PROCESS OF VOCATIONAL TRAINING OF STUDENTS OF HIGHER TECHNICAL EDUCATIONAL INSTITUTIONS

Zhuchenko E.

Severodonetsk Chemical and Mechanical College Volodymyr Dahl East Ukrainian National University

The cultural revival of the higher technical school, the need to address complex social, economic and moral issues, inspire new ways to look at the existing system of development of higher education, for its ability in the conditions of market relations to ensure the preservation and strengthening intellectual and cultural potential of society.

Analysis of the historical, philosophical, pedagogical literature suggests that the importance of the task of forming a harmoniously developed

personality is recognized by all researchers. In this regard, education in the higher technical schools should be built so as to encourage self-education and self-education, and to develop the student's cultural needs, value orientations, interests in the field of culture, to focus his abilities to creative activity

The main content of this training is to reveal the relationship professional and basic crops of the future specialist, because the new socio-economic conditions of the companies beginning to make significant demands of creative, free-thinking person. Among the areas that lead to the assimilation of spiritual and moral values and formation of the business relationship for its future activities, there are two main.

The first area is characterized by independent development of a future engineer their spiritual needs, the search for ways of spiritual enrichment as the basis of creative growth, a comprehensive mastery of the profession. The second - the creation of a system and environment a meaningful cultural and values education through the process of education in higher technical school. For efficiency, the development of these pathways is necessary to introduce in educational process the education and training of students the following activities: - development of theoretical and practical foundations for the design and construction of specific technical systems - exposure of laws of construction and development of technique, introduction of these laws in practice of planning; it is a study of philosophical, pedagogical and psychological bases of development of technique, and also determinations of the cultural-valued sources of technical activity. In connection with this problem the main task of higher technical education is bringing in of students of technical institutes of higher to to historical and philosophical, kul'turologicheskikh and pedagogical knowledges, and also cooperation of natural, - exposure of laws of construction and development of technique, introduction of these laws in practice of pSovremennaya obschekul'turnoe preparation foresees a satiation spiritual, moral, cultural-aesthetic maintenance of both educational and vneuchebnoy activity of students. As justly marked V. of Kaverin, a culture valids only, affecting the souls of people a powerful moral charge ».

It is necessary to change accents in preparation of graduating student of higher school. He must be not only by a specialist on some object, but, foremost, by a man cultural. Modern humanitarian preparation must be based on certain sources, to which we attribute an art, history, philosophy, literature, music, and also scitech, in basis of which, in same queue, spiritual-moral values lie. Consequently, the system of higher technical education must be aimed at reproduction for the students of integral picture of cultural process, that obuslavlivaet specific of their consciousness and activity.

Their general and professional culture comes forward the criterion of efficiency of formed of future engineers Differently speaking, humanitarian knowledges must combine with professional, constantly perfected and filled with creative maintenance, artistic-aesthetic interests of activity.

References:

1. Vasileva M.P. TsInnIsniy pIdhId do problemi avtoritetu vikladacha / M.P. VasilEva // SotsIalna fIlosofIya, pedagogIka, psihologIya: NaukovI zapiski HarkIvskogo vIyskovogo unIversitetu. – Vip. III. – H., 2001. – S.168-174.
2. Leonteva V.N. Obrazovanie kak fenomen kulturotvorchestva / V.N. Leonteva. – Harkov: HGEI, 2005. – 231 s.

FEATURES OF FORMATION OF MARKETING AND LOGISTICS INFRASTRUCTURE FOR TOURISM ENTERPRISES

Zelenko O., Steganets S.
Volodymyr Dahl East Ukrainian National University

According to current trends in the world economy, there are increasingly urgent demands to grow up the effectiveness of enterprises operation. The issue of improving the management for tourist enterprises needs a lot of attention because of the constant raising of customer requirements for quality and comprehensiveness of services, increasing competition within the industry, increasing the efficiency of consumer service processes, problems of reducing the cost of travel companies. Solving these problems requires the use of an instrument connected with marketing and logistics management approach that will support to increase profitability, efficiency and competitiveness activities of tourism enterprises.

Marketing logistics in tourism – it is the activity connected with information management and flow of tourist services and attendant goods management when they are moving from producers to consumers, within the focus on the needs of customers. At the basis of marketing and logistics innovation there are the creation of new services and interaction, organization of new service, financial and information flows in order to maximize customer satisfaction on the background of enterprises cost optimization. All this is possible with proper infrastructure.

Marketing and logistics infrastructure in the tourism enterprise - a set of tools that will provide its smooth functioning by accumulation, saving

and movement of all kinds of material, financial, information, human resources in order to develop and implement quality tourists product.

Introduction of innovative tools available logistics and marketing process to improve management of tourism company will help to plan, organize and control activities of the company as a whole.

Given all of the above we propose formation process of marketing and logistics infrastructure for tourist enterprises, that comprises three successive stages:

1 - stage of preparation - provides analysis of marketing and logistics tools, including the identification of the most affordable and effective one;

II - implementation stage - involves the implementation of selected innovative tools to create marketing and logistics infrastructure;

III - analysis of the results - provides final control results and identify long-term implementation effect of selected instruments; in case of successful implementation enterptisw will improve management by automating of connecting process, attract new customers, popularization of new tourist products.

The main objective of travel agencies managers - budget but effective tools which allow to optimize the communication process.

The main tools of modern logistics relevant to tourism include information technology communication with own clients, namely it is CRM system. Today CRM system (from the English. Customer Relationship Management) the best way to organize the interaction with partners, patrons and monitor the activities of employees.

In 2017 according to the rating of CRM-systems at ISM, Nucleus Research, CRM Magazine it were identified the top ten, among them: bpm'online sales, Bitriks 24, amoCRM, Meha plan, Klyyentska basa, Salesforce CRM, FreshOffice CRM, Zoho CRM, Prostiy Business, Hamster CRM. Among them are expensive or free which work on-line or without an Internet [1].

Most businesses in tourism industry can popularize tourism in its region and increase their sales by implementation of low-cost regional tours for internal customers. In order to attract the attention of potential customers, advertising routes can be presented at the company's website. For example, to disseminate information about existing tourism potential, formation imagination of future consumer about the region, specialists can develop and offer promotional a tourist route, which will be built through computer software of IT company «Vizicom» [2, p.64]. With this program you can create a route in which to choose interesting places to visit, accurate the distance and even approximate estimates for transport services.

Another equally effective marketing tool attracted new customers and spread an information about the tourism potential is 3D-virtual tours. Virtual Tour is one of most effective and modern methods of environment visualization that allows a special way to show anyone that they can see all-around with maximum detail and comfort. [3]

The most popular company among developers of 3D-tour is “Studio g360”. Thus, one example of their work is 3D-tour in “PodWall” restaurant, with the ability to walk on it virtually. If you want to see the 3D-tour in the restaurant, you do not go to the site of the institution. All information stored in Google mapes.

Therefore, comprehensive analysis and creating a balanced marketing and logistics infrastructure will facilitate automation intensification and acceleration of internal and external communication processes; will attract new customers for the domestic tourism product; provide stabilization of the financial situation for enterprises and overcoming the crisis in the tourism industry of Ukraine.

References:

1. Rating of better CRM systems of the Year 2017 [Electronic resource] // Basetop - 2017 - 9 January- Retried from: http://basetop.ru/reyting-luchshih-crm-sistem/
2. Darchuk V.G. Advertising path "farmstead Crimean rural (green) tourism/ VG Darchuk, AA Lupach // Modern problems of tourism and hospitality industry: All-Ukrainian. nauk. and practical. Conf. Students and young scientists. - c. Donetsk.: 2013 - p. 63-64
3. Grishin I.Y. Modern information technologies as a factor of increasing the competitiveness of tourist enterprises [Electronic resource] / I. Yu. Grishin, Timirgaleeva RR // Economic sciences. №50-1. 08/31/2016 - Retried from: http://novainfo.ru/article/7574
4. Fresh 3D-round restaurant PodWall [Electronic resource] // Blog G360 - 2016 - 31 May - Retried from: https://blog.g360.com.ua

ANALYSIS OF GETTING INFORMATION METHODS FROM THE ROLLING STOCK

Kliuiev S.
Volodymyr Dahl East Ukrainian National University

The large ramifications of the railways of industrial transport, the large turnover of products of production and the predominantly shunting nature of the traffic cause considerable complexity in the management of the transport process in the production mode.

The high requirements for the completeness, reliability and efficiency of the initial data used in rolling stock management presuppose the availability of information on the transported goods, trains, locomotives and wagons, their dislocation in real time, as well as data on the use and operation of each mobile unit in operation.

Obtaining information about the location of the train can be carried out according to the state of the floor devices without installing any technical means on the rolling stock, while the automatic identification of the rolling stock is somehow connected with the task of reading information directly from the mobile units of the train.

Automatic getting information (AGI) systems from railway mobile units are based on various physical phenomena: optical, radio engineering, magnetic, inductive, ultrasonic, and radiation.

All AGI methods, depending on the physical phenomenon used, can be divided into main groups using [1]:

- magnetism or electromagnetism;
- radioactive radiation;
- light emission;
- radio wave radiation.

Code onboard sensors (COS), depending on the technical solutions used in their construction, are divided into active and passive. Passive COS converts the energy of the reader into a message from the mobile object in accordance with the code stored in the memory of the COS. In the active COS, the energy of the sensor itself is used to transmit information from the mobile object, i. e. The COS has its own built-in power supply.

AGI systems using optical reflection allow both one-time and multiple reading of information from the COS, which automatically corrects mistakenly received signals and improves the reliability of the read data. The disadvantages of systems with an optical reading method include considerable attenuation and reflection of the beam due to contamination of the COS

and under adverse atmospheric conditions, difficulties in installing and translucent plates [2].

In electromagnetic systems, the AGI generates low-frequency oscillations, which from the transmitting coils arrive at the resonance circuits located under the moving unit, tuned to the corresponding frequencies. AGI systems using static magnetic fields (permanent magnets) and magnetization reversible ferromagnetic materials for information carriers require small distances between the reader and the information carrier (sensor). In such AGI systems, a relatively small amount of information is transmitted, and reading is limited to a travel speed of 40 to 45 km/h. The advantage of such systems is stable operation in adverse weather conditions.

The deficiency of the AGI electromagnetic systems include:

- the complexity of the technical implementation of recording devices (recording magnetic "heads") and reading information (reading the "ruler" with a significant number of ferroprobes);

- restriction of speed of movement of the composition in the reading zone and, especially, in the information recording area.

In a number of AGI systems, television cameras information at higher speeds is recorded on magnetic disks or tapes during the movement of the train in the control zone. Difficulties in the operation of such AGI systems are caused by the need for frequent prevention of cameras, cleaning of lenses, low reliability of data due to contamination, difficulties in focusing cameras, etc. [3, 4].

The AGI systems with an inductive coupling have a distinctive feature of these systems is the presence in the sensor on the mobile unit of frequency generators. Inductive systems limits the data transfer rate and, therefore, the maximum permissible speed of the train. The distance between the coils of inductance is a critical parameter of the systems.

In a number of countries microwave AGI systems developed with power from floor-standing devices. The lack of AGI microwave systems is the constructive complexity of the code responder, a large number of radioelectronic components that reduce the reliability of the system as a whole.

Attempts were made to develop an AGI device and its transmission over radio channels based on the use of surface acoustic waves. However, the number of signals arriving via communication channels from primary sources should not exceed 10.

In devices with acoustic reflection, ultrasound is used. A COS on a mobile unit may not have its own source, but then its dimensions will be significant. The operation of such an AGI system is noticeably influenced by extraneous noise, so it has not received practical propagation.

Until recently, none of the known AGI systems with moving objects, both in terms of floor equipment, and especially in the part of COS, could not be recognized as a successful and complete technical solution. The choice of the most effective AGI system has not yet been done, and the collection of source data and the procurement of media continue to be carried out manually, despite the fact that this process is expensive, negatively affects the efficiency and is subject to errors and the influence of the "human factor".

One of the large-scale projects for the automatic identification of railway rolling stock based on ultra-high-frequency inverse modulated reflection was implemented by the US, Canadian and Mexican railroads developed by Amtech Systems Division [5, 6].

The economic effect of the introduction of the AGI system of rolling stock:

- reduction in the number of errors in the calculation of payment for transportation;
- prompt information transfer to customers about the location of their goods;
- reducing the cost of finding cars;
- loading of wagons according to schedule;
- creating conditions for the precise regulation of rolling stock;
- expansion of railroad services;
- end-to-end data processing and traffic quality growth.

References:

1. Koshevoy S.V., Fetischev O.V. Tehnologii i sredstva povyisheniya bezopasnosti dvizheniya poezdov na uchastkah zheleznyih dorog // DovgovIchnIst, nadIynIst, pratsezdatnIst detaley ruhomogo skladu zalIznits ta spetsIalnoYi zalIznichnoYi tehnIki. ZbIrnik naukovih prats. – HarkIv, 2005, Vipusk # 69. – S. 67–80.
2. Avtomaticheskoe schityivanie vagonov. Sistema Kartrak (SShA). Ekspress-informatsiya, # 9, 1980.
3. Boynik A.B., Germanenko O.A. Videokontrol opasnoy zonyi zheleznodorozhnyih pereezdov. Inform.-keruyuchI sistemi na zalIzn. transportI. – 2001. – # 4. – S. 24 – 27.
4. Sistemyi tehnicheskogo zreniya /Pod red. A.N. Pisarevskogo, A.F. Chernyavskogo. – L.: Mashinostroenie, 1988. – 424 s.
5. Gapanovich V.A. Sistema avtomaticheskoy identifikatsii // Zheleznodorozhnyiy transport. -2005. - #9. – S. 48–83.
6. Gershenzon M.M., Kotletsov D.S. Vnedrenie sistemyi avtomaticheskoy identifikatsii podvizhnogo sostava na Rossiyskih zheleznyih dorogah // Zheleznyie dorogi mira – 2003, #7. – S. 73–77.

THE HIGH-SPEED RAIL TRANSPORT IMPLEMENTATION FOR PASSENGER TRANSPORTATION

Kliuiev S., Bleznyuk O.
Volodymyr Dahl East Ukrainian National University

Railway transport is one of the basic branches of the national economy. Effective management of this industry is one of the necessary conditions for protecting the economic interests of the state and improving the quality of life of the population. A special role in providing these parameters for the functioning of the national economy is played by passenger transportation, because they provide mobility of the population and, the rapid movement of labor resources.

In order not to lose its position in the market of transport services and increase its competitiveness, rail transport should increase the speed of train traffic, improve the quality of services provided and improve the comfort of passenger transportation to the European level. It is necessary to optimize the most unprofitable routes and develop ways to increase their profitability. Increasing the profitability of loss-making routes will significantly improve the financial and economic condition of the railway passenger complex [1].

Among the numerous ways of influencing the efficiency of passenger rail transport, the introduction of high-speed train traffic takes a special place. This circumstance served as an impulse for deciding the gradual implementation of high-speed traffic in Ukraine [2, 3].

The main event in the development of high-speed rail traffic in Ukraine was the implementation on the railways of the purchased rolling stock from South Korea (Hyundai Rotem) and the Czech Republic (ŠKODA). The high-speed rail transport in Ukraine in speed is worse to Western Europe. However, on the other hand, the price of transportation is available to all segments of the population, although it remains still high enough. That's why day trains compete mostly not with air transport, as abroad, but with motor transport. It should be noted that "Укрзалізниця" will have to take into account the social factor and adjust to passengers with lower incomes, so that more passengers can use their services [4, 5].

With the introduction of economically advantageous high-speed traffic in the analysis of transportation, it is proposed to use cost-effective technical and economic volume and quality indicators.

Volumetric displays financial results for passenger transportation:

1. Income – cash proceeds from the sale of services for passenger transportation.

2. Operating costs – this is the cost expression of the costs associated with the transportation of passengers.

3. The financial result is the difference between income and operating costs. In modern conditions, it is mainly expressed in the form of losses.

Quality reflects the efficiency of passenger rail transport:

1. The percentage of income coverage of expenses is an indicator equivalent to profitability. It is determined by the ratio of income to operating costs.

2. The income rate is the income that is accounted for by the unit of travel of passengers (10 passenger-kilometers). It is determined by the ratio of income to passenger turnover.

3. Cost price – this is the amount of expenditure, which is per unit of movement of passengers (10 pasazhykilometrov). It is determined by the ratio of operating costs to passenger turnover [6].

With the introduction of high-speed traffic in Ukraine, the introduction of a new train classification, which meets European standards, is also actual. In this classification, the main classification features are only operational and technical indicators for assessing the efficiency of rail passenger transport. At the same time, the classification does not take into account the cost-based technical and economic indicators. Therefore, there is a need to eliminate this gap: it is necessary to economically justify the classification of passenger trains and to build an additional classification of urban, suburban, regional, long-distance trains and high-speed trains in these indicators.

The new classification provides an opportunity to determine economically profitable, loss-free directions of traffic. The cost-based technical and economic indicators considered allow us to determine the rational zones for the passenger trains running.

References:

1. Barash Yu.S.: Teoretichno-metodichnIy pIdhId do viznachennya konkurentospromozhnostI poslug, scho nadayutsya pasazhirskimi vidami transportu [Tekst] / Yu.S. Barash, A.A. PokotIlov, T.Yu. CharkIna. // VIsnik DNUZT. – 2011. – vip. 38 – s. 233–237.
2. Sich E.M.: Pasazhirskiy kompleks zalIznichnogo transportu: rozvitok I efektivnIst: MonografIya, [Tekst] / E.M. Sich, V.P. Gudkova – K.: «Vidavnitstvo «Aspekt-PolIgraf», 2004. – 248 s.
3. Barash Yu.S.: Teoretichno-metodichnIy pIdhId do viznachennya konkurentospromozhnostI poslug, scho nadayutsya pasazhirskimi vidami transportu [Tekst] / Yu.S. Barash, A.A. PokotIlov, T.Yu. CharkIna. // VIsnik DNUZT. – 2011. – vip. 38 – s. 233–237.

4. Sich, E.M. Pasazhirskiy kompleks zalIznichnogo transportu: rozvitok I efektivnIst: MonografIya. [Tekst] / E.M. Sich, V.P. Gudkova – K.: «Vidavnitstvo «Aspekt-PolIgraf», 2004. – 248 s.
5. Kravchenko, M.V. Vyisokoskorostnyie zheleznodorozhnyie soobscheniya - dostizheniya i problemyi [Tekst] / M.V. Kravchenko // Zheleznyie dorogi mira, 2001, # 2. s. 5–9.
6. Bogomolova, N.I. EfektivnIst transportnogo virobnitstva: sutnIst, zmIst I formi [Tekst] / N.I. Bogomolova // Zb. nauk. pr. KiYivskogo unIversitetu ekonomIki I tehnologIy transportu. SerIya ekonomIka I upravlInnya. – KiYiv: KUETT, 2003 – #3 – s. 22 – 28.

NAVIGATION SYSTEMS IMPLEMENTATION IN TRANSPORT TRAFFIC CONTROL

Kliuiev S., Zamota P.
Volodymyr Dahl East Ukrainian National University

Necessity to increase the cost of transport infrastructure development is dictated by the need for constant growth in the volume of transport services, increased reliability, security and quality. However, with the growth of motorization there are a number of significant problems: an increase in the number of road accidents, toxic emissions, noise, low speeds, congestion during peak hours, large losses of time for participants in the movement, reruns, high fuel consumption, increase in total operating costs for road transport, etc. First and foremost, these shortcomings are manifested in places where traffic flows are concentrated at network sections operating in modes close to capacity. As a rule, these are large cities – megacities with a high level of motorization. Given the stochastic nature of road traffic, the dynamics of changing its characteristics over time, the process of qualitative assessment and forecasting of changes in road and transport situations on the road network is a great challenge.

A qualitative leap in the development and production of powerful information computer systems, in the development of modern types of communication, efficient navigation systems, technical means of collecting and processing information on the characteristics of traffic flows and the road network dictates the need for the active use of intelligent transport systems [1].

In many cities of Ukraine, automated radio navigation systems for the traffic control of urban passenger transport are being created. Part of the

work is carried out within the framework of the targeted program on the use of the navigation satellite system in the interests of civilian consumers.

The automated dispatching control system is necessary for operational planning, instrumental recording of transport operations, control and management of transportation processes, automated output of data on the operation of transport on the line, and provision of operational information on the state of traffic [2].

In general, an automated traffic control system can be characterized by the availability of information support elements, including:

a) software and technology elements;

b) information arrays;

Information support is a multi-level hierarchical structure based on unified principles, including data processing at the following management objects:

- on board the vehicle;
- in the zonal traffic center;
- in the transport enterprise;
- in the central traffic center.

The information system of the automatic traffic control system includes the following minimum set of information arrays of normative and reference information: a list of routes of parks served by the system (urban and suburban); Operational standards of routes; Route schedules [3].

The main purpose of traffic control and management of routed traffic is to timely (operatively) record the detected deviations from the planned traffic (in order to prevent the increase of traffic intervals, irregular flights, disruptions of flights due to system failure, etc.) and eliminate the consequences of violations and deviations [4].].

In the system of automated accounting, control and analysis of routed traffic, the following functions are implemented:

a) accounting and control of the rolling stock output on the route network;

b) accounting and control of the opening of traffic, the beginning of the rolling stock on the line;

c) accounting and control of rolling stock on routes;

d) accounting and control of the time for completion of transport work on the line.

The traffic controller identifies failures in the transport work and participates in the management of vehicles.

Conclusions. The use of navigation systems in the dispatching management of transport solves a number of complex tasks:

1. Operational planning of operations accompanying the transport process to optimize the costs of physical and material resources per unit of time.

2. Automated determination of the mobile objects location as part of integrated security systems.

3. Coverage of the maximum number of possible controlled parameters of transport and the object of transportation.

4. Editing and selection of optimal solutions for changing the traffic plan, due to unforeseen circumstances, in real time.

5. Linking of transportations of different types and characteristics of transported objects while maintaining the parameters of the efficiency of transportation in general.

6. Improvement of the structural basis for the interaction of the main participants in the transportation process.

7. Optimization of costs for maintenance and repair of automotive and special equipment.

On the basis of the use of modern navigation systems, a distributed automated system can be built for operational access to the results of accounting for transport work.

References:

1. Vlasov VM, Efimenko D, Zhankaziev Use of GIS in the technology of dispatching control by routed transport. M., MADI (GTU), 2007.
2. Vlasov V, Zhankaziev S, Nikolaev A, Prikhodko V.. Telematics in road transport - M .: MADI, 2003 - 173 p.
3. A Kudryavtsev Development of methods for collecting and processing data on passenger traffic on urban passenger transport using the equipment of a contactless account and satellite navigation: Diss. Ph.D. - M., 2006. - 168 p.
4. Gurevich G, Bogumil V Improvement of the management of urban passenger transport on the basis of the creation of an automated control system by the transportation process. Motor transport enterprise No. 2, M. 2003.

THE TRANSPORT COMPLEX EFFICIENCY INCREASE

Kliuiev S., Kravchenko S.

Volodymyr Dahl East Ukrainian National University

Stable and efficient operation of the transport complex is the most important condition for the life support of diversified economy and realiza-

tion of the main directions of the country's social and economic development. The main areas for the expedient use of road transport are the delivery and delivery of goods to the main types of transport, the delivery of industrial and agricultural goods for short distances, intraurban transportation, as well as the delivery of goods for trade and construction.

A successful solution to the complex task of ensuring road safety is impossible without increasing efficiency, and the introduction of new technologies. For the successful and dynamic development of a modern city, a transport system corresponding to its needs is needed. Such a transport system should be one step ahead of the city's requirements for passenger transportation.

An analysis of the conditions for the operation of transport systems shows that the ever-increasing demand for freight traffic at the current level of motorization is accompanied by a number of problems both at the institutional level - legislative and regulatory framework, as well as technological - organizational. To solve these problems, there are not enough organizational measures and activities related to the construction of new roads and highways and their reconstruction [1].

To improve the transport situation and increase the carrying capacity and the level of service of transport and pedestrian flows, the introduction of modern innovative technologies. These technologies are implemented in the increasingly widespread intellectual transport systems (ITS) [2].

The main goals of ITS implementation:

- improving road safety;
- increasing the capacity of the road network;
- improving the quality of service for road users;
- reduction of harmful impact of transport flows on the environment;
- Increasing the efficiency of the functioning of transport;
- Increasing the prestige of urban public passenger transport;
- increase of investment and tourist attractiveness of the city.

ITS can be divided into two levels:

- introduction of innovative technologies in the development of an intelligent street-road network;
- modeling the characteristics of traffic flows for the purpose of analyzing, forming and optimizing the movement of freight transport.

ITS differ in the technologies used: from simple car navigation systems, regulation of traffic lights, cargo traffic control systems, various warning signs systems (including information boards), car license plate recognition systems and vehicle speed registration systems, to video surveillance systems, as well as systems integrating information streams and feedback streams from many different sources, such parking control systems,

meteorological, reconnaissance systems Nia bridges and others. Furthermore, can be used in the ITS predicting technology based modeling information and accumulated previously [3].

The introduction of ITS will reduce the travel time of passengers to 25%, improve the quality of transport services, save fuel consumed to 20%, reduce response time to accidents to 30%, additional revenue to the city (parking, photo, video recording).

ITS is not only equipment on poles and a control center with a huge screen. ITS is primarily intellect-control algorithms based on the simulation of real transport situations, as well as the processes of their compilation, testing and implementation.

References:

1. Kocherga V.G., Zyiryanov V.V., Konoplyanko V.I. Intellektualnyie transportnyie sistemyi v dorozhnom dvizhenii: Uchebnoe posobie. – Rostov na Donu: Rost. Gor. Stroit. Un-t, 2001 – 108 s.
2. Gavrilov A.A. Modelirovanie dorozhnogo dvizheniya– M.: Transport, 1980 – 190 s.
3. Przhibyil P., Svitek M. Telematika na transporte. Perevod s cheshskogo O.Buzeka i V. Buzkovoy. Pod redaktsiey prof. V.V. Silyanova M.: MADI (GTU), 2003 – 540 s.

USING DRONES IN THE DELIVERY OF SMALL-SIZED SHIPMENTS AND POST

Kliuiev S., Lopata O.
Volodymyr Dahl East Ukrainian National University

In modern times, the time of technological progress, "Internet things" and "smart systems" logistics is not standing still. One of the most important priorities for the development of transport logistics of the future is the use of unmanned aerial vehicles for the delivery of small-sized cargo and mail. The relevance and novelty of the research theme are due to the fact that in the era of active introduction of innovative technologies, the use of unmanned aerial vehicles will solve a number of acute economic and environmental problems.

Until recently, the drones, known as unmanned aerial systems, were the exclusive prerogative of the military, who used them to undermine ene-

my targets, topographic aerial photographs of the territory and to plot the enemy's dislocation. Today, the use of unmanned aerial vehicles has spread to other aspects of everyday life [1, 2].

Although it is still a very regulated sphere, the consumer market has met with great enthusiasm unmanned aerial vehicles, and their sales have increased significantly.

It's no secret that the leaders of the traditional delivery market around the world are experiencing difficulties (including economic ones) with servicing the so-called "last mile delivery", that is, the final stage of delivery of goods or documents to the customer.

Amazon, the largest Internet retailer, announced in December 2013 its fastest way to deliver purchases - Amazon Prime Air. With this service, purchases made in the Amazon online store will be delivered to customers within 30 minutes, which is 4 times faster than the current fastest way to deliver Amazon Prime Now. So much acceleration is planned to achieve through the use of drones. But the main technical highlight of the project can be called the idea of using balloons as logistics centers for storing cargo and launching drones. In addition to the development of drones, the company formulated a concept for the separation of airspace between manned aircraft and drones. To ensure safety, Amazon proposes to limit the maximum flight altitude of the drones to 400 feet (~ 122 m), which is 100 feet (~ 30 m) less than the minimum permitted altitude of civil aviation operations [3].

DHL, one of the largest logistics companies in the world, shows a steady interest in using unmanned aircraft for cargo delivery. The company conducted the first flight tests in 2013 in Bonn, Germany. In the course of an experiment of unmanned aerial vehicles, which the company calls "Parcelcopter" (which means "messenger" in Russian), transported parcels across the Rhine River during the week [4].

Ukrainian postal service enterprise Ukrposhta plans to test the drones to deliver the parcel to the addressee, the company said in a press release. Testing is planned to be held in the city of Bucha, Kyiv region. "The addressee will receive an SMS message and in a few minutes will be able to receive the parcel from Ukrposhta that the drone will deliver to him." Testing will be carried out using drones produced by the Israeli company Flytrex. "Ukrposhta" is considering the possibility of introducing a mail delivery service by drones in the near future [5].

Logistic company "New Mail" showed at the conference iForum a working prototype of the robot-postman, developed in conjunction with Drone.UA [6].

In Switzerland and Singapore, pilot projects for the delivery of mail by multicopters were conducted, in New Zealand pizza is delivered by air,

and in the US drones have already been used to deliver coffee and donuts, as well as burritos. In India and China, drones for the transport of transplants are being developed, and in Rwanda, drones will deliver blood and medicines [7].

Google Corporation focuses on the development of security systems to prevent the collision of drones and protection against mechanical damage. The corporation is also engaged in the creation of a system of routes, over which the drones will run [8].

In the near future unmanned aerial vehicles will automatically, as necessary, be sent to the nearest "charging station" for recharging. Here you can also recall the concept of the "Beehive" – a skyscraper that serves as a vertical airfield for thousands of drones serving the townspeople. Another option is a mobile automobile "base" that is constantly moving around the city, from which the unmanned vehicles fly out to carry out the delivery to the nearest points to the route. Delivering the order, the drone is catching up with the base and recharging – such a project is run by the Workhorse company in the interests of the UPS delivery service.

The problem so far remains the lack of clear regulation in the field of delivery of goods by drones in most countries, especially in the autonomous mode. That does not prevent a number of companies from conducting experiments of various scales.

There is no doubt that the inevitable difficulties of the first period will be overcome, and in large cities, hurrying with the "parcel post" drone, sweeping over the heads of passers-by, in the coming years can become a familiar element of the landscape.

References:

1. Kak zarabotat dengi na dronah / Internet platforma Luchshie biznes idei. [Elektronniy resurs] – Rezhim dostupa: http://luchshiebiznesidei.rf/zarabotat-dengi-dronah.
2. Lopuh O.R. Analiz perspektivnyih napravleniy primeneniya kvadrokopterov (multikopterov) pri likvidatsii pozharov i chrezvyichaynyih situatsiy, a takzhe provedeniya drugih issledovaniy / O.R. Lopuh // Vestnik Kokshetauskogo tehnicheskogo instituta KChS MVD Respubliki Kazahstan № 4(20) – K.: KTI MVD RK, 2015. – S. 37–47.
3. Obzor mirovogo opyita kommercheskoy dostavki gruzov s pomoschyu bespilotnikov / Interesnyie publikatsii Geektimes. [Elektronniy resurs] – Rezhim dostupa: https://geektimes.ru/post/287094/
4. Logistika buduschego. Optimizatsiya dostavki gruzov blagodarya vyisokim tehnologiyam / Kompaniya DHL. [Elektronniy resurs] – Rezhim dostupa: http://dhl-logistics.com.ua/ru/62-poslednie-novosti/151-logistika-budushchego-optimizatsiya-dostavki-gruzov-blagodarya-vysokim-tekhnologiyam

5. Ukrpochta protestiruet dronyi dlya dostavki pochtyi / Novostnoy internet-resurs Korrespondent.net. [Elektronniy resurs] – Rezhim dostupa: http://korrespondent.net/business/companies/3690063-ukrpochta-protestyruet-drony-dlia-dostavky-pochty.
6. Po sledam Amazon: «Novaya pochta» testiruet dostavku dronami / Zhurnal pro internet-biznes AIN.UA. [Elektronniy resurs] – Rezhim dostupa: https://ain.ua/2015/04/17/po-sledam-amazon-novaya-pochta-testiruet-dostavku-dronami
7. Amazon nachala dostavlyat pokupki v Velikobritanii s pomoschyu dronov / Nauchnyie stati, novosti, otkryitiya: N 1 [Elektronniy resurs] – Rezhim dostupa: https://nplus1.ru/news/2016/12/15/uk-drones
8. Fetisov V.S. Bespilotnaya aviatsiya: terminologiya, klassifikatsiya, sovremennoe sostoyanie.– Ufa: FOTON, 2014. – 217 s.: il.

EFFICIENCY OF CORN EXPORTS BY SEA

Kliuiev S., Smolkov V.
Volodymyr Dahl East Ukrainian National University

The Black Sea coast of our country from the logistical point of view is favorably located for corn shipments. Almost more than 90% of the corn export from Ukraine is shipped in bulk through our ports – by sea. For this, port corn elevators are used.

In the transportation of corn, one can not distinguish one of the modes of transport, since in the process of corn transportation all modes of transport participate, one by one replacing one another [1].

The sixth place in the ranking of world wheat exporters, the growth of exports by almost 70% in comparison with the period of 2008÷2012 by the year of 2021, the complete expulsion of competitors from the CIS from the forage market - these are the forecasts for Ukraine of the UN Food and Agriculture Organization [2].

At first glance, port transshipment is quite a strong link in the corn delivery chain against all other problems. According to APK-Inform, almost all bulk agricultural exports leave the country on sea vessels (in bulk or in containers) through sea ports – in 2012, 91.2% (32.1 million tons). For export, motor transport accounted for only 1.7%, railroad – 7.1%. The capacity for transshipping corn of sea ports is estimated by the agency at 50.9 million tons (with the possibility of a one-time storage of 2.2 million), river ports – 4.3 and 0.24 million tons, respectively [2].

Of course, it is easier and less risky to buy corn, bring it to the port, load it into a ship and take it out. Here, the risks are minimal, compared with production, processing or livestock, in which the investment returns at least after 2–3 years. But, on the other hand, livestock production creates more jobs, livestock production is more expensive and can be diversified than corn [3].

To date, inland waterway transport provides the lowest cost of freight transport in terms of one conventional ton of cargo, while having the least impact on the environment.

Approximately 13.2% of the budget of each enterprise is spent on transportation of goods. At the same time, 60-70% of the cost of transportation - the cost of fuel. The significant economic effect of the use of river transport - where technically possible – is obvious [4].

Annually, the volumes of corn grown on the fields of Ukraine are steadily growing. Today, agrarians grow a corn crop in the range of 60 million tons, in the near future, yields of 80 million tons or more are possible. And if the issues of increasing the yield of corn are resolved in a regular manner, then issues related to the export of corn are experiencing a certain crisis. Any system works effectively when all its components are balanced. At present, logistics is the frankly "weak link" in the Ukrainian corn business.

If you use the statistics of 2012, you can see what kind of transport and in what volumes were the delivery of corn for export: 91.2% – by sea, 7.1% – by rail, 1.7% – by road.

As we see, sea transport in matters of corn supplies from Ukraine is beyond competition. The declared technical capabilities of the existing corn terminals allow shipping about 51 million tons of corn a year. Of this potential, so far, about 60% have been realized [5].

Sea transport carries 90% of the volume of international freight traffic. Features of sea transport and the effect of the volume of lumpsum-transported goods, can significantly reduce energy costs. To date, the energy costs of maritime transport account for 7% of the energy consumption of the world transport industry, which is not comparable with the huge volume of cargo transported by sea [6].

The idea to create the E-40 waterway has been discussed since 2011. E-40 is a shipping route with a length of more than two thousand kilometers. This path must connect the Baltic and Black Seas, passing through the territories of Poland, Belarus and Ukraine.

The resumption of the river route will allow transporting up to 4 million tons of cargo annually. This water transport route should give an impetus to the economies of Belarus, Ukraine and Poland, as well as to strength-

en cooperation with the European Union. Thanks to the connection of the seaports of Gdansk and Odessa, the goods can be delivered to anywhere in the world. In addition, the E-40 waterway will provide significant time savings for cargo carriers operating in Central and Eastern Europe, according to analysts UkrAgroConsult [7].

The industrial program of the Ministry of Agrarian Policy of Ukraine provides for an increase in the production of corn to 70–80 million tons. This means that with an annual annual consumption of 25–26 million tons, the volume of exports in the next 2–3 years can increase to 40–50 million tons. To such volumes the transport infrastructure of Ukraine, unfortunately, is not ready [8].

The existing problems will be solved when considering them at a qualitatively new level. Ukraine will not be able to effectively develop corn trade in the future, with corn losses from the producer up to exporting to 36%, which is 2.5 times more than in Europe.

References:

1. Osobennosti perevozki zernovyih / sayt logisticheskoy kompanii «Neolit». [Elektronniy resurs] – Rezhim dostupa: https://neolit.ua/articles/81.
2. Milliard na zernovozyi: chto sderzhivaet ambitsii Ukrainyi na ryinke eksporta zerna / Tsentr transportnyih strategiy. [Elektronniy resurs] – Rezhim dostu-pa: http://cfts.org.ua/articles/milliard_na_zernovozy_chto_sderzhivaet_ambitsii_ukrainy_na_rynke_eksporta_zerna_381.
3. Mirovoy ryinok zerna – novyie vozmozhnosti dlya Ukrainyi / Informatsionno–analiticheskiy portal Inpress.ua. [Elektronniy resurs] – Rezhim dostupa: http://www.inpress.ua/ru/economics/18509–mirovoy–rynok–zerna–mesto–ukrainy.
4. Transportnyiy balans Ukrainyi 2013/2014 / Blog mezhdunarodnoy yuridicheskoy sluzhbyi Interlegal. [Elektronniy resurs] – Rezhim dostupa: http://www.interlegal.com.ua/corporate/?p=1623.
5. Eksport zerna (inoy vzglyad na tehnicheskie voprosyi) / Natsionalnyiy agroportal Latifundist. Elektronniy resurs] – Rezhim dostupa: http://latifundist.com/blog/read/731–eksport–zerna–inoj–vzglyad–na–tehnicheskie–voprosy.
6. Transport i energopotreblenie / Elektronnyiy zhurnal energoservisnoy kom-panii "Ekologicheskie Sistemyi". Elektronniy resurs] – Rezhim dostupa: http://www.journal.esco.co.ua/2012_5/art222.htm.
7. Vodnyiy put E–40: mif ili realnaya vozmozhnost? / Novostnoy portal UkrAgroKonsalt. Elektronniy resurs] – Rezhim dostupa: http://www.ukragroconsult.com/news/vodnyi–put–e–40–mif–ili–realnaya–vozmozhnost.

8. Rechnyie perevozki zernovyih. / Blog mezhdunarodnoy yuridicheskoy sluzhbyi Interlegal. Elektronniy resurs] – Rezhim dostupa: http://www.interlegal.com.ua/blog/?p=2664.

POSSIBILITIES FOR THE USE OF ROAD FREIGHT

Kliuiev S., Ushakov D.
Volodymyr Dahl East Ukrainian National University

Necessity for the movement of goods arose in ancient times, but then the transport was in a primitive form. With the development of the economy and transport has changed, in order to meet the requirements of the time. In the modern world, there are many ways to move goods, among them road transport takes a special place. Transport as one of the basic branches of the national economy unites all other sectors of the economy into a coherent system and predetermines the stability of transport and economic relations, the regularity and observance of the terms of delivery of goods to business entities.

At the moment, road transport is less in demand than other types of transportation. However, the large territory of the country creates in places a low density of settlement, small settlements stand far from the paved highways. This creates the need for point-to-point transportation of the necessary products or raw materials. This can only do road transport. Thanks to modern technical capabilities, making high speeds of motor transport available, deliveries are made in a short time [1, 2].

Transport companies participating in the distribution chain of finished products, as well as other partners, should ensure a reduction in transportation time, an increase in the level of service. In general, this means moving towards the consumer transport services. This situation is specifically expressed in the provision of various non-traditional additional services, as well as in the large-scale use of the latest achievements in the field of communication and information.

New strategies of transport companies in the field of communications lead to the expansion of the circle of customers, to the emergence of new ones and to the transition to a higher level of old orders, to reduce routine work and to introduce new forms of workflow into everyday practice, to reduce the level of errors associated with improper collection and Analysis of credentials, as well as untimely or incorrect documentation.

Road transport is characterized by indicators of operational and technical quality, which, together with data on specific operating conditions, serve to select the rolling stock of a particular brand. These indicators include the characteristics of the car in terms of its dimensions, weight, carrying capacity, patency, speed and other dynamic qualities, stability and maneuverability, and, lastly, in terms of economy. The efficiency of using road transport is determined by such indicators as the cost of transportation, their productivity, energy intensity, etc. [3].

In 2014, the total length of roads in Ukraine was 163 028 km, and the volume of road freight traffic amounted to 1 131 313 thousand tons of goods. A significant part of the structure of road transport is raw materials. So, among all cargoes transported by road in Ukraine in 2014, ore and mining industry prevailed [4].

It is necessary to emphasize that in Ukraine the structure of cargo transportation by modes differs from the similar structure in other European countries, such as Romania and Germany. They can be compared with Ukraine on the territory and the presence of large navigable rivers. But if in these countries the share of river transport is significant – 13…20%, in Ukraine it is only 1%. The possibilities of such a large artery, as the Dnieper, are not used in full. Today, this issue is extremely relevant, given the unsatisfactory state of the roads in Ukraine.

Trucking is the most affected segment of the market for freight forwarding services from economic sanctions and recession. It is expected to reduce the volume of commercial motor transport by 20%, freight turnover – by 10%, the drop in cost and physical indicators in the international transport segment by 25…30% and sharp aggravation of competition in the international and domestic transportation market.

Conclusion. The main most important goal for the near future for domestic freighters should be to reduce the cost of cargo transportation, their optimization and increase the quality of services provided.

References:

1. Karbanovich I.I. Mezhdunarodnyie avtomobilnyie perevoz-ki / I. I. Karbanovich // uchebnik – Mn.: Yunipak, 2002.
2. Avtomobilnyie perevozki, ih aktualnost na segodnya / Informatsionnoe agentstvo «AvtoSreda». [Elektronniy resurs] – Re-zhim dostupa: http://www.avtosreda.ru/info/other/gruz/avtomobilnyje-pjerjevozki-ikh-aktualnost-na-sjegodnja.
3. Bogomazov V.A. Gosudarstvennoe regulirovanie trans-portnoy deyatelnosti i strategicheskoe upravlenie avtotransport-nyimi predpriyatiyami: ucheb. posobie / V.A. Bogomazov. – SPb.: Iza-telstvo «SPbGIEA», 2007. – 234 s.

4. Problemyi i vozmozhnosti transportnogo balansa Ukrainyi/ Novostnoy internet-resurs Baker Tilly. [Elektronniy resurs] – Rezhim dostupa: http://www.bakertilly.ua/ru/news/id928.
5. Korporativnoe izdanie «Optimalnaya logistika», 2015. – S. 15–16.

INNOVATIVE METHODS IN TEACHING ENGLISH TO TRANSPORT DEPARTMENT'S STUDENTS

Kozmenko O.
Volodymyr Dahl East Ukrainian National University

Foreign language is an important means of international communication, it facilitates intercultural dialogues and allows to feel comfortable in a foreign country. In this context it becomes relevant the position in which the ability to understand another culture representative depends not only on the proper use of language units, but also the specific skills to understand the norms of their culture, including verbal behavior in different situations of communication. The results of learning a foreign language are to be factually learned knowledge and competencies, personal development, self-dependence and creative search, an ability to continue learning the language on a higher level.

To realize this task it is necessary to organize educational process in such a way so that it assists in effective realization of people's aims in learning foreign languages. Today innovative methods and technologies in teaching foreign language are considered the most useful because they represent an innovative trend in education, based on domestic and global trends, best practices and traditions. Innovative methods and technologies of teaching today are gaining increasing recognition and new opportunities associated with the establishment of interpersonal interaction through external dialogue in the process of assimilation of educational material, as well as contribute to the implementation of the principle of continuity of knowledge transfer, formation of competencies, personal qualities and meta-professional ones.

Among the innovative methods for teaching transport department's students are used such methods as: method of direct instruction (J. Wiechmann and J. Grell), method of electronic self-directed education (T.M. Balykhina), method of pedagogic studio work (E.V. Nevmerzhitskaya) etc.

The essence of the method of direct instruction is to achieve a more informed perception of educational material to learn, active orientation of the target. The starting point of the method is the evaluation of the direct instruction teaching success, regardless of the study discipline and the individuality of a teacher. The effectiveness of the method of direct instruction is achieved under the conditions of implementation in the educational process: orienting introduction at the beginning of the lesson, independent presentation of the assignment after the lesson and the resulting check at the next lesson. It is important to note that this method makes it possible to use the training time advantageously, the less of which is given to informing of students, learning the material, discussion of the proposed tasks. The teacher controls the training, trying to involve all learners in the process of cooperation.

The purpose of introducing the electronic self- directed method of learning is to transfer the knowledge to highly independent learners (those who wish to receive education on their own terms). Based on the traditional methods and forms of teaching this method is enriched with modern ICT. The use of ICT in one's own activity as a part of the competency of person's image promotes the individual's development, as well as disclosure of creative and intellectual abilities of the individual at all levels of education. The method during preparing or carrying out practical tasks may include such forms of work as multimedia presentations, web-pages and other interactive tutorial information. Moreover, all instructions are given in the self-study course materials, as self-learning is often deprived of the opportunity to clarify difficult points from the instructor, ask for «help» because of the territorial remoteness.

The main aim of a lesson with using the method pedagogic studio work consists in receiving by student additional topics unfixed in educational programmes with the help of a teacher under obligatory expressed initiative of student in mastering new knowledge. It includes 8 methodical working steps, which structure, discipline and gradually brings students and teachers to its effective realization. They are 1. theme formulation: 2. criticism phase; 3. creative exercise; 4. intermediate control; 5. check of fulfillment; 6. strategic stage; 7. transformation phase; 8. reconstruction phase [2].

According to this method the central phase is the reconstruction one which supposes communication with the participants of the studio. That's why from the methodological point of view the study and work's discussion of the studio's supervisor requires collective consideration with the other teachers in a form of pedagogic conference, round table, etc. where different views of everyone on the question of method's realization can be presented.

So, there are so many different innovative methods of teaching students which together with the traditional ones help us to instruct students while learning foreign languages and organize the work in class.

References:

1. Kaplina S.E. Innovative Methods in Teaching English to Adults // S.E. Kaplina.- Journal of Siberian Federal University. Humanities & Social Sciences № 11, 2015. - p. 2437-2447.
2. Nevmerzhitskaya E.V. Method of pedagogic studio work// E.V. Nevmerzhitskaya. - Secondary Professional Education № 2, 2012. - p. 18–20.

RISK-ORIENTED INSTRUMENTATION UNDER CONDITIONS OF UNCERTAINTY OF MANAGEMENT OF A SPECIFIED INHOMOGENEOUS PROJECT

Kramskiy S.

Odessa Institute Interregional Academy of Personnel Management

At present, the risks of incidents in the sea are increasing, taking into account the aging trends of the fleet, it is becoming increasingly important to ensure reliability at the stage of its operation, the so-called "operational" reliability. The purpose of technical supervision and supervision of risk management in conditions of uncertainty is to ensure the safe operation of vehicles and infrastructure facilities.

According to [1], the axioms of a potential hazard, since there is no type of human activity that would be accompanied by a zero level of risk. Therefore, when developing the project objectives, the risks that arise in the project should be taken into account.

Problems of risk from different perspectives, including risk management, are devoted to studies where it is indicated [2] that risk is a potential, numerically measurable possibility of loss. The concept of risk is characterized by the uncertainty associated with the possibility of emergence during the course of the project implementation of adverse situations and consequences.

The risk of the project is the degree of danger to the successful implementation of the project. Project risk is an undefined event or possible situation that creates a negative impact on the achievement of successful project results in general and on the achievement of individual project re-

sults or events that can lead to unpredictable losses [3].

Project risk management includes processes related to risk management planning, identification and analysis, risk response, and risk management and control within the project [4].

The book [5] gives the following definition of risk: "A measure of the significance of the hazard, including an assessment of its consequences and the likelihood of an offensive." Along with this, it is necessary to take into account the possibility of risk situations associated with the characteristic personal characteristics and qualifications and professional qualities of the individual.

Qualification and professional risk, characterizing the situation of lack of effectiveness of processes due to poor performance of works by individuals. Proceeding from this, risk reduction measures are chosen that provide benefits for the enterprise and the organization. From the point of view of work, a ship can be compared to an enterprise where everything is continuously rotating and from which workers can not leave at the end of their working time, retire to a distance. Thus, staff and labor resources are formed taking into account the need for the efforts of a group of individuals to implement each project process.

The use of risk theory in a complex man-machine system avoids catastrophic accidents, accidents at such facilities as a sea-going vessel during the project implementation, carries out risk assessments during the operational phase and technology of technical supervision over vessels. Identification of the actual state of complex technical systems, detection of a predicament state, prediction of the dynamics of changes in the state during operation, determination of the remaining resource - all these tasks form part of a single problem - ensuring accident-free operation of marine equipment on vessels [6].

A formalized safety assessment is a tool (prescription) for the development of regulations by the (IMO) International Maritime Organization based on a risk assessment related to navigation. In recent decades, the International Maritime Community has developed a manual on a formalized safety assessment based on risk theory, this approach is proposed to apply to specific projects, as well as in the methodology of project-oriented management [7].

Since the formalized safety assessment covers project design, repair, operational parameters of specific projects, and provides information on risks, as well as management options, and associated costs in the project. A formalized safety assessment is a systematic approach to risk assessment that occurs in maritime practice, as well as an assessment of the associated costs and benefits of alternative solutions that can be considered to reduce

the level of risk in each specific project.

Thus, a formalized safety assessment is a non-trivial approach that is based on an assessment of the risk of an undesirable situation and is aimed at identifying hazards before they cause emergencies. The application of the provisions of a formalized safety assessment with the classical theory of reliability in the operation of machinery makes it possible to optimize the costs of maintaining vessels in operation without compromising safety. With regard to risks in shipping, one of the weaknesses of the formalized safety assessment is the linkage to a specific (present) moment in assessing the safety of the ship [8].

The essence of the FSA application is that for certain hazards, it is necessary to find such measures to reduce their probability and effects of impact; *E*, defined as the difference, the cost of *Z*, implementation which will be less than the risk change *R*, also defined in value form.

$$E = R - Z \rightarrow \max,$$

Other hazards are a direct consequence of the human factor and require management, in particular, the introduction of the Safety Management System for navigation vessels.

In Fig. 1., a scheme for assessing the risk of ship safety and technology of technical supervision is proposed.

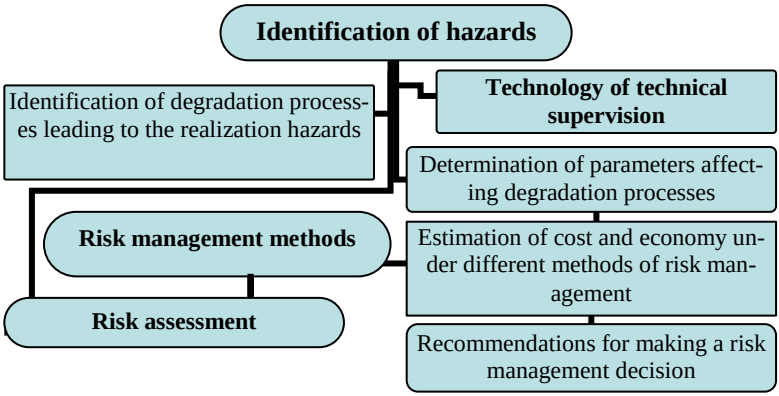


Fig. 1. The ratio of the formalized safety assessment at the operational stage and technology of technical surveillance of vessels

The identification (identification) of the degradation processes leading to the implementation of hazards is performed by analyzing the physical processes occurring on the vessel during operation, as well as the analysis

of the causes of occurrence of emergency cases with the same type of vessels or similar objects in adjacent areas.

Conclusions. The formalized safety assessment is a tool to improve the safety of ships' navigation, technological facilities and their operation by using risk environment assessments to select the most rational and economical means for improving the safety of ships. To monitor the security of objects, it is necessary to periodically evaluate the formal safety assessment, which is certainly impossible in operation.

In the author opinion, it is possible to synthesize the methodology of a formalized safety assessment and the theory of degradation processes to use these approaches when conducting technical observations. In addition, risk management in projects, taking into account anti-risk measures allows the customer to save material assets, and the crew to prevent accidents, injuries, to ensure the safety of the vessels and crew on its board.

References:

1. Rudenko, S.O., Gogunskiy, V.D. (2006) Assessment of environmental safety in projects - Odessa: Monograph. Phoenix, - 144.
2. Knight, F. (2003) "Risk, uncertainty and profit", translation from English. Moscow: Business, - 360.
3. Danchenko, E.B. (2009) Process management of deviations in the project. Mat. V International conference"Project management: status and prospects". Nikolaev, NUS, 107-109.
4. Krams′kiy, S.O. (2017) Mizhnarodne spivrobitnytstvo u vyrishenni problem sotsial′no-ekonomichnoho rozvytku rehioniv u aspektakh upravlinnya ryzykamy Mat. V Nauk.-prakt. konf. "Evropeys′ka intehratsiya v konteksti svitovykh hlobalizatsiynykh protsesiv": Naukove vydannya. Zbirnyk mat. tez dopovidey. Odessa, ORIPA NAPA, 202-204.
5. Lapkina, I.A., Pavlovskaya, L.A., Boldyreva, T.V., Shutenko, T.N. (2008) Project analysis. Theoretical basis for the evaluation of projects in maritime - Odessa: ONMU, - 315.
6. Shurpyak, V.K. (2005) Ship accident analysis and technology of technical surveillance / Scientific and technical collection of the russian maritime register of shipping - St. Petersburg: №28. - 32-42.
7. Guidelines for Formal Safety Assessment (FSA) for use in the IMO Rule-making process (2002). MSC/Circ.1023, MEPC / Circ.392 - London, - 54.
8. Shakhov, A.V, Bokareva, M.O. (2014) Risk management in ship repair projects / Visnyk NTU "KhPI" - Bulletin of NTU "KhPI". Kharkiv: – 2 (1045). – 87-95.

PROVISION OF THE MAINTENANCE SERVICE OF THE DEPOT WITH THE OPTIMAL SIZE OF REPAIR STOCKS

Krasheninin O., Ponomarenko O., Yakovlev S.
Ukrainian State University of Railway Transport

The traditional system of technical maintenance, current repairs of rolling stock provides for the mandatory provision of the maintenance service with turnover stock of nods and units. In the modern conditions, the linked capital in the form of stocks requires economic justification in terms of reduction in traffic volumes and aging of locomotives and rolling stock. Further operation of the maintenance service can be considered effective when it is based on up-to-date research, and various innovations will be used in business.

In UkrSURT and a number of research organizations and universities. research was conducted to study the optimal operation of the technical maintenance of optimal maintenance, current repairs of rolling stock. Analysis of trends, in particular, shows that research is focused on the features of infrastructure development in order to form the rolling stock maintenance system. Much attention is paid to the optimization of the rolling stock operation system, the introduction of diagnostic software, automation and information technology in the technical maintenance, current repairs, the optimization of life cycle, including the possibility of its extension beyond the normal period.

In terms of market relations, it is necessary to ensure a balanced system of production and operation of the maintenance service.

In Ukraine and abroad the rolling stock maintenance strategy is aimed at reducing all costs of technical maintenance, current repairs throughout the life cycle.

So, in order to ensure the operation of the maintenance service of the depot, industrial activities are divided into operational and repair components. This, in turn, implies that the repair plants along with the implementation of "major" renovations will provide locomotive and railroad depots with spare parts. At the same time, analysis of domestic and international experience shows that the most appropriate model is where the primary responsibility for the technical condition of locomotives and cars for the whole life cycle should be borne by the plant. This makes it possible to invest efforts in improving their design, increasing reliability, providing modern repair equipment, organizing a flexible connection between different branches of the repair and production services.

Our studies allow the following conclusions:

1 Achievement of the minimum expected order costs depends in varying degrees on the following factors: the probability of detecting a faulty unit, the size of ordered batch of products and additional costs when reordering by the customer.

2 The greatest impact on the cost of the order is made by the value of additional costs for the execution of a reorder, also affecting the value of the order.

3 The value of guarantee payments to suppliers for the quality of products is also dependent on additional costs for ordering products and the value of the order, determined by a decrease in the probability of detection of a faulty unit.

4 In the transition to the principles of the service maintenance, one should take into account the impact of these factors on the value of the costs of providing the depot maintenance service with the necessary stock of components, quality management and there is a possibility to provide flexible impact on the optimization of maintenance units.

References:

1. Alinovi A., Bottani E., Montanari R. Reverse Logistics: A stochastic EOQ-based inventory control model for mixed manufacturing/remanufacturing systems with return policies / International Journal of Production Research. – 2012. – 50 (5), pp. 1243–1264.
2. Cantos, P., Pastor J., Serrano L. Efficiency Measures and Output Specification: The Case of European Railways / J. of Transport and Statistics. – 2000. – № 3. – pp. 61–68.
3. Govindan K., Soleimani H., Kannan D. Reverse logistics and closed-loop supply chain: A comprehensive review to explore the future / European Journal of Operational Research. – 2014. – № 240 (3), P. 603-626.
4. Hughes M. Cost and capacity drive high speed train design/ Railway Gazette International. – 2010. – № 5. – pp. 37–39.
5. Methods for assessing the life cycle of traction rolling stock of railways: mograph / E. D. Tartakovskiy, S. G. Grishchenko, Yu. Ye. Kalabukhin [etc].– Lugansk: Publisher «Noulidzh», 2011. – 174 p.
6. New technology center for temple mills train service Eurostar / Railway Gazette International. – 2008. – № 10. – pp. 820–821.
7. Turki S., Hennequin S., Sauer N. Perturbation analysis for continuous and discrete flow models: A study of the delivery time impact on the optimal buffer level / International Journal of Production Research. – 2013. – № 51(13), pp. 4011-4044.

LEISURE AS CONSTITUENT OF THE SPIRITUAL AND MORAL WORLD OF STUDENT OF CLASSIC UNIVERSITY

Krokhmaleva O.

An important constituent and diagnostic reception of the spiritual and moral world classical university student to analysis of leisure. Exactly organization of leisure is one of major links of only integral process of spiritual and moral development of personality.

The choice of employment in own time is a projection of personality in society. In modern pedagogical science field of leisure given enough attention. Leisure is examined as the span of time, that belongs to her and sent to purposeful, useful activity, subjectively estimated by personality.

In capturing a person satisfies the need for independence, cognitive needs, develops and self-completion, building a harmonious relationships with the environment world, , capturing help to form attitude toward the vitally important values of personality, to achieve harmony between thoughts and feelings. There is a serious need for independent activities. Impose capture to the man is impossible, chooses him in accordance with the necessities of the inner spiritual and moral world. Will distinguish such directions to development of the spiritual world of modern student :

- intellectually and aesthetic delight (deep study of separate objects, music, drawing, programming, etc.).
- egocentric capture (any business is only a means to demonstrate their success).
- leader fascinations (a man changes groups, sections, public commissions, while will not find a group it is possible control in that).
- body and manual capture (type of seizures associated with the intent to strengthen willpower, stamina, agility, or to acquire any piece chiropractic skills: sports, car or motorcycle controls, etc.).
- storage capturing (collecting). This type of seizures can be combined with cognitive demand or with a tendency to follow fashion.
- informing-communicative fascination (most primitive kind: street companies, protracted revision of television or DVD; type of fascinations, characteristic for the representatives of youth age with the unsteady type of character, - the got information is mastered superficially, a man often looks over all in succession, gets out even if, then mainly easy genre, the people of this type are distinguished among other by weak will, unsteady behavior).

The lack of meaningful capture leads to gambling, illegal behavior, early alcohol abuse, substance abuse and addiction. Sections and groups - the most effective ways of prevention of antisocial behavior.

During research before us such picture of leisure of modern student appears: night-clubs, youth evening-parties, reading of literature, going in for sports, visit of cafe, disco, unconventional forms of leisure, domestic leisure, pastime on loneliness, infatuation for the different kinds of art, artistic independent action, participating in political motions, visit of church. On the whole it should be noted that leisure of students is related foremost to entertainments.

To the displays of moral consciousness it follows to attribute a conscience, work, ability to altruism renunciation. Efficiency of the "soul of man" consists in the hierarchy of reasons and values of personality (to subordination of more subzero levels higher). As research showed, the basic constituents of moral consciousness of student of classic university are such descriptions. Spiritual and moral development of man in a structural aspect envisages support not only on actual but also potential possibilities that at the proper terms can be developed on a faith in boundless possibilities.

The image of the spiritual and moral educated man incarnates in itself sense of conscience, duty, faith, responsibility, citizenship, patriotism, patience, mercy, gentleness, meekness, capacity for distinction of good and evil, selfless love, readiness to overcoming of vital tests. The results of diagnostics of the state of formed of moral consciousness of students of classic university allow to us to do such conclusions:

- cognitive needs and the need for self-knowledge is not dominant for the prevail of students surveyed;
- the desire for harmony in the surrounding world characteristic for the spiritual and moral world of modern student, but far not all of them see the ways of achievement of this harmony;
- attitude to life as the highest human values prevailing in most of the respondents, but this attitude is often motivated by the egocentric motives;
- positive quality in system of value orientations characteristic of most students, but not all are ready to actively defend these values in everyday life, many who show passivity and conformity in stance;
- the desire to develop and cultivate characterized by a significant portion of respondents;
- the existence of harmony between the thoughts and feelings of the individual is not the main characteristic modern student, most students going through the period of the sensory fields and ideological concepts inherent youthful ages.

References:

1. Lichko A. E. Opredelenie psihicheskogo infantilizma u podrostkov s pomoshh'ju patoharakterologicheskogo diagnosticheskogo oprosnika / [A. E. Lichko, A. A. Vdovichenko, N. Ja. Ivanov, S. D. Ozerckovskij] // Psihologicheskaja diagnostika pri nervno-psihicheskih i psihosomaticheskih zabolevanijah. – L.: NII psihonevrologii, 1985. – 367 s.
2. Men' A. V. Kul'tura i duhovnoe voshozhdenie / Aleksandr Vladimirovich Men'. – M.: Iskusstvo, 1992. – 495 s.
3. Mishhuk Ju. K. Jeticheskie kodeksy inzhenernyh soobshhestv [Jelektronnyj resurs] / Ju. K. Mishhuk. – Rezhim dostupa: http://masters.donntu.edu.ua/2010/fknt/mishchuk/library/article1.htm.h.
4. Momov V. Chelovek, moral', vospitanie / V. Momov. – M.: Progress, 1975. – 168 s.
5. Panchenko L. M. Formuvannja cinnisnih orієntacij molodi v period sistemnoї transformacії ukraїns'kogo suspil'stva: avtoref. dis. … kand. filos. nauk: 09.00.03 / Lesja Mikolaїvna Panchenko; Akad. ped. nauk Ukraїni, In-t vishh. osviti. – K., 2003. – 19 s.
6. Rosul V. Vishha osviti v Ukraїni: stan problemi i perspektivi [Elektronnij resurs] / V. Rosul, V. Kobal'. – Rezhim dostupu: http://www.e-lib.zakdu.edu.ua/index2.php?option=com_sobi2&sobi2Task=dd_download&fid=239&format=html&Itemid=11
7. Skok M. A. Cinnisni orієntacії osobistosti suchasnogo studenta / M. A. Skok // Chernigivs'kij derzhavnij pedagogichnij universitet im. T. G. Shevchenka. Visnik ChDPU. Serija: Psihologichni nauki. – 2002. – Vip. 11. – S. 128–132.
8. Suchasni problemi vishhoї osviti Ukraїni v konteksti integracії do єvropejs'kogo osvitn'ogo prostoru: materiali naukovo-metodichnoї konferencії, m. Sumi, 6–7 zhovtnja 2010 r. / za red. O. V. Prokopenko. – Sumi: Sums'kij derzhavnij universitet, 2010. – 196 s.
9. Tabachuk Ju. V. Moral'na svidomist' osobistosti: psihologichni vimiri analizu / Ju. V. Tabachuk // Problemi suchasnoї psihologiї: Zbirnik naukovih prac' K-PNU imeni Ivana Ogiєnka, Institutu psihologiї im. G. S. Kostjuka NAPN Ukraїni. – 2011. – Vip. 13. – S. 497–506.

INTERACTIVE TECHNIQUES IN THE PROCESS OF TEACHING PROFESSIONAL TERMINOLOGY TO STUDENTS OF TRANSPORT TECHNOLOGIES

Krsek O.
Volodymyr Dahl East Ukrainian National University

Innovative methods of teaching are a goal of many educators. Teaching students in ways that keep them engaged and interested in the material can sometimes be a challenge. Foreign language occupies a special place in the education system in the era of culture globalization. For the modern professional it is not only a means of communication, but also the source of intellectual, cultural and professional personality development and the factor of society's social, economic, scientific and technical progress. Foreign language skills in the field of professional communication enable to facilitate socialization in the labor market, to adapt to dynamically changing conditions and to apply knowledge in creating new competitive products. Ability to carry out effective foreign language communication in the process of professional activity is an important component of the expert's vocational training. Hence, it's necessary to create a qualitatively new education system, capable to provide the experts' effective communication in the modern global space.

Plenty of scholars (I.Berman, V.Bukhbinder, V.Korostylov, O.Tarnopolsky) have paid a considerable attention to the methodology of teaching students different facets of foreign language terminology. In particular, they have suggested a wide range of techniques for disclosing the meaning of terms, offered ways of translation and contextual explanation of new words, worked out numerous exercises for learning new vocabulary and fixing it in the students' memory. Scientists and methodologists have focused their works on making the process of teaching/learning vocabulary purposeful, communicative and effective. Learning vocabulary «functionally», students form their «verbal networks», which function as a basis for keeping words in the memory and as a condition of their reproduction in speech. Having acquired reproductive skills, which are mainly based on the work of memory to solve standard, conventional tasks with the learning material, students move on to forming and producing their own patterns of speech with that material, offering creative, original solutions, thus involving not only memory, but their thinking.

Scientists (O.Tarnopolsky, V.Borshchovetska, D.Bubnova, I.Lipska, Z.Korneva, L.Morska, O.Petrashchuk and others) have formed the methodological basis for further research in the field of teaching terminology. In

particular, as it has been revealed in numerous studies by the researchers, they described the principles of selecting terminology and suggested lists of terms to be acquired by students of different specialties, offered methodology of learning terms in different types of speaking activity, paid attention to the ways of translating and disclosing meanings of such lexical units, analyzed different strategies for memorizing and applying terms in oral and written communication, studied the effectiveness of using computers and special training programs in teaching/learning vocabulary, elaborated complexes and systems of exercises for learning and brushing up terminological vocabulary while reading and/or listening to different authentic professionally oriented texts [6, 23].

There are some methodological problems which should be solved in the process of teaching students the skills of professional speech. These primarily include the task of expanding professional vocabulary of students and activate it in targeted training in various types of exercises. Foreign researchers of the problem under discussion (N.Schmitt, R.Carter, M.McCarthy, R.Ellis, R.Gairns, D.Gardner, M.Lewis, I.Nation, L.Taylor and others) have also made a great contribution to the methodology of teaching professional vocabulary, and the results of their thorough study have been widely used by Ukrainian theoreticians and practitioners of ESP. In this respect it is worth mentioning N.Schmitt [5, 133], who determined and described vocabulary learning strategies and also proved the necessity of using them concurrently by good learners to structure their vocabulary learning, review and practice target words, define semantic relationships between new and previously learned words so that students can be conscious of their learning and can take steps to regulate it. Consequently, the researcher assumes that «vocabulary acquisition is an incremental process, and the teachers must concentrate not only on introducing new words, but also on enhancing learners' knowledge of previously presented words.» J.Nattinger [2, 62] stresses that comprehension of vocabulary relies on strategies that permit learners to understand words and store them, to commit them to memory, while production concerns strategies that activate one's storage by retrieving these words from memory, and using them in appropriate situations. I Nation [3, 182] underlines two important factors affecting productive vocabulary use: knowledge and motivation. Productive knowledge of vocabulary requires more learning efforts than receptive knowledge, the researcher claims. The necessity of applying stimulating, social, mnemonic, cognitive, metacognitive, and compensatory strategies in the process of teaching/learning target words has also been substantiated [8], because due to using these strategies learners are able to enrich significantly their vocabulary load in the process of mastering foreign languages.

In that case we agree with N.Schmitt [5, 158], who resumes that patterns of strategy use can change over time as a learner either matures or becomes more proficient in the target language. At the same time we cannot expect that the student will be able to use his/her knowledge of linguistic rules (new words) for effective communication even if he/she has learned these rules (new words). Therefore, it is recommended that teachers teach vocabulary and grammar through contexts so that students can learn how to apply their knowledge into practice [7, 58].

The importance of using interactive activity which can take different forms in the classroom has been long proved by various researchers (H.G.Widdowson, N.Brieger, M.Ellis, Ch. Johnson, J.M.Dobson, J.Comfort, D.Nunan, W.Rivers and others). According to R.Arends [1, 229], the interactive aspects of teaching combine the following items: presentation, direct instruction, concept teaching, cooperative learning, problem-based instruction, and classroom discussion. Scholars emphasize the effectiveness of such forms of interactive cooperation in the teaching/ learning process which implies full participation of the teacher and students and their interaction with the purpose of planning (classroom and independent work, different projects), making effective choices (of words relevant to future profession), helping each other (to organize vocabulary, to draw lexical charts). Interactive, or cooperative learning, also implies «small-group activity, large group instruction, interacting in pairs» [4, 78], sharing information with others, etc., while the teacher becomes an advisor, guide, helper, supporter, and partner in such a cooperative venture. Such an approach to teacher-student relations can ensure mutual respect and responsibility for the results of studying, provide information for discussions, which all together promote interaction as a powerful means of forming all constituent parts of communicative competence and successful language learning.

References:

1. Arends R.I. Learning to Teach, 5th , Boston: McGraw-Hill, 2000, p. 229.
2. Nattinger J. *Vocabulary and Language Teaching*, London: Longman, 1988, p. 62–82.
3. Nation I.S.P. *Learning Vocabulary in Another Language*, Cambridge: CUP, 2002, p. 182.
4. Rivers W.M. *Communicating Naturally in a Second Language*, Cambridge: CUP, 1996, p. 78.
5. Schmitt N. *Vocabulary in Language Teaching*, Cambridge: CUP, 2000, p. 158.
6. Semenchuk Yu. *Rwandan Journal of Education*, 2015, vol. 2, No. 1, p. 18–36.
7. Yigzaw *Ethiopian Journal of Education and Sciences*, 2013, vol 9, No. 1, p. 51–60. Retrieved April 28, 2015 from http://www.ajol.info/index.php/ejesc/article/

THE KEY FACTORS OF FORMATION OF SUSTAINABLE DEVELOPMENT OF TRANSPORT ENTERPRISES

Kuimova A.
National Transport University

Transport plays a significant role in the socio-economic development of any country. Effective functioning of enterprises of transport is a prerequisite for ensuring a high level of competitiveness in general. The transport enterprises are an important tool for achieving social and economic objectives. The current development of the company in any industry is only possible through the development of innovation as extensive way of economic development exhausted. Therefore, it is necessary to use new solutions in the field of technology, management and organization of production [1].

The level of development of the transport sector of the state is one of the main characteristics of technological progress. The determining factor is able to bring the transport sector from the crisis on the technical and technological level of developed countries, is an innovative development and active implementation of innovative processes. The process and terms of innovative transport sector revival is dependent on the volume of financial support for innovation.

In the scientific literature there is a diversity of approaches to the definition of the category "Sustainable Enterprise", but from them two main approaches are distinguished to the characterization of viability: first, from the standpoint of its ability to maintain a certain status and operate in every single time, despite impacts, and secondly, from a position of immutability, permanence of any features of the behavior of the company (state or process) over time. From this perspective, the category of "sustainability" is also the "instantaneous economic stability of the enterprise" and "dynamic stability of the process of economic development enterprise."

This "steady development of the company" is determined by a combination of changes in economic, environmental, social and other subsystems of the enterprise caused by the influence of various factors that lead to the switching of relatively stable from one state to another. [2]

Thus, the steady development of the company is a process of constant change, in which the use of resources, direction of investments, technological development, innovation, improvement of personnel and institutional changes agreed with each other and aimed at improving the capacity of enterprises, meet their needs and achieve strategic goals. [3] The importance of innovation transport systems reflect the data given in Table 1.

Table 1

Financing medium-term priorities for innovation by spending funds in the 2014-2015 biennium.

Kinds of activities	2014		2015	
	Total, thousand grn.	Specific weight, %	Total, thousand grn.	Specific weight, %
The development of components and systems for the new generation of high-speed and high-speed rail transport	3817,77	21,46	138,00	1,3
The development of transport logistics	4030,40	22,66	337,46	3,2
Creating new generations of equipment and technologies in aircraft, shipbuilding and space industry	4108,20	23,1	1940,50	18,36
Development tools for the diagnosis aviation, naval and space equipment	520,00	2,92	1170,00	11,07
The development of the navigation systems of various purpose	925,80	5,2	840,00	7,95
Total medium-term priorities	13402,17	75,34	4425,96	41,88
Other	4387,1	24,66	6141,60	58,12
Total strategic priority	17789,27	100	10567,56	100

Analysis of the statistics shows that the highest priority areas of innovation to creating new generations of equipment and technologies in aircraft, shipbuilding and space industry, because in this sector 8611.30 thousand grn. were contributed by budget, but the second priority is the development of transport logistics, which share is 22.66% of total funding. State promotes the sustainable development of transport enterprises investing budget funds the innovative development of transport logistics, as one of the main innovations of the transport process is the same structure improvement of transport and logistics systems in Ukraine, because it is the development of transport logistics can bring the country to a new level.

In order to generalize the concept of sustainable development of transport enterprises, it is necessary to distinguish the main factors that affect its security, include: factors affecting the social component of sustainable development company; factors affecting the environmental dimension of sustainable development company; factors affecting the financial and economic component of sustainable development company.

Studying the problem typology factors of sustainable development of transport enterprises can be distinguished five groups of factors to provide services in the transport sector, such as labor, capital, innovation and management, information ecology.

Thus, the three basic components of sustainable development characterized by factors of sustainable development: «social" development - work; «ecological» development - natural factors and the environment; «economic" development - capital, innovation and management information.

Characteristic factors of sustainable development of the enterprise or organization are: financial stability and positive trend in profitability; the presence of customers, consumers of products or services, that source of business income; positive impact on the performance of public consciousness in terms of environmental protection and energy consumption; positive assessment of the enterprise community, employees and business partners. Indicators should be used as tools to assess economic and environmental outcomes of previous administrative decisions regarding the development of economic activities and prevent future erroneous decisions in controlling the degree of achieving the development goals.

References:

1. Beketov A. Problems of strategic transport development of enterprises in terms of advanced economy [electronic resource] / A. Beketov, N. I. Myssyura 2010 - Access: http://cyberleninka.ru/article/n/problemy-strategicheskogo-razvitiya-transportnyh-predpriyatiy-vusloviyah-perehodnoy-ekonomiki.
2. Sukhorukov T. V. Economic Stability enterprise [Text] / TV // Economy Sukhorukov of Ukraine. - 2001. - № 5.- S. 48-52.
3. Veselovskaya V. S. Management of economy resistance at enterprises in modern conditions [Electronic resource] / V. S. Veselovskaya, A. B. Horody - // Plekhanov Russian University of Economics 2012 - Access: http://kirgteu.com/filemanager/download/2374.

RESEARCH METHODS IDENTFY INCONSISTENCIES ENVIRONMENTAL REGULATIONS WHELED VEHICLES IN THE PROCESS OF CERTIFICATION

Labuta A., Kryvoruchko T.
National Transport University

Under orders of the Ministry of Infrastructure of Ukraine [1,2] all wheeled vehicles and their equipment must meet environmental standards. Check the vehicle carried out in accordance with the set procedure. Vehicles must meet only technical regulations and rules.

The main purpose of the certification is applicable conformity vehicle standards Ukraine and prevent the use of vehicles that can cause damage to life and health, the environment or property. The method of determining emissions of pollutants for diesel engines and gas diesels set [3], the engines of ignition [4]. These tests are carried out in laboratories modes and the statistical position of the vehicle. This method does not show the real picture for testing the vehicle. Therefore, the country refused to use this method and proposed test method test car races on public roads in the city and outside the city. The implementation of this method is through the use of special portable equipment installed in the trunk or attach behind the vehicle.

When driving on public roads the car overcomes much larger loads with variable nature than in test trials in the laboratory. When tested in the real world, a number of factors affect the objectivity of the results. Therefore, this method is appropriate for use to get a real picture of harmful substances in exhaust gases of vehicles.

The study we found that in tests conducted in the open level of emissions from different laboratory. First of harmful substances were significantly higher. Second, this method better describes the actual operating conditions.

Thus the method of measuring emissions in the open more shows results close to real conditions. So we think that is important to use this method as the main measure for the study of emissions.

References:

1. Nakaz Ministerstva Infrastrukturi Ukraïni №521 vid 17.08.2012.
2. Nakaz Ministerstva Infrastrukturi Ukraïni № 710 vid 26.11.2012.
3. DSTU 4276:2004
4. DSTU 4277:2004

IMPLEMENTATION OF TRANSPORT COMPONENT FOR CONSTRUCTION

Lashkov O., Lashkova T.
Dnipropetrovsk National University of Railway Transport named after academician V. Lazaryan

During the designing and preparation of the construction work schedule, not only the total need for the necessary materials is taken into account, but also their quantity in "portions" in time. After all, until you build the first floor – you do not use the material to build the next.

It is proposed to use an undirected graph whose vertices are all the stations of Ukraine open for cargo work and are named as $x_1, x_2, ..., x_n$, and the edges $a_1, a_2, ..., a_m$ - railway lines between them. The problem is in finding the shortest path from the given initial vertex $s \in X$ up to a given finite vertex $t \in X$, on condition that such a path exists, i. e. on condition $t \in R(s)$.

Let us introduce the following notation:

G – a region, on which we find the shortest distance;

R – a set of requirements, a system of restrictions;

X – a functional, which should be minimized

We get the system of triples (G, R, X), where in each specific case it is necessary to solve the problem of finding the smallest path.

Considering our mathematical formulation on a concrete example of Ukrainian railways, a customer can list the following problems of finding the least path:

1. It is required to find the minimum distance between two points, in order to minimize the travel time, i.e.

$$(G_1, R, X) \to \min$$

G_1 : graph, where the value of the edge of the graph is the time of transportation

R : t- min , t - time of getting from x_i to x_j;

$$X : \{x_i, x_j\}$$

x_i – point of departure;

x_j – arrival point.

2. It is required to find the minimum distance between two points, without taking into account the time of motion.

G_2 : Graph, where the value of the graph edge is the distance $R : d \to \min$

$$X : \{x_i, x_j\}$$

3. It is required to find the minimum distance between two points in order to minimize the costs of transportation, i.e. in the graph G_1 the value of each edge is equal to the prime cost of transportation.

$$(G_1, R, X) \to \min$$

G_3 : a graph, whose value of the edge is the prime cost of transportation

$$R\text{-}\min;$$
$$X : (x_i, x_j)$$

While using this method of selection the way of transportation, the construction organization that is the consignor gets the opportunity:

- to reduce the cost of their services, by reducing the railway tariff for the transportation of necessary cargos (thereby increasing its competitiveness);

- if there is a sudden need to start construction or rehabilitation work (restoration of destruction, its prevention, an order for an "emergency" construction), it will be possible to obtain the necessary materials in the shortest time in the specified volumes;

- the receiving of certain volumes of goods on time, specifying a concrete day of delivery.

This will attract additional orders by lowering the prices for construction work and guarantying the execution of urgent orders. It will also provide the possibility of planning stage-by-stage construction with the calculation of specific dates, which, as a kind of service, will also interest the rich clients, thereby increasing the competitiveness of the construction organization.

References:

1. Galaburda V. G. Optimal transportation planning and marketing // Railway transport. 1991.— № 8.— P. 60-63.
2. N.Christofides "Graph theory. Algorithmic approach". M., Mir—1978., 432 p.

RELIABILITY PERISHABLE GOODS OF DISTRIBUTION CHANNELS

Lebid I., Anufriyeva T.
National Transport University

World globalization of trade and economic relations and implementation of IT technologies have caused significant structural changes in the goods' distribution, such as reducing the term of the contract of sale and delivery volumes, increased requirements for vehicle enforcement of international treaties and reliability of its operations, reducing deadlines orders and its value, creation of multimodal logistics systems and so on. Therefore, the development of trade relations between Ukraine and the European countries in a globalizing economy requires the introduction of modern distribution systems and delivering products that contribute to ensuring the competitiveness of national businesses. Lack of quality methodological support improvement of the goods' delivery is an obstacle on this way. The investigation doesn't give answers to many questions of practice. Therefore, the study of patterns of functioning distribution system for cargo delivery needs of scientific research.

Improvements in the delivery of goods to distribution systems dedicated work of many national and foreign scientists [1-3]. Among these works it's possible to highlight the following areas: inventory management [1], the design of logistics systems [2]; Organization of road transport terminal [3].

Most attention was paid to scientists studying leakage flows and processes that take place between counterparties in the way of goods from producer to consumer. In general, the participants of the process, complex manufacturing operations, their sequence and duration determine the type of goods. This greatly complicates the study of the distribution of goods delivery. To study the basic laws of functioning of such delivery systems can restrict consideration to products that do not require specific conditions, storage, transport and sale. Under this assumption the totality of the operations and their sequence remains unchanged. They repeated the performance at each delivery that is cyclical in nature. Therefore, the analysis process is sufficient to consider performing one cycle of delivery, which is realized through the channels of supply. For the analysis of supply channels using three approaches: Process, object and evaluation of the quality of logistics services. Process approach involves the development of descriptive models, limiting opportunities to optimize the delivery process. Objective approach involves the development of models based on graph theory or mathematical

programming, leading to simplification of the real object by ignoring significant relationships between contractors and growth of error of calculations. Evaluation of the quality of logistics services has generally recognized aggregate indicators that determine the level of service.

Analysis of supply channels is much more complicated when considering the delivery of perishable goods, which impose additional restrictions on the process of shipping and handling them in the performance of international traffic. Only in one component distribution channel - inventory management, the author in [4] notes that the total population of the developed models, share models that focus on inventory management perishable goods does not exceed a few percent. This is because such problems are difficult to analyze. In addition, the author notes that a significant number of proposed models because of the assumptions adopted can't be used in practice as research efforts have been directed at solving problems mainly in the abstract light setting without serious study computational aspects. Areas of Advanced Studies in Management perishable inventory by S. Namiasom in the monograph [4]. However, they apply only to certain compositions. Challenger - organization perishable goods supply chain - hardly considered. In addition, studies have not examined the features of companies that interact and influence the transport component.

Priority should be given to the management of distribution channels according to the views of leading scientists [1,2] in the analysis of distribution systems. In this release the following business processes: planning, procurement, production, delivery and return. Thus, the efficiency of the goods' distribution is considered as a management function in a given organizational structure that limits the ability to optimize the system as a whole. Considerable attention is the analysis of the efficiency of distribution assigned in [5]. The author notes that among the various approaches to assess and ensure the effectiveness of the most widely chains received process approach and developed based on SCOR-model. Ideology-SCOR model provides a combination of the principle of continuity as a commodity, and so information flows and contains three popular management concepts, business processes reengineering, benchmarking and use of best practices. According to the ideology of its implementation no guarantee of achieving optimal business processes and evaluating the results correct functioning of the distribution channel. The author [5] recommends comprehensive channel management performance criterion deliveries take cost-effectiveness for a given level of stability of the system from external disturbances. The basis of this assessment method he sees adapt reliability theory to describe the technical systems of organizational and economic systems. The main obstacle on this path is to establish consistency between the basic concepts of the

theory of reliability and supply channels. In addition, features of transport, warehousing and trade organizations do not allow without significant changes to adapt to their goals developed in other areas of evaluation methodology and reliability of production. An important feature of the distribution is a property of its elements rehabilitation after crashes. Ignoring this can lead to incorrect assessment of the situation and acceptance of erroneous decisions. In addition, most of the proposed methods involve evaluation channels of supply for the results of the delivery cycle without assessing the performance of individual business processes that significantly differ from each other as technical equipment and technology performance of their tasks. Thus, to assess the reliability of the delivery process perishable goods sufficient to establish the possibility of failure and its quantitative characteristics and the need to determine the duration and failure to assess its impact on the general terms of delivery and sale of perishable goods.

Therefore, the problem of assessing and improving the reliability of perishable goods distribution channels is a complex scientific problem, which should be detailed by individual business processes and counteragent distribution channel. Its solution is possible by examining one type of product delivery by using dynamic programming ideas and mathematical apparatus of fuzzy sets.

This study provides a theoretical basis for modeling the process of perishable goods' delivery in distribution systems, which will examine the impact of various supply channel members and inventory management strategies on the efficiency of the process. Based on the modeling process will be possible to determine the optimum batch delivery of goods in a specific context of the distribution system, reliability of components and rational transportation technology that ultimately will improve feed supplies.

References:

1. Stock JR, Lambert DM Strategic management of logistics: Per. From the 4th of Eng. Ed. - Moscow: INFRA-M, 2005. - 797 s
2. Organization and design logistics systems: Textbook / Ed. prof. M. Denisenko Sci. PG Lekovtsya Sci. LI Mikhailova. - K .: Center of educational literature, 2010. - 336 p.
3. Belyaev VM Terminal systems of cargo transportation by road / VM. Belyaev - Moscow: Transport, 1987. - 287p.
4. Nahmias S. Perishable Inventory Systems / Steven Nahmias. - New York: Springer Science + Business Media, 2011. - 96 p. - (Series "International Series in Operations Research & Management Science").
5. Bochkarev PA Management of reliability of supply chains in supply logistics. Dis. Cand. Economy. Sciences. : 08.00.05 - Economics and management of the national economy (logistics). - SPbGEU., 2015. - 155 p.

WAYS OF IMPROVING OBJECTS TRANSPORT AND CUSTOMS INFRASTRUCTURE

Luzhanska N.[1], **Lebid I.**[2]
[1]*National Transport University,*
[2]*Optimal Logistic Systems Ltd.*

An important role in the overall transport and customs infrastructure owned Freight forwarding and customs warehousing services which are provided by public, private and other commercial entities in the organization managing the cargo movement. On the one hand the features of these service categories are characterized by general properties of infrastructure services to which they belong, on the other one their specific features. Infrastructure nature of freight forwarding and customs storage services are reflected in the fact that they don't meet the defining feature material-material production, acting as a prerequisite for foreign operations or meet specific needs, they always have a maintenance facility and the main quality criteria and efficiency of these services is the nature and extent of their positive impact on facility maintenance.

The multistage space-time sequence is the main feature of the freight forwarding and customs warehouse services in which implementation can take part several independent economic structures. Some of them are responsible for the final result at the facility served. Others are responsible for the intermediate services in separate operations, such as loading, transportation, handling, customs procedures, storage, labeling. Thus it is possible to set options for the provision of these services (both for warehouse and their sequence), unequal in terms of not only the total cost, but the effect of service. This in turn allows and requires the search for more effective, that is rational (optimal or close to it) option providing comprehensive services and modes of service with the help of modern logistics management systems, in readiness transport and storage companies take over the provision of a complex technological and informational interrelated and interdependent services for the movement of goods, their interim storage and other accompanying operations.

The sharp increase in the role of management in different functional areas provides an opportunity to consider the economic structures in the area of freight forwarding and customs warehousing services as specific management systems. Firstly performance of these systems include the possibility of multiple choices of goods movement, different, both on the level of service supply agreement and on the total costs of the process that reveals additional reserves organizing freight forwarding and customs warehouse

service by finding the optimal or close to it alternative goods movement. Secondly set economically and legally independent economic systems can participate in the process. It can compete with each other in providing intermediate services in various combinations, indicating the possibility of forming a market for these services through the construction and development of efficient logistic chains that allow regularly evaluate various options for goods movement and successfully solve quite complex information and optimizing freight forwarding and customs warehouses tasks from the application of the logistics methodology in any part of the goods movement.

There is feasibility of cargo customs such as logistics management system that aims not only to provide comprehensive services but also a single information field and the organization controls cargo in real time. Cost-effectiveness of this solution is evaluated from the perspective that it helps significantly increase the speed goods' movement of foreign economic activity at the lowest possible cost, facilitating formalities and settlements for all stakeholders.

Marketing tactical assessment of demand for complex forwarding and customs warehouse services, taking into account the growth dynamics of freight traffic that allows you to make a prediction about the need for network construction in Ukraine cargo customs and determine their locations depending on demand for services. Given the market opportunities every cargo customs complex has to specialize on complex transport and forwarding services and warehousing of goods to customs processing and a complete set of related services. This operation is relevant strategic development program to ensure an acceptable ratio between small, medium and large objects of transport and customs infrastructure in Ukraine.

Despite of the Ukrainian transport potential which is provided strategic locations at the crossroads of regional trade routes for further enhance integration into the global transportation system requires that the transport sector was capable and ready for integration into the regional network cargo customs. The successful integration of Ukraine into the European network of highways is impossible without substantial improvement of transport and customs infrastructure. [1]

The integrated services principle of foreign economic activity is driven by the need of coordination and cooperation of customs authorities, Cargo Customs, carriers, members of foreign operations control services with the creation of closed supply chain, united by a common information and communications network. As part of its logistics function is implemented traffic control traffic.

The formalization of information and optimization of logistical problems are required by Cargo Customs mechanism in developing. They pro-

vide the opportunity to complement the marketing orientation substantive guidance which is aimed at meeting the needs of customers who formulate a particular need for an integrated unit or service and the corresponding demand.

This approach enables the building management system forwarding and customs warehouse services, including the formation of customers, the effectiveness of management traffic, using different modes of transport, taking into account the type and distance of transportation, customs warehouse services, insurance, installation tariff policy. At the same time to successfully solve the problem of system management organization, including the functioning and development necessary to change the nature and content of the information flow of cargo and information model itself. Effective process management delivery and customs clearance of goods and vehicles of development is not possible without the full use of international and national information space, new technology and management systems at the present stage.

References:

1. Pasichnyk A. M. Cargo Customs as a structural element of the transport and logistics center / A.M. Pasichnyk, S.S. Kravchuk, I. YU. Lesnikova // Visnyk AMSU. – 2007. – № 4. – C. 75–79.

SYSTEMATIZATION OF PRINCIPLES OF MODERN UKRAINIAN LABOR LAW

Liamzienko V., Kotova L.
Volodymyr Dahl East Ukrainian National University

The principles of labor law is a category which indicates the guiding ideas and principles that underlie both on labor relations and their legislative regulation. Finding its image in law principles, the principles determine the nature of law regulation, its ideological orientation. It can be argued that the principles of labor law is a dynamic phenomenon that develops according to specific historical conditions.

A significant expansion of the principles of labor law, primarily due to the implementation of international, particularly, European standards in the sphere of labor regulation is a trend of recent years. In order to deter-

mine the areas of improvement of legislative regulation of labor law principles, a necessity in their systematization is arisen.

Some aspects of the issue of labor law principles were researched by such scientists as O. A. Ahakov, V. V. Honcharov, L. P. Hruzinova, V. I. Kurilov, O. V. Lavrinenko, S. V. Miroshnyk, A. S. Pashkov, P. D. Proskuriakov, O. V. Starchuk, V. I. Shkatulla and many others. However nowadays there are no comprehensive recent studies on the systematization of sectoral and intersectoral principles of labor law including modern tendencies of developing of this science, what highlights again the importance and relevance of the proposed theme.

Labor law is a complex branch of law that consists of several subsectors and individual institutions. Species diversity of labor relations determines the existence of the system of relevant principles, which are based on certain types of labor relations. In this case, we are talking about the distinction of general, sectoral and intersectoral principles of labor law.

There is a traditional approach for legal science, according to which the principles are classified according to the spheres of their actions: 1) general legal principles common to all branches of law (humanism, democracy, social justice, recognition and security of human rights, freedoms and civil rights, equality before the law etc.); 2) intersectoral principles that reflect the common features of several branches of law (minimum conditions of safety and production); 3) sectoral principles, which characterize a separate branch of law (universality, social security by compulsory payments to the extrabudgetary funds, the state budget and etc.); intrasectoral principles, relating to individual branches of law (principles of minimum wage, social services, etc.). [1, p. 23-24].

This classification is appropriate for the demarcation of the principles of labor law. In particular, the general principles (international, constitutional, and others.) apply to all types of labor relations and other adjacent law relations; intersectoral cover several institutions of labor law, but sectoral – only one of them. In this context, the idea of P. D. Proskuriakov seems to be sensible, he argued, that the usage in legal regulation of labor sectoral principle of unity and differentiation provides (as the way of its realization) the division of labor law principles into two groups: 1) general principles that are expanded to all employees; 2) special principles that are expanded to certain categories of workers, including those in certain categories of civil servants [2, p. 520].

Likewise, the classification of the principles of labor law may be assigned such criteria as the scope of the extension of the principles of relevant groups on the subjects of labor relations. Those that distribute its effect

on all subjects of labor relations, belong to the general, and the rest - to special.

O. V. Lavrinenko believes that the component structure of system Ukrainian labor law principles should be determined considering that the sectoral in status (level) principle is one of objective criteria, which allows to structure this branch in legal system; seamlessly interact in the system with its other components - relevant sectoral principles; to each such principle given its own important role in the characterization of their branch of law and in the overall system of law – in the "shell", in which the branch of law exists; a certain sectoral principle reflects only that features of the right, which have the most important social, political and legal importance in specific historical circumstances and in connection with the tasks, defined by the state and society [3, p. 267].

Thus, we can say that the whole system of labor law principles by distributing the scope of their action advisable can be classified into three groups: 1) general; 2) sectoral; 3) intersectoral.

The first group traditionally includes: 1) the principle of freedom of labor; 2) the principle equality in the field of labor; 3) the principle of contractual nature of labor; 4) the principle of certainty of labor functions; 5) the principle of stability of labor relations; 6) the principle of material interest in the outcome of labor; 7) the principle of security of labor; 8) the principle of participation of labor collectives and in solving issues of establishing working conditions, exercise control over compliance with labor legislation; 9) the principle of freedom of consolidation to protect their rights; 10) the principle of material support in case of disability because of a disease, motherhood [4, p. 103-104].

The fundamental general labor law principle (and in other sectors) is the principle of rule of law. Its observance is actually a condition for effective implementation of not only all other principles, but also the rights recognized by legislation.

The rule of law, according to N.R. Nyzhnyk and V.V. Tsvetkov, should be understood as a legal principle, formed under the influence of globalization, international and European integration processes, which is a combination of a number of criteria (requirements) that although differ in form of legal mediation in national legislation, but serves to ensure the priority of rights and freedoms, legal interests of man and citizen in society, including in relations with public authorities at all levels, and equality of all subjects before the law [5, p. 34]. This principle extends the same effect for all labor and other relations, which arise in the state.

In the context of this study, we focus on the systematization of sectoral and intersectoral principles of labor law. Each of these groups of prin-

ciples requires working-out of independent approach for classification. Thus, based on the analysis of international acts and national legislation in the field of labor relations, as well as the draft of Labor Code of Ukraine, we believe that sectoral labor law principles can be classified as to their regulatory effect on:

1) the principles which determine the nature and direction of labor relations: equality, social justice, social partnership, stability, continuity etc.

The principle of equality is enshrined in international and constitutional levels and means the equal right of every person in the sphere of work, prohibition of discrimination on any grounds. In particular, the Convention on discrimination in employment and occupation № 111, the term "discrimination" includes: a) any distinction, exclusion or preference, which is based on race, color, sex, religion, political opinion, national extraction or social origin and leads to nullifying or impairing the equality of opportunity or treatment in employment and occupation; b) any other distinction, exclusion or preference, resulting in nullifying or impairing the equality of opportunity or treatment in employment and occupation.

The principle of social justice, according to O.A. Ahakov, in modern social states (or welfare states) is the foundation of coexistence, cooperation and partnerships among members of society, subjects and objects of market and political relations. Social justice is defined as the equality of opportunities of personality in the political, economic and social spheres. [6]

The principle of social partnership means that conditions and standards in labor sphere should be based on a common agreement of workers, employers and the state, taking into account the interests of each party.

Stability of labor relations is provided so that the employer can change the terms of the employment contract only with the consent of the employee, and to terminate the employment contract - only on grounds provided by law [7, p. 61].

The continuity of labor relations means that the employee performed work functions within the operating time specified by labor contract and other local acts on the permanent constant basis.

2) principles-conditions of providing by the employees the labor function: implementation of labor solely on the basis of labor contract, which was personally adopted; additional compensation if you work in hazardous and dangerous working conditions; the guarantee of security of production and labor, etc.;

3) principles-standards of labor activity: legislative strengthening of minimum standards in the area of wages, labor protection, safety, etc.; providing of full and productive employment of workers and protection

against unemployment; creating by employees equal opportunities for their professional development, training, re-training, etc.;

4) principles-bans in the working sphere: the prohibition of all forms and types of forced labor; prohibition of forced labor; prohibition of child labor and working people at the age of 14 to 18 without parental consent;

5) principles that determine the rights and obligations of the employer: a combination of economic power and state regulation of the employer's labor relations; the employer's responsible for providing safe and healthy working conditions; providing by the employer of right of employees to mandatory state social insurance etc.

Sectoral labor law principles should be classified by the scope of their action to specific institutions of labor law: 1) principles in the sphere of conclusion and termination of employment contract; 2) principles in the sphere of regulation of wages; 3) principles in the sphere of regulation of rest; 4) principles in the sphere of regulation of work of certain categories of workers; 5) the principles that underlie the system of regulation of labor; 6) principles in the sphere of providing state control over the compliance with labor legislation.

Thus, labor law principles constitute a multifaceted system. Some of the principles, set out in international acts, including European, did not find its proper form in acts of national legislation. Because of this and due to the absence in the current Labor Code of Ukraine established system of principles, there is a necessity in its' legislative consolidation. This should be the subject of the next scientific research in this sphere.

References:

1. Dolzhenkova H. D. Pravo sotsyalnoho obespechenyia: konspekt lektsyi / Dolzhenkova H. D. – M. : Yurait-Yzdat, 2007. — 187 s.
2. Proskuriakov P. D. Realizatsiia pryntsypu yednosti y dyferentsiatsii pravovoho rehuliuvannia v sferi trudovykh vidnosyn pratsivnykiv OVS Ukrainy: ontolohichnyi ta aksiolohichnyi aspekty / P. D. Proskuriakov // Visnyk Donetskoho natsionalnoho universytetu. – 2007. – Vyp. 1. – S. 519-526.
3. Lavrinenko O. V. Suchasni problemy doktrynalnoi ta zakonodavchoi systematyzatsii haluzevykh pryntsypiv trudovoho prava: komponentnyi aspekt / O. V. Lavrinenko // Problemy pravoznavstva ta pravookhoronnoi diialnosti. – 2011. – № 1. – S. 257-270.
4. Trudove pravo Ukrainy: pidruchnyk / Yu. P. Dmytrenko. – K. : Yurinkom Inter, 2009. – 624 s.
5. Derzhavnyi sluzhbovets v Ukraini (poshuk modeli): nauk. vyd. / N. R. Nyzhnyk, V. V. Tsvietkov, H. I. Lelikov ta in.; za zah. red. N. R. Nyzhnyk. – K. : In Yure, 1998. – 272 s.

6. Aharkov O. A. Sotsialna spravedlyvist yak sutnisnyi pryntsyp sotsialnoi ukrainskoi derzhavy: materialy Mizhnar. naukovo-praktychnoi konf. «Ideoloh ukrainskoi derzhavnosti – Viacheslav Lypynskyi: postat na tli istorii (do 130 - richchia z dnia narodzhennia)» / O. A. Aharkov. – [Elektronnyi resurs]. – Rezhym dostupu: http://archive.nbuv.gov.ua/Portal/Soc_gum/Gileya/2012_61/Gileya61/P1_doc.pdf.
7. Trudove pravo Ukrainy: navch. posib. / L. P. Hruzinova, V. H. Korotkin. – K. : MAUP, 2003. – Ch.1. – 128 s.

THE WAYS TO ENSURE A RATIONAL LOAD DISTRIBUTION ON THE BEARINGS BY CREATING AN AXLE BOX

Martynov I., Trufanova A., Aulova N.
Ukraine State University of Railway Transport

Long-term experience of operation on the railways of Ukraine cylindrical roller bearings shows that they have insufficient reliability. The actual durability of the railway axle bearings is much lower than the calculated one. The reason for this is an uneven load distribution between the rolling elements and along the forming rollers [1, 2]. The peculiarity of the construction of the axle box of the freight car and the connection zone with the side frame of the bogie consists in the fact that during operation it is inevitable to wear both the body of the axle box and the axle frame of the side frame of the bogie. At the same time, significant gaps appear in the joints of the case of the axle box and the side frame. During the movement, this leads to running of the side frames and overloading one of the boxes, which causes uneven loading of the frame of the axle unit. This, in turn, leads to a distortion of the axle bearings and, as a consequence, to a decrease in durability.

Many scientists have for decades paid attention to the reliability of the roller bearings for railway axle boxess. Thus, fundamentals of the theory of calculation of durability of rolling bearings have been proposed. Weibull [3] in 1939 and was further developed in the works of A. Palmgren and G. Lundberg [5]. But the application of this theory in relation to railway axle box cylindrical bearings yields results which differ significantly from data exploitation. So, according to [6] average bearing life should exceed 40 years; in fact, it does not exceed 10 years [4].

According to [6] estimated service life of roller bearing depends on the basic dynamic load rating and equivalent load applied to the bearings. To Refine the results, enter number of correction factors that take into account the influence of the lubricant and the working conditions of the axle unit.

The value of the dynamic load capacity is based on calculations or tests of the bearing manufacturers.

Equivalent load acting on the bearings is determined by the following formula:

$$P_e = (X \cdot V \cdot F_r + Y \cdot F_a)\, K_T \cdot K_B, \quad (1)$$

where X, Y – are the coefficients of respectively the radial and axial loads, V – coefficient of rotation, F_r – radial load, kN, F_a– axial load, kN, K_T – temperature coefficient, K_B– factor of safety (dynamic).

In [5] to calculate the equivalent load offered to accept the assumption that in operation the axial forces do not exist and buxom nodes, they do not act, so the formula to determine the equivalent load will be as follows:

$$P_e = F_r \cdot K_T \cdot K_б, \quad (2)$$

But in the case of railway axle box bearings, this is not true

It is assumed that axle node loaded by the classical scheme: the most loaded is the upper roller, the center of which is located in the direction of the radial load acting on the bearing, and the load on the other rollers are reduced in proportion to the cosine of the angle between the guide force and the straight line connecting the center of the roller with the bearing center.

It should be noted that when considering the issue of increasing the durability of the bearings, the main focus is directly on improving the design of bearings by making changes to the geometry of the rolling elements and bearing rings and the manufacturing techniques of the bearings themselves. The choice of the rational form of contact between the side frame of the trolley and the case of the axle box remained outside the field of view of the researchers.

To ensure uniform distribution of loads optimizing the design of the axle boxes in the future can solve the problem of insufficient reliability of axle box bearing units of freight cars.

One of the main tasks during the commissioning of axle box assemblies was to ensure their interchangeability with the axle box nodes on sliding bearings. It is the requirement of interchangeability has led to the construction of the first cargo roller axle boxes had a number of elements of the

transitional type. However, the designers have taken steps that highlight the features of roller bearings, namely high rigidity, small gaps etc.

Another direction of improving the design of the axle boxes is the use of elastic elements. In the early 80-ies of XX century was the design of axle unit with elastic strip located between the adapter and the outer ring. There is a structure made with two rectangular lugs on the edges of the arch in the area of the load rollers. These tides are found along the length of the body and are the bearing surfaces to transmit load from the side frame. But these proposals for changes in structures axle box node has not received further development. The disadvantage of these designs has increased the complexity of manufacturing, lack of strength of the new elements and the appearance in these elements additional sources of stress concentration.

In this way, the issue of ensuring an even distribution of loads due to the optimization of the construction of the axle box is insufficiently studied and can solve the contemporary problem of the axle box bearing units of freight cars.

References:

1 Deshmukh, B. D. Study of Failure Modes of Rolling Bearings: A Review / B. D. Deshmukh, N. D. Moundecar // Journal of Modern Engineering Research. – 2014. – № 1. – P. 139-145.

2 Lunys, O. Investigation on features and tendencies of axle-box heating / O. Lunys, S. Dailydka, G. Bureika // Transport Problems. – 2015. –№ 1. – P. 105-114.

3 Martynov, I. E., Analysis of operating experience of cylindrical roller bearings of axle boxes of freight cars / I. E. Martynov // East Ukrainian state University. – 2000. – №5 (27). – P. 157-159.

4 Weibull W., "A Statistical Theory of the Strength of Materials" ActaPolytechnica, Mechanical Engineering Series, Proc. Royal Swedish Academy of Engineering Sciences, No. 151, Stockolm, (1939).

5 Lundberg G., Palmgren A. Dynamic Capacity of Rolling Bearings. – Acta-Politechnica, Mechanical Engineering Series. – Vol. 1, №3. -1947.

6 GOST 18855-94. The rolling bearings. Dynamic design load capacity and design life (longevity). 01 – 01 – 1997. – Publishing house of standards, 1996. – 19 P.

IMPROVING ORGANIZATION CAR TRAFFIC ON NETWORK TRAIN

Marchenko D., Sydnyev V., Maksimov D., Sydnyev I.
Volodymyr Dahl East Ukrainian National University

The current trend increase in freight traffic international traffic on railways of Ukraine makes changes organization and management traffic on railway.

Effective organization car traffic at international and intermodal transport goods enables Ukraine's deep integration into structures European Union, increased revenues to state budget foreign exchange, consolidation in international market for transport sector of Ukraine solid traffic coming from Asia to Europe and vice versa.

Thus, research, development and implementation methods for improvement and technology services freight car traffic in international traffic with scientific and practical value [1,2].

Railway stations are most important element organization of export-import traffic. From the definition their work depends on uniformity and rhythm servicing international destinations, dates delivery goods, the degree use of technological means transport.

In turn, plant consists a number subsystems with some general lines conveyor to ensure its productive capacity - bandwidth and processing power.

The technology these lines is based on continuous operation, allowing predetermine overall progress export and import car traffic. Predicting behavior a complex system, which is the station necessary for proper management decisions at micro and macro levels.

To bring selected queuing system in line with the existing size of car traffic, and given dynamics model that defines input streams and streams service, analysis of structure and parameter estimation service car traffic.

Random character flow leads at certain points on login queuing formed, and in other periods idle channels.

Statistical data collected during years 2014-2016 are one-dimensional arrays of dimension 600 observations.

Studies conducted by various scientists proved that much traffic laws satisfactorily described by Poisson distribution, Erlang, and binomynalnym normal [3,4].

This conclusion is largely used in real conditions for railway stations in international transport, connection with situation when existing car traffic

already established and capacity terminal devices with provision for their maintenance [5,6].

If distribution effluent is determined by three factors: input stream, duration service and load, vehicle maintenance, for stations with low load service devices typical case, when Poisson input stream and Poisson or Erlang distribution service time at output system can be obtained arbitrary law distribution of intervals between trains.

The paper found that research, development and implementation methods for improvement and technology services freight car traffic in international traffic with scientific and practical value. Analysis data shows that rail transport has leading position in transport market of Ukraine, but competition from other modes transport significantly increases [7].

Treated in statistics can build histogram random time intervals between trains arriving at station in sequence, and check empirical distribution law compliance exponential distribution law or law Erlang using selected criteria. The basic causes vibrations car traffic on railway network. Based research proved that much traffic laws satisfactorily described by Poisson distribution, Erlang, and binomynalnym normal.

References:

1. Itermodal Transport Services To The Interior Project. Part F: Container Railway As MTO Industry Structure And Practices. – China. - October 2004.
2. Jennings, B., and M. C. Holcomb (1996). "Beyond Containerization: The Broader Concept of Intermodalism", Transportation Journal, pp. 5-13.
3. Di Febbraro A., Recagno V. and S. Sacone (1996). "INTRANET: A New Simulation Tool for IntermodaTransportation Systems", Simulation Practice and Theory, vol. 4, pp. 47 – 64.
4. EUROPEAN Agreement on Important International Combined Transport Lines and Related Installations (AGTC) // United Nations Economic Commissions for Europe Inland Transport Committee. – Done in Geneva on 1 February 1991. – 33 p.
5. Ferreira, L., and J. Sigut (1993) "Measuring the Performance of Intermodal Freight Terminals", Transportation Planning and Technology, vol. 17, pp. 269-280.
6. Berenyi J. Nas status on terminal technologies and challenges (the evaluation and development of the intermodal transport in Hungary) / Institute for Transport Sciences Ltd (Budapest) / EUTP 3rd Clustering Meeting Rotterdam, 12th December 2002.
7. Kolmogorov A.N. Osnovne ponjattja teoriï jmovirnostej. ONTI NKTP SRSR. 1986. – 294 s.

IN REGARD OF TAKING INTO ACCOUNT THE WEATHER CONDITIONS AT ORGANIZING AND PLANNING TRANSPORT PROVISION IN AGRICULTURE

Medvediev Ie.
Volodymyr Dahl East Ukrainian National University

In terms of high demand and limited transport resources of agricultural manufacturing companies the urgent matter is the rational planning and organization of the transport services and provision particularly during the grain crops harvest time.

Irrational transport provision is one of the causes of the production process disruption, quality deviation of the whole harvesting campaign chain, that leads to substantial losses during harvesting and damages to the businesses.

According to scientific research only one third of the territory of Ukraine is in the zone of guaranteed crop yields. On the rest of the territory the arid conditions of the spring-summer period, unfavorable conditions of overwintering and overwetting soils reduce crop yields by 30-40%. Therefore, agricultural production specialists should be able to use climate and weather resources efficiently to increase agricultural productivity, reduce dependence on unfavorable weather conditions [1].

In Ukraine, the repetition of weather anomalies occurs every four years under the conditions of the steppe, and within the country – it is every four to five years. The actual reduction in the grain yields is determined by the rigidity of adverse weather factors and zonal soil and climatic conditions. Decrease in crop yields occurs within 3.7 - 5.3 kg/ha [2].

Indisputable is the fact that the operation of transport depends on weather conditions, but the influence of weather and climate factors, their consideration in the mechanism of transport provision is relatively not enough researched. To organize the transportation and technological processes to ensure efficient and safe performance of all actions in different climatic conditions, it is need to understand and evaluate this impact and dependence.

Because of the relatively high variability of weather and climate factors there should be a tool (a Software (SW)), which will adapt the transportation of the harvesting campaign with the conditions prevailing or forecasted on the farm.

Weather conditions can as facilitate harvesting and transport operations as slow down them for a while that may cause loss of crops. Thus de-

laying harvesting term and its extension over the standard duration results in crop losses in the amount of 1% per day of exceed period.

Based on above we conclude that weather conditions component has significant influence both on composition of harvesting transport complex and on its flow, that is on the speed of the process, variability of its components. The important question is whether it will be enough of means of transport owned by the enterprise, organizing the harvesting at a high level or their will be need to involve additional resources.

Considering the weather conditions will allow to identify additional reserves to improve performance of harvesting-transport complex.

Rationally organized transport support is the key to timely and high-quality harvest. The significant dependence of agriculture on natural and climatic conditions, to a greater extent, needs to improve the organization of transport provision.

References:

1. Poliovyy A.M. Fundamentals of Agricultural Meteorology: A Textbook / Poliovyy A.M., Bozhko L.Y., Volvach O.V.; Odesa State Environmental University – Odesa: Publisher TES, 2012. – 250 p.
2. Marenych M.M. Variability of winter wheat yield in the terms of Poltava region. [Electronic source]. Available at – http://base.dnsgb.com.ua/files/journal/Visnyk-Ddau/Visnyk-Ddau2009-1/Ecology/Ddau2009-1-Ekology-Marenych.pdf.

USING THE GAME THEORY IN AGRICULTURE TRANSPORT SUPPORT TASKSING

Medvediev Ie., Blezniuk O.
Volodymyr Dahl East Ukrainian National University

Transport plays an important role in the activities of agricultural enterprises, carrying out the function of delivering the crop from the place of its harvest to the place of its storage. An important task of each enterprise is the rational planning and organization of transport support. One of the transport support tasks is the selection of the optimal type and number of vehicles for transportation of agricultural cargoes. Transport is one of the most weather-dependent sectors of the economy [1]. The efficiency of transport and technological processes in the agro-industrial complex is af-

fected by weather conditions, which largely determine the technology of growing and harvesting crops [2].

The problems solution for transportation support can be modelled with the help of the game theory. The use of the game theory in managerial decision-making at agricultural enterprises, taking into account various weather and climatic factors, is a crucial task.

The game theory studies the relationship between people who are guided by mismatched (and sometimes opposing) motivations [3]. A game is understood as a process in which two or more parties participate in the struggle for the realization of their interests. Each side has its own goal and uses some strategy that can lead to winning or losing - depending on the behavior of other players. Game theory helps to choose the best management decisions taking into account the beliefs of the possible weather conditions and transport resources of the enterprise. Situation, in which other player's strategy is impossible to predict, is called "games with nature".

The game theory is used when choosing the optimal types of combines, taking into account various possible weather conditions during the harvesting process [4].

The use of game theory in managerial decision-making is very rational and helps to choose the most optimal options, which, when taking into account weather conditions, will help rationally plan and organize the work of transport of agricultural enterprises.

References:

1. Astapenko P.D. Questions About the Weather. - 2nd ed. corr. and add. - L., Gidrometeoizdat, 1986, 392 p.
2. Mishchenko V.A. Features Of Formation Of Transport Logistics In Agriculture / V.A. Mishchenko, L.I. Gubska // Problems and prospects of the business. - 2012. - № 1. - P. 66-68.
3. Introduction to the Game Theory / N. N. Pisarchuk. - Minsk: BSU, 2015. – 256 p.
4. Kidyaeva N.P. Increasing the Efficiency of the Use of Harvest Combines Through the Optimization of Energy Costs in the Amur Region: dis. ... cand. Tech. Sciences 05.20.01 - Blagoveshchensk, 2014. - 135 p.

TRANSPORTING OF THE FLUIDIZED HYDROCARBON GASES IN TANK-CONTAINERS

Mikhailov E., Bondarenko G.
Volodymyr Dahl East Ukrainian National University

Tank-containers for the Ukrainian market are relatively the new type of a transport equipment, although the first tank-containers appeared for us as early as 80th past century. With the increase of volumes of export and import of chemical and food products, demand on this equipment grew substantially. Taking into account the deficit of the specialized cisterns, absence of entrance tracks on gas deposits, and also at export supplies, transporting of the fluidized hydrocarbon gases in a number of cases it is expedient to carry out the tank-containers.

This container is an universal transport module for transportation of the fluidized hydrocarbon gas by a motor, railway, river and marine transport without flowing in the places of docking of transport systems and temporal storage of the fluidized gas for a sender and consignee, that answers the modern requirements of market, and also requirements of safety and guard of environment.

It specialized a transport equipment allows safely to transport the fluidized hydrocarbon gases and also temporally to keep the fluidized hydrocarbon gases in the conditions of temperate and marine climate at t° from -50°C to +55°C. Loading and unloading of tank-containers can come true by the specialized truck crane by the carrying capacity of 32 t. and by flight of arrow 27 meters, operations are maximally simplified the same on transporting and storage of the fluidized hydrocarbon gases.

One of scheme of transporting of the fluidized gases at the internal market from a deposit to the petrochemical combine presented on pic.1. The scheme of export supplies of the fluidized gases in containers is shown on pic.2.

The tank-containers, being a multimodal transport equipment for international transportations, answer international and national requirements to the transport vehicles which transport dangerous loads, in particular:

1. To international Code of marine transportation of dangerous loads (IMDG Code);

2. To the international rules of transportation of dangerous loads on railways (RID);

3. To the European agreement about international travelling transportation of dangerous loads (ADR);

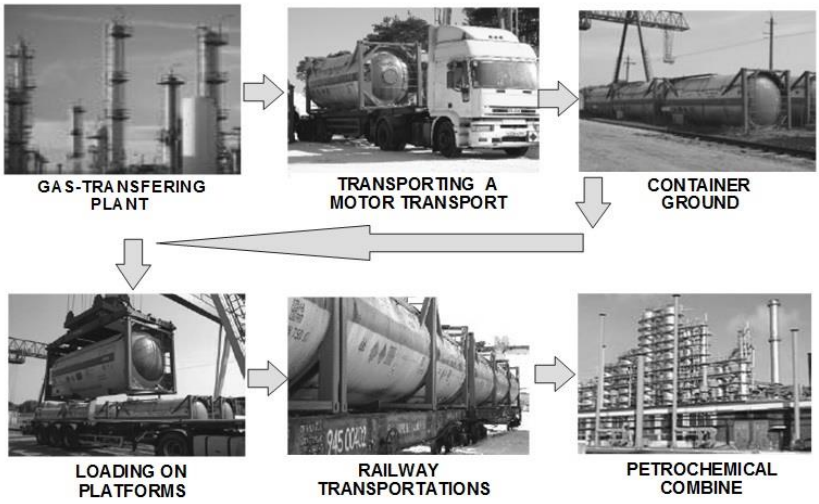


Fig. 1. Scheme of containertraffics of fluidized hydrocarbon gases at the internal market

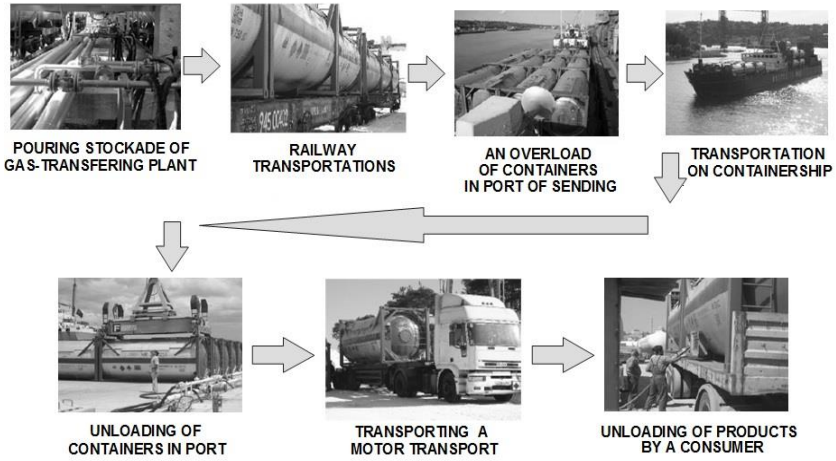


Fig. 2. Scheme of containertraffics of fluidized gases at export supplies

4. To international convention on safe containers (CSC);
5. To international custom convention (CCC).

It allows without difficulty to transport loads the aquatic and surface types of transport all over the world. For transporting of tank-containers for territories of Ukraine some additional certificates or approvals are not needed.

Application of tank-containers is the perspective type of a transport technology which unlike the traditional transporting of the fluidized hydrocarbon gases allows complex to decide such actual tasks as:

- utilization of passing petroleum gases and gas runback, which is burned from the uncomplex processing of oil and gas, poorly developed system of transporting from difficult of access deposits;
- an increase of ecological, fire, emergency safety is at transporting of the fluidized gases in compatible transport modules;
- supply of the fluidized gases from a producer to the consumer by a marine, railway and motor-car transport without flowing in the places of crossing of transport charts;
- free including to the market of Western Europe, as distribution at the market of the fluidized power gases, which exists presently, monopolistic belongs to the proprietors of downlow trestles and gas-holders;
- the use of tank-containers can allow also on occasion to give up building of gas pipelines for the supply of gas in small settlements.

References:

1. Litvin M. Perevozka SUG v tank-kontejnerah //«AZK+AT», №2 (26), 2006.- C.8-9.
2. Tank-kontejner ili specvagon: kto oderzhit pobedu/ Informacionnyj por-tal «RZhD-partner.ru». – Rezhim dostupu: http://www.rzd-partner.ru/zhd-transport/comments/tank-konteyner-ili-spetsvagon-kto-oderzhit-pobedu/ – Nazva z ekrana. – Perevireno: 15.03.2017 r.
3. TANK-KONTEJNERY: tipy, naznachenie, preimushhestva. – Rezhim dostupu: http://www.newchemistry.ru/printletter.php?n_id=3434/ – Nazva z ekrana. – Perevireno: 15.03.2017 r.

ANALYSIS THE PROBABILITY OF DERAILMENT WHEEL PROMISING DESIGN SCHEME WITH RAIL

Mikhaylov E., Semenov S., Shepit'ko O.
Volodymyr Dahl East Ukrainian national University

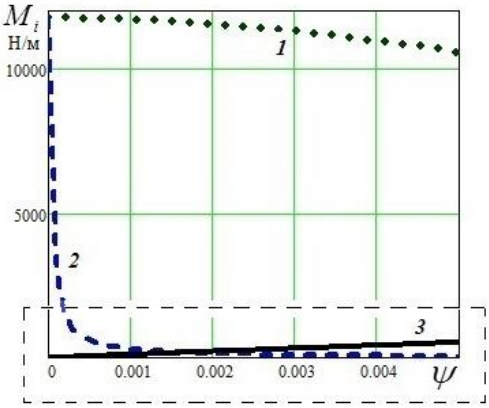
One the main characteristics of rail vehicles is the level of resistance to their movement. It is determined by rational choice of constructive schemes the crew part at the design stage.

An analysis of the well-known scientific literature has shown that the known attempts to reduce energy costs during the passage of track sections by the rail vehicles due to lubrication the contact zones of wheels with rails, radial installation of wheels and trucks and etc. do not yet completely solve this problem. Without changing the traditional constructive scheme of the wheel (with the monolithic performance its rolling surface and the flange), it is not possible to completely avoid differential parasitic slippage of the flanges. Therefore, it is necessary to investigate the potential benefits of a fundamental change in the design of wheel, for example, allowing the turn of flange with respect to the wheel around their common axis [1, 2]. This will allow breaking the closed power circuit in the "wheel-rail" system and significantly reducing the level of frictional interaction in the flange contact of the wheel with rail.

The advantages of a fundamental change in the design scheme of wheel, allowing the rotation of flange relative to the wheel around their common axis, are considered in [2, 3]. It is established that the use of such a constructive scheme of wheel will allow breaking off the closed power circuit "the side face of the railhead - the flange of the wheel - the surface of the rolling of the wheel - the surface of the rolling rail head" and substantially reduce the level of differential parasitic slippage along the rails.

One of the most important characteristics any design of the rail vehicles is the stability reserve from the derailment when wheel rims are inserted into the rail heads [4, 5, etc.]. Therefore, it is necessary to estimate the stability reserve from the derailment of wheel the perspective design scheme (PDS) in comparison with the wheel of traditional constructive scheme (TCS).

Figures 1 and 2 show the results of calculating the values of the corresponding moments for the two variants of the design of the wheels under consideration with the following initial data: $P_Z = 125$ кN; $Y = 50$ кN; $K_W = 1{,}021$; $\mu = 0{,}25$; $r_K = 0{,}475$ m; $h_\Gamma = 0{,}01$ m.



1 - $M_{X1} = f(\psi)$ (wheel TCS); 2 - $M_{X2} = f(\psi)$ (wheel PDS); 3 - $M_Z = f(\psi)$.

Fig. 1. Dependency graphs $M_{Xi} = f(\psi)$

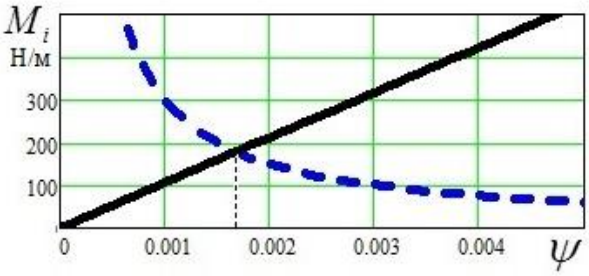


Fig. 2. Increased selected fragment of the graph in Figure 1

Analysis of the graphs in Fig. 1, 2 shows that PCS wheel for given initial values, the magnitude of torque M_Z will already exceed the value even for small angles of the approach ($\psi > 0{,}0017$ radians or about 0.1 degrees) M_X. In these conditions, rolling in of the wheel on the rail head with the detachment of the rolling surface of the wheel from the rolling surface of the rail head is almost impossible, since its flange will tend to turn in the opposite direction to the wheel side.

It is established that rolling of the PDS wheel onto rail head with detachment of rolling surface the wheel from rolling surface of the rail head at the angles of wheel flange over 0.1 degrees becomes practically impossible,

because under the influence of applied force factors system its flange tends to turn into the opposite rolling of wheels of the sides.

References:

1. Mikhaylov E.V., Slashchov V.A., Gorbunov M.Í., Shcherbakov V.P., Semenov S.O. Koleso reykovogo transportnogo zasobu. Deklaratsíyniy patent na korisnu model' 75279. Opubl.26.11.2012, byul. № 22/2012.
2. Mikhaylov Ê.V., Slashchov V.A., Gorbunov M.Í., Semenov S.O. Kolísna para reykovogo transportnogo zasobu. Deklaratsíyniy patent na korisnu mo-del' 78070. Opubl.11.03.2013, byul. № 5/2013.
3. Mihaylov E., Semenov S., Panchenko E. The possibility of reducing kinematic slip with two-point contacting with rail wheel railway vehicle.// TEKA. Commision of motorization and energetics in agriculture, 2013. Vol. 13, №3, 03-08, pp. 139-145.
4. Mikhaylov Ye.V., Slashchev V.A., Semenov S.A. Snizheniye kinematicheskogo proskal'zyvaniya po rel'su kolesa rel'sovogo ekipazha s podvizhnym grebnem // Vestnik VNU im.V.Dalya. – 2013. – № 18 (207), (CH. 1). – S.28-34.
5. Verigo M.F. Vzaimodeystviye puti i podvizhnogo sostava// M.F. Veri-go, A.YA. Kogan.– M.: Transport, 1986.–559 s.

PERSPECTIVE TYPE OF GROUP PACKAGE TO IMPROVE THE TECHNOLOGY MOVING OF PACKAGED GOODS

Mikhailov E., Smaliy M.
Volodymyr Dahl East Ukrainian National University

One of the types of packaging, which can be used to efficiently transport, process and store in the port, rail and other terminals large quantities of products that are packaged in small bags, bales, boxes, flexible containers or other packaging, are slings and sling-bags.

Slings are the constructions of woven belts-tapes, girdle and helping to keep the group package weighing up to 2 tons.

To when shipping multiple package does not fall apart and kept its shape, slings are additionally equipped with fixing elements.

To ensure greater safety of the transported goods covered by the sling set small cargo units can be supplied with various linings, gaskets, wrapped with stretch film or polypropylene fabric, etc.

More often, however, to prevent possible wakings cargo, and as additional protection from moisture, damage bags, etc., are manufactured

slings in conjunction with a shell made of laminated polypropylene fabric - sling-bags.

Sling-bags (hereinafter SB) or soft container bags used for transporting and temporary storage of goods loaded in small individual packaging. That is, they are used as packing or, more simply, "bag for bags".

Structurally SB is a stitched from cargo slings, sling with attached to it a woven sheath. Due to the fact that the main load-bearing element here is the lanyard, sheath sling-bag can be either solid or to have various constructive elements in the form of the top or side of caps, which facilitates the process of loading and unloading bags.

Typically, this type of soft containers used in the transport of costly materials where it is important to eliminate the loss of cargo and to ensure the integrity of supply. The shell of the soft container package, even if the damage inside of bags with production, will keep her inside, holding back the precipitation material.

Sling-bags can have various modifications, from stitched in sequence straps with polypropylene shell to the complex designs with additional locking system on the cargo. The choice of design depends on the type of cargo and the need in certain structural elements.

Selection of the most optimal size of the sling-bag is carried out in general case by the following parameters:

• the type of bags (valve, paper, polyethylene, polypropylene, etc.) or other small-sized packaging;

• downloadable products;

• dimensions and weight loaded compact packaging (LxWxH);

• method of transportation;

• number of loaded small packages in a row (type of loading);

• the load capacity of the sling-bag.

Based on the analysis of the existing practice of using SB, it is possible to establish that there is a most common universal design, manufactured from polypropylene fabric with the bottom size of 110 cm x 110 cm, filling height of 130 cm and with four lifting handles. The capacity of such a sling-bags of 1500 kg. the studies confirm the safety factor of 5:1.

In such SB you can move almost all granular and bulk goods, which are packed in bags or other small packing: fertilizer, granular polymers, cement, or other loose granular construction materials, sugar, flour, salt, cereals, other packaged foods, bulk food ingredients, animal feed, seeds, etc.

Most often, the SB are used to move bulk cargo, packed in 25 kg and 50 kg bags. When using traditional technologies transport the loaded goods 25 kg or 50 kg bags need to be immersed in a container or wagon, and at destination to unload. This can be done either manually or with the use of

standard pallets and forklifts, or with the use of specialized mechanisms, such as conveyor loaders.

Use sling-bags streamlines the process of loading and unloading. Sling-bags folded very compact. One of the important advantages of the SB is that the design generally enables its full disclosure, which is very convenient for a transportation and cargo operations with the products, packed in small individual packaging.

Open SB laid on the floor, then the center of the design is stacked (stackable) load, after it is laid, the edges of the structure rise up on all sides, the corners are bound together with specially established ties and a sling-bag with cargo ready for transportation. The time that must be expended to decompose the sling-bag is 1-2 minutes.

Loaded SB are loaded into the container or wagon. Thus, group packaging provides consolidation packages, maintains the shape of the cargo and protects cargo from leaks and contamination. On-site delivery of products unloaded in a multi-pack, and then unloaded the sling-bag. In this case, run reverse action: on the corners untied all the strings, the soft walls of the container are expanded and stacked on the floor, giving full access to the cargo.

The sling-bags can not only carry, but to store different groups of products (including and open areas, if the design of the sling bag provides protection against atmospheric effects). Through the fixing strips, the package retains its shape.

The most effective is the use of sling-bags in the transport-logistic schemes of delivery with multiple overloads with the need to minimize the downtime of vehicles, especially when moving on the route manufacturer - port terminal - ship - port terminal - consignee due to optimization of handling operations and schemes of loading into transport means.

They significantly reduce the time for loading and unloading, allowing you to free up labor for other tasks and due to the absence of manual labor at all stages of loading operations to minimize financial costs.

So, the main advantages of using a sling-bags during transportation, processing and storing of bulk products, packed in small packing, the following:

• Reducing the cost of transportation of goods, loaded in its own package, by optimizing the loading/unloading and reduce the duration of cargo operations.

• The ability to transport packets of bags in one approach the loading and unloading operations with a forklift or crane.

• Additional protection of goods from external damage and contamination.

• The possibility of transporting all existing types of vehicles, according to the shipping Rules for each type of transport.

Sling-bags can be used many times. Store empty must SB in closed clean rooms. However, they must be protected from mechanical damage, exposure to sunlight and adverse climatic conditions. In heated buildings products must be stored at a minimum distance of one meter from the heat source.

ANALYSIS OF THE DEPENDENCE OF THE PRODUCTIVITY OF THE CAR FROM THE TIME IT HAS BEEN IDLE FOR LOADING/UNLOADING OPERATIONS

Mikhaylov E., Fesenko D.
Volodymyr Dahl East Ukrainian National University

One of major indexes of efficiency of work of rolling stock of industrial motor transport is his productivity which determines efficiency of the use of car rolling stock for certain period of time and characterize efficiency of organization of transportations. So, the sentinel productivity of car can be certain, for example, from expression [1].

$$W_A = \frac{q \cdot \gamma_C \cdot V_T \cdot \beta_R}{L_{RC} + t_W \cdot V_T \cdot \beta_R}, \text{ t/h,} \qquad (1)$$

where: q - nominal load capacity of the vehicle, t.;

γ_C - a static coefficient of the use of carrying capacity;

L_{RC} - length of ride with a load, km;

V_T - technical speed, km/h;

β_R - a coefficient of the use of run;

t_W - the idle time for loading and unloading operations, h.

Obviously, this index depends on the row of factors from which part is added influence from the side of organizer of transportations (time of loading is unloading, coefficient of the use of run et cetera) and not guided, I.e. those which are determined external environments (distance of transportations, speed of a transport stream et cetera). Included in the expression (1)

factors in same queue can be determined difficult enough functional dependences. So, for example, size of coefficient of the use of run β_R, determined as a relationship of run of car with a load to his general run, depends in same queue on placing of points of loading and unloading, character of traffics of goods and organization of controller's service on a line. Size of technical speed V_T depends on the technical state of car, state and type dear, intensities of motion and trade of driver.

More frequent than all the rolling stock of industrial motor transport is utillized pendulum routes with empty by a reverse run. Coefficient of the use of run for such route

$$\beta_R = \frac{L_{RC}}{L_{RC} + L_{RX}} = 0{,}5\,, \tag{2}$$

where L_{RX} - length of ride without a load, km (in our case $L_{RX} = L_{RC}$).

Productivity of car for one ride

$$W_A = \frac{q \cdot \gamma_C \cdot V_T}{0{,}5 \cdot L_{RC} + t_W \cdot V_T} \cdot t_R, \tag{3}$$

where t_R - time of implementation of one ride.

$$t_E = \frac{L_{RC} + L_{RX}}{V_T} + t_W\,, \tag{4}$$

t_W - the time for loading and unloading.

One of the significantly influencing on the productivity of car factors - the idle time for loading and unloading operations t_W. Ineffective of rolling stock time under loading and unloading depends on a carrying capacity and type of car, character of organization and mechanization of freight works, type of load and his packing etc.

We will analyse, as an increase of time of outage of rolling stock influences on some size Δt_W under freight operations on his productivity for one ride. In view (2), (4)

$$W_A = \frac{q \cdot \gamma_C \cdot V_T \cdot 0{,}5}{L_{RC} + t_W \cdot V_T \cdot 0{,}5} \cdot \left(\frac{L_{RC} + L_{RX}}{V_T} + t_W + \Delta t_W\right). \qquad (5)$$

After simple transformations expression (4) will be accepted by a kind

$$W_A = \frac{2 \cdot q \cdot \gamma_C \cdot (L_{RC} + V_T \cdot (t_W + \Delta t_W)}{L_{RC} + 2 \cdot V_T \cdot (t_W + \Delta t_W)}. \qquad (6)$$

On Pic.1 the graph of dependence is resulted $W_A(L_{RC}, \Delta t_W)$. Δt_W it is accepted in stakes from an initial value. For the example of calculation the followings values are accepted: q =4 t; γ_C =0,8; V_T =25 km/h; t_W =0,5 h.

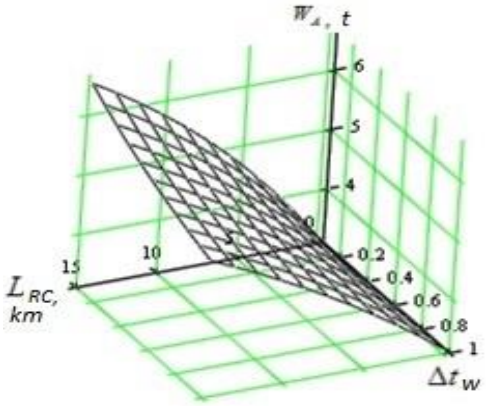


Fig.1. Graph of dependence $W_A(L_{RC}, \Delta t_W)$

The analysis of the got dependence shows that distance of transportation directly influences on the stake of freight operations from time, expended on a trip. Obviously, than less than distance of transportation, the stake of outage at implementation of freight works in general time of ride higher. With the increase of time of outage of rolling stock in the points of loading and unloading of load the size of the productivity of car diminishes notedly.

In order to improve the performance of the transportation process in industrial transport is necessary to reduce the time for loading and unloading through a variety of organizational and technical measures.

References:

1. Vorkut A. I. Gruzovye avtomobil'nye perevozki. - 2-e izd., pererab. i dop.- K.: Vishha shk. Golovnoe izd-vo, 1986.- 447 s.

IMPROVEMENT OF THE TRANSPORT COMPLEX OF UKRAINE BY USING THE LOGISTICS PRINCIPLES

Nesterenko G.[1], Kuzmenko A.[2]

[1]Dnepropetrovsk National University of Railway Transport named after Academician V.A. Lazaryan

[2]University of Customs and Finance

Analysis of indicators of the innovative activity state and dynamics in Ukraine demonstrates that the situation that has developed in this area is unsatisfactory and requires urgent measures for revitalization. Among the main priority areas of innovative activity in Ukraine there are also "Transport systems: construction and reconstruction" [1]. The potential of Ukraine's geopolitical and geo-economic position is largely realized through the provision of transport services. Over the past ten years, transit has become an important component of the service exports. Export of transport services is a real resource that Ukraine has to achieve economic growth. Thus, the development of transport infrastructure is not the industry-specific, but the national priority.

Ukraine needs its own investment strategy to raise funds in the transport and logistics system through an effective combination of market mechanism and state regulation in the framework of transport and logistics clusters. The sources of investment into transport and logistics infrastructure can be: budget, special-purpose loans, private capital when creating toll roads, concessions for the development of minerals and forest areas adjacent to the road, etc.

The transport-logistic cluster presupposes the integration of separate regionally, functionally and economically interconnected logistic links: international transport corridors, transportation hubs of the main infrastructure, transport and distribution logistics centres, main, regional and local

transport routes into a single transportation system capable of providing high-quality logistics service to internal or external consumers while minimizing the overall logistics costs, including on the basis of rail transport as a key component.

The need to introduce the logistics principles in the process of organizing international freight flows is also caused by the fact that recently the organizational and economic, as well as legal relationships between participants in the transport process have changed significantly, resulting in problems of compatibility of the national transport system with the international system [2]. This is seen the most clearly in the work of rail transport, but the increased role of road transport in servicing international freight turnover, enhanced role of expedition activities in shaping the supply and demand for transport services radically changed the concept of the transport market. Based on a single optimization criterion and a global goal in the general model of synthesized constituent parts of the logistic potential, each of them has its own set target functions that have coordinated local objectives and criteria.

Using the evaluation criteria and indicators, the factors of combined effect of functioning of the transport and logistics infrastructure and the prospects for its development in a market economy [3, 4], it is possible to decide on the formation of transport and logistics centres, which will ultimately maximize profits and minimize the expenditures of all types of resources for each participant of the commodity circulation process. It is also necessary to pay attention to rationalizing the choice of the logistics system model in relation to the delivery process for a forwarding company [5] based on analysis of existing modelling methods and determining the most sustainable of them for creating a functioning model of the transport and logistics system.

To develop the concept of the formation and development of the transport and logistics system, it is proposed to use such an indicator as the transport and logistics potential characterizing the potential capabilities of the target facility [6,7]. The transport and logistics potential of the region is a set of indicators or factors characterizing its power, sources, capabilities, funds and other reserves that can be used in the economic activities of the transport and logistics complex. At the same time, the transport system of Ukraine was considered as part of the global transport system. It was also taken into account that its important infrastructural element is multimodal transport and logistics centres [8], which are created on the basis of network-wide transport hubs and operated, as a rule, on a commercial corporate basis. The work of these centres was described as the functioning of a multifunctional terminal commodity distribution complex, which combines

the transport, industrial, trade, financial and information flows, as well as handles the value-added cargoes, enabling interaction of various modes of transport. Therefore, an important criterion determining the approach to the formation of transport and logistics hubs is their belonging to the main transport arteries.

Thus, this work, devoted to the search for ways to improve the transport complex of Ukraine by using the logistics principles, is relevant and aimed at ensuring minimum service time consumption and increasing the capacity of national transport systems.

References:

1. Gricenko, S.I. Strategija razvitija transportno-logisticheskih klaste-rov v Ukraine. / Avtoref. dis. na soisk. uch. st. doktora jek. nauk //Sankt-Peterb. gos. univers. jekonomiki i finansov, Sankt-Peterburg, 2009 g. - 41 str.
2. Kuz'menko A.I, Nesterenko G.I. Pidvishhennja efektivnosti roboti sistemi obslugovuvannja mizhnarodnih vantazhopotokiv. VIS-NIK UMSF 1_2016,
3. Kupavyh S. S. Transportno-logisticheskaja infrastruktura: kriterii ocenki, problemy i perspektivy razvitija / S. S. Kupavyh // Al'ter-nativnye istochniki jenergii v transportno-tehnologicheskom komplek-se: problemy i perspektivy racional'nogo ispol'zovanija. 2016. T. 3. №. 1. C. 427-429.
4. Drewello H. The Consideration of Local Preferences in Transport Infra-structure De-velopment: Lessons from the Economics of Federalism // Uni-versity of Applied Sciences Kehl, Kinzigallee 1, Kehl am Rhein, Germany, Volume 207, 19 September 2016, Pages 291-304.
5. Zhevtun I. F. Analiz modelej logisticheskih sistem i issledovanie ustojchivosti ih funkcionirovanija / I. F. Zhevtun, V. O. Zubkova // Al'ternativnye istochniki jenergii v transportno-tehnologicheskom komplekse: problemy i perspektivy racional'nogo ispol'zovanija. 2016. T. 3. №. 1. C. 394-399.
6. Syzdykbaeva, B. U. Metodologija formirovanija i razvitija integri-rovannoj transportno-logisticheskoj sistemy Kazahstana. / Avtoref. dis. na soisk. uch. st. doktora jek. nauk // Mezhdunar. kazahsko-turec. univers. im. A.Jasavi, , g. Turkestan, 2010 g. - 48 str.
7. Syzdykbaeva, B. U.Ocenka jeffektivnosti realizacii programm for-mirovanija regional'noj transportno-logisticheskoj sistemy // Vestn. MKTU. –2010. - №1-2. - S. 155-164.
8. Shpak, A.V. Problemy i perspektivy formirovanija transportno-logisticheskih sistem na Severe. / A.V. Shpak // Funkcionirovanie os-novnyh vidov jekonomicheskoj dejatel'nosti i proizvodstvennyh kom-pleksov. 2010. №. 32 (89). C. 72-76

EVALUATION EFFICIENCY IN FORMATION OF GROUP TRAINS

Nesterenko H., Muzykin M., Avramenko S.
Dnipropetrovsk National University of Railway Transport named after academician V. Lazaryan

The basis of car traffic plan is the formation of trains (TFP), which determines the level of loading of means of transport and distribution of sorting and shunting on railway landfill stations.

According to (TFP), due to the number of groups-proof cars in freight trains are divided into:

- *one group* - one destination station (or unloading rozfor-formation);
- *group* - two or more groups selected cars to different destination station.

Operative group trains formation is one of the possible measures to reduce carriage down timeduration and accumulation of trains. This current (TFP) is not broken, but depending on the specific conditions of operation of the station promptly addressed the issue of expediency of forming a separate group composition of several cars free allocations. The criterion for deciding on the formation of the technical group trains stations are costs associated with the accumulation, formation and promotion of trains on the main railway stations and free way.

The task of calculating plan formation can be divided into two levels [1]:

1) determine the optimal plan for the formation of through trains at the site of railways;

2) the car traffic in local areas of operation.

For the first part of the calculation elected core network by analyzing the location of ground stations on the railway, their technical equipment and operating plan formation. Its numbers include sorting, district, large cargo of railway station and adjacent railways [2].

In the second part to the reference line is added all cargo and intermediate stations that perform work on the train formation plan. The purpose of attaching car traffic to the calculated reference stations are records of local technology areas.

The most important factor that affects the operational activities of the railways is uneven passing car traffic.

Prof. S.V. Duvalyan [3] proposed a method that allows offline determine the best plan of formation at the site network to calculate plan of through one-group trains formation.

Minimizing of the costs associated with carriges downtime for accumulation and execution of sorting, was solving as a problem of linear programming.

The calculations to determine the plan of forming a simple accumulation of used cars under the parameter storage cars. He is one of the main criteria that demonstrate the effectiveness of the plan allocations formation. The first theoretical study on this issue belongs prof. A.N. Frolov.

Prof. A.N. Koreshkov [4] considers two group accumulation schedule depending on size of group savings and pasting individual parts on the ratio of number of cars daily appointments

One of the major tasks of operational management of car traffic regulation is a process of accumulation by organized supply carriages individual appointments and their processing in sorting stations for the plan of trains. If the accumulation of cars is unstable, it will place additional costs wagon hours by increasing the length of downtime between individual operations. If the accumulation of cars consciously regulated, thereby defined a particular order of operations involving appropriate groups supply scheme, processing and sending cars that are accumulated in respect of the specific situation at the stations and sections.

In modern conditions optimal solution operational management of car traffic taken by combined use option plan formation trains, including the appointments of three trains groups:

1) forming a stable core of the plan - for the whole duration;

2) designation, which periodically enter or canceled that lasts several days to several months with the conditions of their application;

3) options plan adjustments formation trains that implement the operational management of car traffic, taking into account the terms of their approach to the formation stations - for some trains.

As a one-time adjustment of train formation can be seen forming group trains with the possibility of forming trailed groups associated stations.

Until now planning train formation at the vast majority of stations supply is done almost "by hand". However, significant amounts of information that must be processed within extremely tight deadlines do not allow satisfactory quality to rely on "manual" calculation.

Today, there are many methods of operational management of traffic volumes, most of which have been successfully tested and put into practice. Each of the existing methods, of course, has certain advantages and has a

theoretical and practical value, but they have been introduced quite a long time ago and under the modern conditions almost all of them can be characterized by disadvantages, the most important of thesebeing the following:

- current planning of train work at each railway station is carried out independently of each of the others, without taking into account the mutual influence between the stations;

- potential for group trains is not significantly utilized.

In the work we developed the methods of assessment of efficiency of formation of a group of trains under operational conditions by developing simulation models of the transportation process on separate railway direction with the help of computers and the study of influence of various technological factors on the technical and operational parameters of the transport process.

The analysis shows that an increase in the value of plan-ning period increases overall carriage down time of idle cars at stations, reduces the amount of shunting locomotives and simple train. Thus, changing the number of single- and train two-groups individual process indicators are improving, others worse. In order to identify an effective mode of operation must perform a feasibility comparison of different options.

The main purpose of this study is to search for methods to reduce carriage down time at stations during accumulation and accelerate the promotion of carrige traffic on the rail direction in terms of operational efficiency by combining and forming one-group and two-groups following way trains.

References:

1. Bujanova V.K., Kondrahina N.V., Pojarkova M.A. Vnutridorozhnyj plan formirovanija poezdov. Avtomatizacija i operativnoe upravlenie vagonopoto-kami / VNIIZhT. M.: Transport, 1995. 93 s.
2. Bujanova V.K., Smetanin A.I., Arhangel'skij E.V. Sistema organizacii vagonopotokov. M.: Transport. 1988. 224 s.
3. Duvaljan S.V. Metody i algoritmy reshenija zadach planirovanija i ucheta na zheleznodorozhnom transporte. M: Transport, 1969. 256 s.
4. Koreshkov A.N.. Sapezhinskij F.N. Ustanovlenie celesoobraznosti formirovanija gruppovyh poezdov v uslovijah spada razmerov vagonopotokov odnogruppnyh naznachenij. Tezisy dok. pervoj nauchno-metod. konf. Ch-Z -M: RGOTUPS, 1996. S 73-79.

STUDY OF CAR TRAFFIC FLOW STRUCTURE AT THE MARSHALLING YARD

Nesterenko H., Muzykin M., Horobets V., Avramenko S.
Dnipropetrovsk National University of Railway Transport named after academician V. Lazaryan

The marshalling yard is a complex set of technologically interrelated elements intended for car flow rehandling. Marshalling yards of Ukrainian railway network are usually located at the junctions. They rehandle the flows coming from different directions. These stations were always the busiest and the capacity of the entire line is dependent on them as 70% of all car traffic flows are rehandled at the junctions.

That is why, the question of improvement of marshalling yard operation at the junctions is of high importance. Behavior of incoming and outgoing flows is one of the most important requirements for the components taken into account when describing the performance of any queuing system.

The law of train arrival distribution is Poisson, and the intervals between them have exponential distribution. Irregularity of train arrivals affects the station operation and must be taken into account both when developing the procedure and when solving the problems of the station technical equipment [1,2].

The main indicator of the marshalling yard operation is the average downtime of rehandled transit cars. Station-time of cars consists of the time taken to perform successive operations on individual elements of the rehandling process and downtime in expectation of operations. The correct determination of the average time spent by a rehandled transit car at the station is essential, especially in the conditions of new system of economic incentives. But still there is no separate methodology for determining the wagon downtime, which would allow to objectively consider the equipment and operation technology and exclude the possibility for subjective decisions.

Some downtime elements are the values, determined by the operation procedure and not dependent on the volume of work, which can be expressed as time to complete the operations. Increase in workload leads to reduced downtime during formation but extends the queue downtime on the subsequent service element. Depending on the operation volume effect on the downtime elements, the latest can be divided into three groups.

The curve variation on the graph clearly shows the effect of rehandling volume on two downtime elements: during formation and in expectation of operations.

In case of small rehandling volumes the car downtime decrease should be achieved mainly by reducing the car formation costs organizing the approach of locking groups, replacement of one-group minor purpose trains with the group ones, etc. In case of large rehandling volumes the focus should be given to reducing the time of breaking-up, composition and departure processes, in order to shorten the queue downtime.

The analysis of changes in downtime elements, depending on the rehandling volume allows not only to identify the car downtime reduction methods, but also to make a correct assessment of station staff work, as well as to adjust the rate of idle cars. The station car downtime rate is set for a specified amount of work. But the actual rehandling is different from the scheduled one. In this regard for objective evaluation of station staff work it is necessary to adjust the rate on the amount of work performed.

One of the important elements of the time spent by the cars at technical stations that affects the car traffic management system is car downtime during formation. This downtime may be determined both by total car flow, that is from the moment of arrival at the station of these specific cars and to the moment of their departure from the station, and only by the flow at the marshalling track. To plan the composition for a specified period the car downtime during formation is determined with sufficient accuracy by analytical calculations. Analysis of the formation process in different conditions of car approach to the station and its operation makes it possible to determine more precisely the formation parameter *c*, and hence the formation car-hours for individual destinations or total value for the station [3].

One can conclude that the formation parameter is dependent on uneven approach of car groups to the station, but besides it is dependent on a significant number of factors that affect the train formation process. The average number of car groups *e*, forming the trains m_{om}, depend on the number of car groups of a specific destination arriving during a certain period (day or T_H).

But we need to pay attention to the fact that continuous and uniform flow to the station of car groups with the same volume does not affect the formation parameter. Thus, the formation parameter is dependent on the interval between the car group arrivals, frequency and duration of interruptions in the train formation, the value of completing group, the number of cars in the first and other groups.

References:

1. Muzykin M.I., Nesterenko H.I. Vplyv «vikon» na propusknu spromozhnist zaliznychnoho napriamku [Influence of maintenance windows on the working capacity of railway route]. *Nauka ta prohres transportu – Science and Transport Progress*, 2014, no. 3 (51), pp. 24-33. doi: 10.15802/stp2014/25797.
2. Muzykina H.I., Bolvanovska T.V., Zhorova Ye.M. Vplyv parametriv nakopychennia vahoniv na yikh prostii na sortuvalnii stantsii [The influence of cars acquisition parameters on their idle hours on marshalling yard]. *Visnyk Dnipropetrovskoho natsionalnoho universytetu zaliznychnoho transportu imeni akademika V. Lazariana* [Bulletin of Dnipropetrovsk national University of railway transport named after Academician V. Lazaryan], 2008, issue 20, pp. 198-201.
3. Nesterenko H.I., Muzykin M.I., Horobets V.L., Avramenko S. I. Study of car traffic flow structure on arrival and departure at the marshalling yard X. *Nauka ta prohres transportu – Science and Transport Progress*, 2016, no. 1 (61), pp. 85-99. doi: 10.15802/stp2016/60986.

CURRENT STATE REFORM OF RAILWAY SECTOR

Nosulko A.
Public joint stock company "Ukrainian railway"

The regional branch "Donetsk railway" JSC "UZ" started its activities 1/12/2015 and is part of JSC "Ukrzaliznytsia". Branch ensure sustainable functioning centralized management traffic in the transport network region.

During existence regional branches in reform process its membership in other branches of Society withdrew following units:

- Production structural unit "Donbass mechanization of track work center" (submitted branch "Center for repair and maintenance track machines "JSC UZ");
- Production structural unit "Energosbyt" (referred to the branch "Energosbyt" JSC "UZ";
- Information and calculated Center (referred branch "Main Information and Computing Center JSC "UZ ");
- manufacturing structural unit single technological center for processing shipping documents YeTehPD (transferred to the branch "Single payment center rail transportation JSC "UZ";

Also, according order JSC "UZ" in 2016 was created and incorporated into regional branch two rail traffic management - Donetsk and Luhansk [1,2].

Created profile and start function and special activities for the branch:

- branch "Center of transport logistics", whose main goal - to meet needs state, businesses and individuals safe and high-quality rail transportation in domestic and international communications, works and services carried out (provided) branch, to create conditions for improving competitiveness of industry, and profit from business activities;

- branch "Center of construction works and operation buildings and structures" whose main objective is meet needs companies and other entities all forms ownership in construction buildings and structures, construction materials, products and structures, other services and works fulfilling (providing) Branch.;

- branch "Passenger Company", whose main objective - the management integrated system passenger transportation, services for passengers, baggage, cargo and mail by rail in domestic and international traffic, production, operation, modernization, depot, major, current etc. types repair, maintenance decoupling of passenger rolling stock [3,4];

- branch "departmental militarized protection", which main activities are provision health goods transported by rail engineering structures, railway transport infrastructure, implementation of other security activities, implementation measures for compliance at sites protected throughput within object and modes detection and prevention, within competence offenses on objects protected including terrorist [5];

- branch "Research and Design and Technology Institute of Railway Transport", main areas activity - implementation international scientific, engineering and technological solutions and their development to development railway transport of Ukraine to ensure effective functioning and development industrial and technological complex railway transport public and other enterprises, creating conditions for improving competitiveness of industry and profit course business;

- branch "Center software production", whose purpose - to meet needs Society logistical resources, services carried out (provided) branch, effective functioning and development industrial and technological complex Railway Transport of Ukraine;

- branch "Center service provision", the subject activity - building activities (organizing construction buildings, construction communication facilities, specialized construction work), sales travel documents, works and services for passenger services, manufacturing and supply technological

equipment for railway transport and his service, provision of services telecommunications operator and Internet, computer programming.

Also, basic directions improvement train control on large landfills and creating traffic control centers. To go new principle separation of functions envisaged dispatching controllers combine functions road in main control center traffic (HTsUPi) and implement centralized management of operational work on major landfills considerable length railways by creating regional centers traffic management (RTsUPiv). The most important place in the new structure will take control HTSUP. Traffic control in ways that are not included in HTSUP assumed organize at RTSUP.

At present, regional branch created and operates Limanskii area of train control, which essentially meets the creation RTSUP.

The process reform continues. According strategic directions are based core business - vertical: freight transport and logistics, passenger transport, infrastructure, services, thrust, manufacture and service.

References:

1. Resolution of 16 december 2009 g. n 1390. Kyiv. On approval state target program railway reform in years 2010-2019.
2. Resolution of 27 December 2006 g. N 651-p. Kyiv. On approval Concept State program of reforming railway transport.
3. Vovk A. Directions improving utilization rates of freight cars on the railroad (office) / Vovk A // Rail transport of Ukraine. - 2008. - № 5. - p. 49 - 53.
4. Mirotina L. Transport Logistics: Textbook for transport universities / M.: Publisher "Exam", 2003. - 512 p.
5. Possibilities decline expenses during exploitation of suburban areas on the railways Germany.- l996.-45, №9.-c.535.

METHOD OF CALCULATION OF SPARE PARTS FOR MAINTENANCE OF SERVICE OF LOCOMOTIVES

Olhovskaja T.

Regional branch DP "Southern railway"

The quantity of spare parts is traditional for maintenance of carrying out of maintenance service (TO) and repair of the locomotives which are a subject replacement during the predicted period, in overwhelming number of methodical documents is determined by means of development of specifications. And attempts to create them for various stages of life cycle of a

corresponding series of the locomotive (the initial stage of operation, the regular operation, current and major overhauls, etc.) are done.

Carried out researches show, that branch norms of the charge of spare parts and units and other material assets on TO and repair of locomotives not completely meet the requirements, which to them are shown. In existing norms, do not find reflection of a condition of operation of locomotives and feature of work of each, separately taken locomotive depot. Also actually reached level of the charge from introduction in this or that locomotive depot of actions which are directed on economical and rational use of material resources is not considered.

Proceeding from this, the statistical model is offered at casual demand of spare parts and materials. In this model, the scheduled period consists of a uniform interval of time. The decision concerning stocks is accepted once in view of predicted levels of demand, which can be presented by values of some casual variable. Thus, economic parameters, which characterize expenses and distribution of probabilities for demand, are determined by predicted conditions on each concrete interval of time.

Let for some locomotive it is expedient to have spare parts of one name. It is known, that the probability of breakage n of pieces of these details is equal $P(n)$. Cost of one detail is equal C_1, losses in case of breakage and her absence in a warehouse - C_2. It is required to determine optimum quantity of spare details N so that total expenses for purchase and average expenses because of shortage of spare parts were minimal.

Total expenses for purchase and average expenses because of shortage of spare parts can be determined as

$$Y(N) = C_1 \sum_{n=0}^{N} (N-n) P(n) + C_2 \sum_{n=N+1}^{\infty} (n-N) P(n). \qquad (1)$$

Let's carry out researches of a control system by stocks on parameters of the given model. For this purpose we shall find value of criterion function Y for $(N+1)$ and $(N-1)$. As a result, we shall receive

$$\begin{aligned} Y(N+1) &= C_1 \sum_{n=1}^{N+1} (N+1-n) P(n) + C_2 \sum_{n=N+2}^{\infty} (N-1-n) P(n) = \\ &= C_1 \sum_{n=0}^{N} (N+1-n) P(n) + C_1 (N+1) P(N+1) + C_2 \sum_{n=N+1}^{\infty} (n-N-1) P(n) - \\ &- C_2 (N+1) P(N+1) = C_1 \sum_{n=0}^{N} (N-n) P(n) + C_1 \sum_{n=0}^{N} P(n) + \\ &+ C_2 \sum_{n=N+1}^{N} (n-N) P(n) - C_2 \sum_{n=N+1}^{\infty} P(n) \end{aligned} \qquad (2)$$

Using equality $\sum_{n=0}^{\infty} P(n) = 1$ it is possible to write down, that

$$\sum_{n=N+1}^{\infty} P(n) = 1 - \sum_{n=0}^{N} P(n). \quad (3)$$

Substituting this expression in (2) we shall finally receive

$$Y(N+1) = Y(N) + (C_1 + C_2) \sum_{n=0}^{N} P(n) - C_2. \quad (4)$$

Value $Y(N)$ will be minimal under following conditions

$$Y(N-1) > Y(N) < Y(N+1); \quad (5)$$

$$Y(N+1) - Y(N) = (C_1 + C_2) \sum_{n=0}^{N} P(n) - C_2 > 0; \quad (6)$$

$$Y(N-1) - Y(N) = -(C_1 + C_2) \sum_{n=0}^{N-1} P(n) + C_2 > 0; \quad (7)$$

$$\sum_{n=0}^{\bar{N}-1} P(n) < \frac{C_2}{C_1 + C_2} < \sum_{n=0}^{\bar{N}} P(n). \quad (8)$$

Calculating the left and right parts of last inequality (8), it is possible to find such $\bar{N}$ at which the parity $\frac{C_2}{C_1 + C_2}$ will appear the prisoner between them. This value $\bar{N}$ also will be optimum.

Now on the given method calculation of spare parts for maintenance TO and repair of locomotives in depot is carried out.

References:

1. Melnik M.M. Ekonomiko-matematicheskie metody i modeli v planirovanii materialno-texnicheskom snabgenii / M.M. Melnik. - M.: Vyschay chkola, 2000. – 352 S.
2. Firon X. Upravlenie snabgeniem i zapasami / Firon X., Linders M. – SPb.: "Poligon", 1999. – 768 S.

INTENSIFICATION OF HEAT EXCHANGE WITH THE HELP OF A FLOW SPIN

Panchuk O., Aleksahin O., Pogoreliy
Ukrainian State University of Railway Transport

It is possible to increase substantially physical data of heat exchange equipment and a power plant itself in general with the help of intensification of heat exchange. The intensification of heat exchange processes is economically reasonable in all the branches of industry.

While developing heat exchange equipment, we use quite a wide range of intensification means, some of them being quite conventional for heat and power engineering: the use of turbulent flow mode of energy carriers; the reduction of channels diameter; the choice of optimal shape of channels cross-section; heat transfer surface ribbing; the application of heat carrier turbulence promoters; the utilization of heat exchange rough surfaces; the spinning of heat exchange flows; the application of short channels and heat exchange noncontinuous surfaces; the utilization of curved channels; the installation of cross baffles in a tube bundle etc.

A great practical effect that could be expected after the application of heat exchange intensification while creating heat exchange equipment has led to an efficient research and substantial introduction of various means of heat exchange in industry.

A heat exchanger flow spin substantially intensifies heat exchange. Centrifugal forces in a spinned flow drive the flow back to the pipe wall, at the same time secondary medium cross flow and the increase of wall flow speed appears which contributes to the heat exchange improvement. The flow spin is provided by a spinned metal band inserted along the full length of the channel and creating constant spin along the pipe, behind which spin intensity gradually damps under the influence of viscous friction in the flow.

The application of a spinned band is efficient in rectangular section under certain hydrodynamic conditions.

A possible disadvantage of flow vortex generators continuously mounted along a pipe is substantial increase in hydraulic resistance. The decrease in hydraulic resistance at quite high level of heat exchange can be reached by means of the installation of a train of separate vortex generators. Heat transfer in such a channel depends on the geometry of vortex generators and the distance between them.

The assembly of separate vortex generators in a pipe is technologically more complicated than the installation of a continuous swirler.

When a working body approaches a pipe input tangentially, heat exchange decreases while moving away from the input (spin damps), however the spin provokes greater intensity of heat exchange than at the initial thermal part of an unspinned flow and on the greater length of the pipe.

The increase of the technical level of heat exchange equipment by means of heat exchange intensification improves general characteristics of a heat and power plant. The decrease of specific fuel consumption greatly depends on the auxiliary equipment of power pants. That is why the intensification of heat exchange serves as a powerful means to increase the efficiency not only of the heat exchange equipment but of a heat and power plant in general.

EVALUATION METHOD TRANSIT POTENTIAL UKRAINIAN TRANSPORT SYSTEM

Pasichnyk A., Klen E., Mirohnichenko S.
University of customs and Finance

Ukraine is located at the intersection of trade and transport flows between world economic centers of Europe and Asia. Experts estimate the share of trade flows between these regions is about 40% of international trade. Therefore, to improve the effectiveness of transit potential of Ukraine are all favorable conditions substantial increase in international cargo transit through its territory. In this regard, the further development of the methodology of analysis and evaluation of transit potential is quite an urgent problem.

The transit potential of the country is determined by the capacity of the transport network, as well as qualitative and quantitative characteristics of the resources of the transport system and its infrastructure to provide transport service for transit cargo and passengers across Ukraine.

The available technological resources of Ukraine's transport infrastructure make it possible each year to transport by rail, inland waterway and road transport and process over ports 120-130 mln tons and pipelines deliver about 200 mln tons of transit cargo. The effectiveness of the use of such an important economic resource does not exceed 40%. One of the main reasons for this situation is the discrepancy technical parameters of Ukrainian transport system infrastructure to modern standards.

Analysis of traffic statistics shows that the bulk of transit goods carried by rail and road modes of transport by 2014 their share of the total traffic of 81.2% and 16.2% respectively. Note that the last three years marked a positive trend increase in transit cargo by road. The third place in terms of traffic ranks maritime transport, which in 2014 carried 2.2% of cargo. And it is a small proportion of traffic is carried by river and air transport modes.

However in recent years, marked by negative trends associated with a significant drop in cargo transit through Ukraine. In particular in the period from 2008 to 2014 transit decreased almost three times. The reasons for this decline in transit cargo were the global financial crisis, events in the Crimea and in the east and untimely adoption and implementation of both technical and organizational and financial decisions for modernization of transport infrastructure. So according to the World Economic Forum [1] for the competitiveness of transport infrastructure Ukraine occupies 91 place, the quality of roads - 132, the quality of port infrastructure - 108, the index of global competitiveness - 79 among 140 countries. Note that according to a study conducted by the Gallup Institute (USA), Ukraine occupies 133 place from 148 countries of the world ranking of the state roads [2].

For the analysis and evaluation of transit potential analyzes the factors that shape it, and which practically determine its level and scope. Factors forming transit potential - is the specific conditions and economic factors that exercise some influence (directly or indirectly) the transit potential of the country, ie the volume and level. Transit factor is defined as territorial factors and their level of interaction with the technical and economic indicators and characterizes the level of development of transport links with the country taking into account relevant infrastructure that provides these links. To calculate the values of transit proposed to use the following expression

$$K_{Tp} = \sum_{i=1}^{n} k_i E_i , \quad (1)$$

where K_{Tp} – coefficient transit, κ_i – weight and influence of the i-t factor, E_i – part of transit potential and the i-t factor.

In calculating this figure takes into account the following factors: the potential of Ukrainian transit network ITC; length of land borders; trans borders level; characteristic relief area; capacity highways; infrastructure development of the state border; quality of internal transport network; density highways; the number and condition of the vehicle fleet.

Value indices E_i transit potential components derived from statistical data, the volume of transit cargo, assessment of transport infrastructure and data on the use of transit potential of Ukrainian ITC network. The value of

weighting coefficients k_i determined based on expert evaluation of the impact of each of the factors considered by the amount of transit ranking 10-point calculation. The corresponding values for each parameter adopted for calculating transit ranking and the results of the calculation formula (1) shown in table. 1.

Thus, in accordance with the proposed approach values of Ukrainian transit transport system will be equal to 3.53. Note that according to the British Institute of Transport Randall, Ukraine has one of the highest in Europe, transport transit rating - 3.75 (before 2002 - 3.11) points [3].

The main areas to stimulate development of transit potential of Ukraine should be:

- increasing throughput and processing capacity of transport facilities;
- increase the intensity of processing freight and traffic flows, reducing time parking of vehicles;
- improving the reliability of transport and its security;
- obtaining additional revenue from of transport and other, related activities.

Table 1

Results of calculation of transit potential of Ukrainian transport system

№ п/п	Designation of weighting coefficients	The value of the weight of coefficient	Designation of index transit potential	The value of the indicator transit potential	The value of the component transit potential
1	2	3	4	5	6
1	$к_3$	0,6	$Е_3$	0,2	0,120
2	$к_5$	0,8	$Е_5$	0,45	0,360
3	$к_9$	0,75	$Е_9$	0,25	0,188
4	$к_7$	0,3	$Е_7$	0,15	0,045
5	$к_{Б\text{-}Чм}$	0,65	$Е_{Б\text{-}Чм}$	0,25	0,163
6	$к_{С\text{-}А}$	0,75	$Е_{С\text{-}А}$	0,35	0,263
7	$к_{р}$	0,55	$Е_{р}$	0,5	0,275
8	$к_{пск}$	0,45	$Е_{пск}$	0,6	0,270
9	$к_{рт}$	0,5	$Е_{рт}$	0,6	0,300
10	$к_{рск}$	0,6	$Е_{рск}$	0,25	0,150
11	$к_{сап}$	0,55	$Е_{сап}$	0,2	0,110
12	$к_{пса}$	0,6	$Е_{пса}$	0,35	0,210
13	$к_{я}$	1	$Е_{я}$	0,4	0,400
14	$к_{ізм}$	0,55	$Е_{ізм}$	0,5	0,275
15	$к_{ідк}$	0,7	$Е_{ідк}$	0,25	0,175
16	$к_{щм}$	0,65	$Е_{щм}$	0,35	0,228
Scale		10,0	The value $К_{Тр}$		**3,53**

In accordance with the proposed approach to improve the ranking Ukrainian transit transport system in the future need to implement a set of measures aimed at increasing the transit potential of the indicators listed in table 1.

References:

1. Pozytsiya Ukrayiny v reytynhu krayin svitu za indeksom hlobal′noyi konkurento-spromozhnosti 2015-2016 [Elektronnyy resurs] – Rezhym dostupu: http://edclub.com.ua/analityka/pozyciya-ukrayiny-v-reytyngu-krayin-svitu-za-indeksom-globalnoyi-konkurentospromozhnosti-0 .
2. Departament DPS MVS Ukrayiny. [Elektronnyy resurs]. – Rezhym dostupu: http://www.sai.gov.ua .
3. Pasichnyk, A. M. Mizhnarodni transportni korydory yak osnova realizatsiyi tranzytnoho potentsialu Ukrayiny [Tekst] / A. M. Pasichnyk, O. M. Klen // Visnyk SNU im. V. Dalya. – 2011. – № 5 (159). CH. 1. – S.218–223.

JUSTIFICATION POSSIBILITY OF USING DRONES TO STUDY THE PARAMETERS OF TRAFFIC

Pasnak I.

Lviv state university of life safety

Active development of unmanned aircraft caused a great potential for its use. Today drones used in many fields of human activity, including agriculture, in the construction of various facilities and facilities to conduct search and rescue operations, mail delivery and more. Also drones have been applied in photography and film, because they can be easily and cheaply take pictures with altitude and at different angles. As you can see, international experience shows that drones can be an effective tool for monitoring and mapping of areas, but research in this area is extremely important and promising.

It is worth noting that the National Police is using drones to prevent the formation of traffic jams and tracking of problematic situations on the roads. The first flight took place on a police drone on the highway Kyiv – Odessa, where a repair formed three-kilometer traffic jam.

Typically collect information about the parameters of traffic carried by field observations, which involves a number of accountants. So promising is the use of modern means for fixing traffic that would have limited the need to attract people to research.

In the direction outlined by the author was asked to study the parameters of the road apply method using DVR (patent Ukraine for useful model №79573). However, this method has several drawbacks as it provides a record of traffic only in a section of the road network.

For more pictures in the video processing would be appropriate to ensure the installation of cameras on top of the investigated object (eg crossroads) to be able to comprehensively explore the parameters of movement in all directions. It looks promising application drone that will help make a record of traffic and pedestrian flows by "hovering" over the crossroads and obtaining better quality video. In the future, you can work out in laboratory conditions, which will reduce the number of researchers.

For transport studies recommended drone with the following parameters [1]:

- camera with sufficient extension (for accurate fixing traffic and pedestrian flows);
- the possibility of GPS guidance (to improve the positioning of certain parts of the road network);
- the opportunity to "hang" on the given place (to obtain a clear video of the object studied);
- automatic return to emergency situations (to prevent loss drone in case of low battery or low signal link control);
- increased autonomy of operation (for ensuring continuous recording);
- increased distance control and transmission (to enable investigate large-sized areas of the road network or individual transport area).

Processing video in laboratory conditions will enable researchers to obtain the following information [1]:

- intensity and composition of traffic on main-street network of the city;
- intensity and composition of traffic on roads that are part of the city;
- pedestrian traffic;
- speeds on streets and roads of the city;
- delays in traffic at intersections and in some sections of main-street network;
- placing and conditions of parking vehicles;
- traffic conditions in paragraphs periodic crowded (stadiums, parks, train stations, etc.).

As you can see, the use of drones in the field of transport research will significantly facilitate the work of researchers and improve their work,

and thus obtained video footage can also be used during the learning process to improve the quality perception of the material students.

Also received the ways data would be useful for optimizing routes and special vehicles safety of their movement; the author examines these issues in [2-3].

References:

1. Pasnak I. (2017) Zastosuvannya kvadrokopteriv dlya doslidzhennya parametriv dorozhn`ogo ruxu [The use of drones to study the parameters of traffic]. Proceedings of the Problemy z transportnymy potokamy i napriamy yikh rozviazannia (Ukraine, Lviv, March 16-18, 2017), Lviv: Publisher Lviv Polytechnic, pp. 15-17.
2. Pasnak I. (2015) Rozkrittya osoblivostey vplivu parametriv vulichno-dorozhnoyi merezhI na trivalist sliduvannya ta bezpeku ruhu spetsiIalnih transportnih zasobiv [Disclosure of the peculiarities of the parameters of the road network and the length of follow safety special vehicles]. Scientific Journal of LSULS, no. 12, pp. 209-216.
3. Pasnak I. Development of algorithms for efficient management of fire rescue units / I. Pasnak, O. Prydatko, A. Gavrilyk // EasternEuropean Journal of Enterprise Technologies, Vol 3, No 3(81) (2016): Control processes, pp. 22-28.

WAYS OF ENERGY SAVING IN RAILWAY TRANSPORT

Pidipryhora A., Kletska O., Yevtushenko E.
Ukrainian State University of Railway Transport

Energy saving is one of the most important tasks of the 21st century. The place of our society among the economically developed countries and the standard of living of citizens depend on the results of solving this problem. The energy resources required for domestic development can be obtained not only by increasing the extraction of raw materials, but also, at lower costs, by saving energy directly in the energy consumption centers, in this case, in the production units of the railway transport.

The efficiency of the use of fuel resources is still quite low. To date, the specific fuel and energy consumption in equipment and processes on average twice exceeds those for the industrialized countries of Western Europe and the United States. Improving the energy efficiency of the national economy is one of the main ways to ensure national security, filling the

budget, increasing the competitiveness of domestic products, and addressing social issues.

The current state of use of energy resources does not meet modern requirements. The negative impact on the energy saving process is primarily played by the availability of outdated technologies and equipment in operation, as well as the lack of sufficient control over the consumption of energy resources and, of course, the lack of sufficient financing for energy-efficient projects.

One of the ways to increase the overall efficiency in the field of fuel use is the use of alternative energy sources, in particular heat pumps. The use of heat pumps makes it possible to convert, for example, electrical energy into thermal energy, with a coefficient of 2.5-3.0. This determines the efficiency of using heat pump plants. Despite significant initial costs, the payback period of such projects is within 5 years, which makes it possible to speak about the cost-effectiveness of the introduction of such equipment at railway enterprises.

Railway transport is one of the resource and energy consumed by the economy. First of all, it concerns electricity and diesel fuel which is used in the traction of trains. In 2016, 4.6 billion kWh of electric power (83% for traction of trains), 302.8 thousand tons of diesel fuel (87% for traction of trains), 90.0 million cubic meters of natural gas were used by rail, 32.2 thousand tons of coal, 1.47 thousand tons of fuel oil and 4.58 tons of gasoline.

Regardless of the annual reduction in energy costs, railway transport increasingly pays attention to their effective use. Since 2017 in the structure of the Ukrainian Railways Ukrzaliznytsya, the Energy Management Department has started its activity, which should consolidate the activity of all regional branches in the field of energy saving, develop a unified strategy in this direction, tighten control over the use of fuel resources and improve the normalization process, At the end of the year, reducing the energy intensity of the transportation process.

For this purpose (reduction of energy intensity), the "Energy Saving Program" for PJSC "Ukrzalyznitsa" was designed and developed, the main areas of which are: improvement of the technology of the transportation process; Rational use of the operating park; Modernization of external lighting of railway infrastructure facilities; Reconstruction and renewal of the thermal facilities of production units.

Planned capital investments for energy saving measures for 2017 are 106.5 million UAH, which should allow 11.4 thousand tonnes of energy saving in energy resources and reduce the energy intensity of the railway sector by at least 1.0%.

IMPACT OF TRAFFIC CONDITIONS ON THE BUS DRIVER'S FUNCTIONAL STATE

Postranskyy T.
Lviv Polytechnic National University

Each year increases the intensity of traffic. Also, it is increasing participation of road transport in goods and passengers movement. According to this researchers need to ensure the proper functioning of the system "driver - vehicle - road - environment" parts.

According to statistics, in most cases, the driver`s behavior is the cause of different traffic accidents. The reason of it may be traffic violations, deterioration of traffic conditions and the driver`s functional state [1]. Particularly this question is important during passenger transportation with road transport. Because of that, there is a task to research the factors that influence on the functional state of the bus driver. This allows to improve existent methods of traffic management and to take into account indicators of the driver`s functional state durring planning their work schedule.

After some investigation was founded that the area in which lies the road and the level of it`s loading influence on the driver's functional state. Also on it influences the type of vehicle. This research was done with using ECG recording. The indicator that reflects the functional state of the driver is an indicator of regulatory systems' activity. It marks with conventional points from 1 to 10. This method was offered by R.M. Baevskii [2].

In relevant forms was recorded information about the driver and vehicle parameters before trips. Also, vehicles were equipped with camera and GPS-tracker, which recorded data about traffic conditions. This research of the driver`s functional state was made by using device CardioSens [3].

Driver`s indicator of regulatory systems' activity reaches maximum values while driving in the mountain`s conditions and on the roads in the cities. The minimum value of this index observed while driving on roads in the flat terrain. This affirms that the conditions of movement and parameters of vehicles and traffic impact on the driver`s functional state.

References:

1. Statystyka avariynosti v Ukrayini: [Elektronnyy resurs]. – rezhym dostupu: http://www.sai.gov.ua/ua//ua/static/ 21.htm.
2. Baevskii R. M. Matematicheskiy analiz izmeneniy serdechnogo ritma pri stresse / R. M. Baevskii, O. N. Kirillov, S. Z. Kletskin. – M. : Nauka, 1984. – 222 p.

3. Sistema holterovskogo monitorirovaniya KardioSens : metodicheskie rekomendatsii / Natsionalnyiy aerokosmicheskiy universitet «HAI». – H. , 2006. – 113 s

INVESTIGATION INTO SURVIVABILITY OF THE SYSTEM OF CAR FLOWS AND TRAIN FORMATION ON THE BASE OF THE PERCOLATION THEORY

Prokhorchenko A.[1], Panchenko A.[2]
[1]Ukrainian State University of Railway Transport
2V. N. Karazin Kharkiv National University

The system of freight car flows and train formation on railways in Ukraine is based on accurate cargo delivery. One of the system features characterizing railway transport capability to function in predetermined conditions is the system survivability. The prevailing approaches to analyzing the transportation system survivability are imperfect as they do not allow examining the actual system's behaviour. Under such conditions investigation into the transportation system survivability requires new solutions based on up-to-date methods of analysis and computer simulation [1].

The proposed approach to analyzing survivability of the system of car flows and train formation is based on the described interrelations between railway stations within the network presented as a network structure of paths according to the freight train formation plan (TFP) with a directed graph the nodes of which correspond to arrival/departure train stations while its arcs are destinations. The network analysis is based on the information derived from "The order and direction of car flows in the organization of freight trains on Ukraine's railways for 2012-2013" [2]. To summarize the information, the database of railway stations in the network, the TFP destinations in accordance with types of trains (through, divisional, assorted trains), and their distances has been established. The analysis has been carried out with the free software PAJEK [3]. The analysis of 482 links between 181 railway stations is the object of the applied network research (fig.1).

Within the investigation into survivability of the network destination structure according to the train formation plan it has been offered to use the site percolation process [4] as an alternative for special displacement of

freight cars within the network under increased amount of stations which cannot perform their basic function regarding passing trains to their destinations in accordance with the train formation plan under disadvantageous conditions (emergencies, overload etc). The percolation process suggests considering the change in freight transportation distances within the network under increased amount of failures [5].

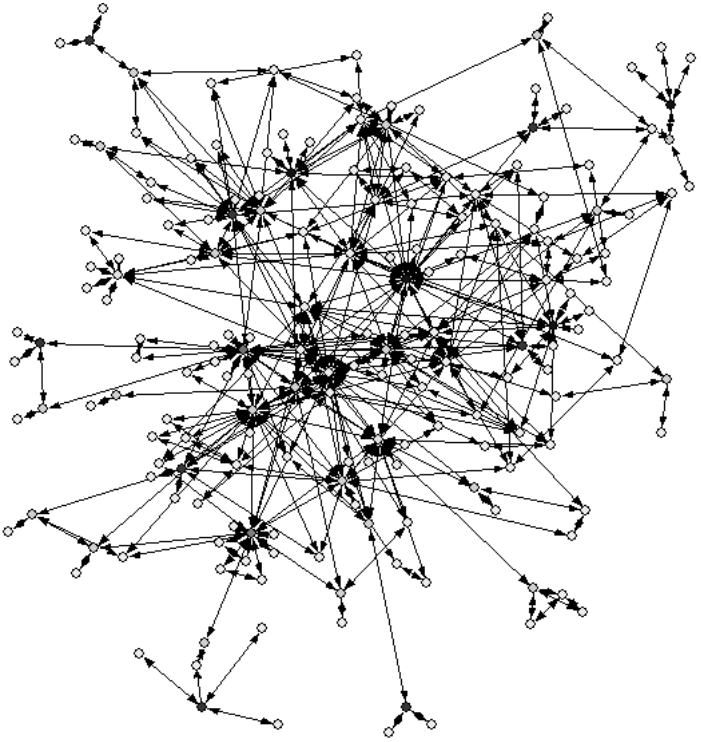


Fig. 1. Graph visualization of the TFP destination network

The research has proved stability of the destination network in accordance with the train formation plan to random failures, while the network graph is extremely vulnerable to coordinated attacks. To select the most stable structures within the train destination network the article gives calculation of the k-kernel of the highest graph component, which reaches the critical point during the random and correlated percolation.

The proposed approach to analyzing the transport system survivability allows monitoring the system's behaviour on its actual scale. The results obtained practically make it possible to identify the most significant network stations, effectiveness of which greatly influences the carrying capacity of the whole railway network.

References:

1. Wasserman, S., Faust, K., Social Network Analysis: Methods and Applications [Text] // Cambridge University Press, Cambridge, 1994.
2. But'ko, T. Investigation into Train Flow System on Ukraine's Railways with Methods of Complex Network Analysis [Electronic resourse] / T. But'ko, A. Prokhorchenko // [Science and Education Publishing From Scientific Research to Knowledge, American Journal of Industrial Engineering, 2013]. – Vol. 1(3). – P. 41-45. – Mode of access: World Wide Web: http://pubs.sciepub.com/ajie/1/3/1/. – Title from the screen.
3. Batagelj, V., Mrvar, A., Pajek: Package for Large Networks, Program Version 1.10 (October 25, 2005). University of Ljubljana, Ljubljana.
4. Broadbent, S. K., Hammersley, J. M. Percolation processes I. Crystals and mazes. [Text]// Proc. Camb. Phil. Soc. – 1957. – 53. – P. 629-641.
5. Cuquet, M. Limited-path-length entanglement percolation in quantum complex networks [Text]/ Martı Cuquet, John Calsamiglia // Journals PHYSICAL REVIEW, 2011. – V. 83. – 14 p.

INTELLIGENT INFORMATION LOGISTICS MANAGEMENT SYSTEM PRODUCT LIFE CYCLE TECHNOGENIC TRANSPORT COMPANIES

Ramazanov S.

Kyiv National Economic University of the name Vadim Hetman

Analysis of the use of modern information technology in the pro-industry shows that one of the areas of development are increasingly Shih Roque application of information technologies at all stages of the life cycle of complex high-tech products as part of an integrated infor-mation environment.

Integrated computerized system developed eco-economic monitoring, modeling and management (SEEMU) nohennym-tech industrial enterprise, which is represented as a 3-level hierarchical structure, functioning in conditions of instability. This system is based on the same basic principles, concepts and the results of author [3-6].

SEEMU proposed paradigm can be applied to a large number of complex systems and technological processes [3-6].

References:

1. Judicial EV Yntehryrovannaya ynformatsyonnaya support zhyznennoho cycle mashynostroytelnoy products. Principles. Technology. Methods. Modely.- N .: ID "MWM", 2003. - 264 p.
2. Ynformatsyonnaya support zhyznennoho cycle of products mashinostroeniya, principles, systems and technologies CALS / YPY: Ouch. Posobye for students. Wu-Call / [AN. Bucket, YF Nazarov, IM Ybrahymov, AD Nikiforov]. - M .: Publishing. center "Academy", 2007. - 304p.
3. Ramazanov SK Models and Information Technologies eco-economic management proizvodstvennoe systemoy in nestabylnoy environment / Author. dyssert. soyskanye to pupils. steppe. d.ɔ.n., Lugansk, 2008. - 40s.
4. Ramazanov SK Innovative Technologies crisis management chnymy ecosystems: monograph / SK. Ramazanov, GA Nadon, NI Crystal, AP Stepanenko, LA Timashev; Ed. prof. SK Ramazanova. - Lu-Ghana - Kyiv: publishing house EUNU. Dal, 2009. - 584 p.
5. Ramazanov SK, Danilchenko TV, Tishkov BO Integrated information-analytical logistics system life cycle management of products, man-made industrial enterprises. // Research publication "Problems of modern-governance: economic, environmental, political, legal, historical, cul-tour mental aspects. Coll. Scientific papers on materials of the All-XXII h NPK, 24-26 November 2016, m. Odesa. - S. 148-155.
6. Ramazanov SK, Velihura AV, Ivanovo M. Parametric model pitch-toast lifecycle engineering of railway transport. // Herald EUNU. Dal. - 2014. - № 3 (210). - P. 211- 218.

SHIPMENT TRACKING AND TRACING SYSTEMS

Rudenko N., Bezsmertna A., Pushynska O.

National Aerospace University «Kharkiv aviation Institute»

In the report it is considered the using shipment tracking and tracing systems in case of development of information flows in logistic system. In practice, the term tracking and tracing is steadily gaining recognition. “Tracking” concerns the continuous electronic monitoring of shipments. “Tracing” denotes the storing of data recorded during tracking.

Application of these methods allows receiving data on a freight condition continuously. There are two methods of ensuring these processes:

with process step-based tracking and tracing, status notifications are sent after the completion of each defined process step and continuous tracking, using GPS systems, that allows to see the location of freight between checkpoints.

On the example of the logistic company "DSV Logistics", we will consider the typical problems at the entity connected with an obsolete communication system. We analyzed a situation which developed in the company. And we see that the company possesses such problems:

- lack of information about the shipments;
- decentralized information flow about the shipments;
- customers cannot monitor their goods.

It is necessary to centralize an information flow for an effective company performance. It is also necessary to implement shipment tracking and tracing systems.

In the reviewed example we applied a method shipment tracing by means of the GPS system. And also we centralized an information flow having created the central server with the database.

Implementation of these methods allows the customer to plan production, despite problems with delivery. He sees a freight condition round the clock, respectively knows when it arrives.

The offered innovation in the form of reorganization of an information flow with use of shipment tracking and tracing systems reduces quantity of a manual work, respectively reduces the risks connected with a human factor. Track&Trace App for the customers will attract buyers. These changes will increase competitiveness.

References:

1. Gorev A.E. Informatsionaja tehnologija ns transporte. Electronaja identifikatsija avtotransportnyh sredstv I transportnogo oborudovanija/ Gorev A.E. // Sank-Peterburgskij gosudarstvenyj arhitekturno-stroitelnyj universitet. . – 2010. - S. 98.
2. Sergeev V.I. Logisticheskie sistemy monitoring tsepej postavok/ Sergeev V.I.//. – M: INFRA-M. . - 2003. – S. 172 .
3. Gorev A.E. Informatsionye tehnologii i sredstva sv'azi na avtomobil'nom transporte / Gorev A.E. // Visnik Shidnoukraïns'kogo nac. un-tu im. V. Dalja. . - 1999. – C 162
4. Road Transport Informatics Terminology. Nordic Road Association, Technical Committee. – № 53. Oslo, 2002. – 55 p.

THE CHOICE OF A RATIONAL ROUTE OF DELIVERY OF BRAKE EQUIPMENT OF CARS ON FOREIGN ENTERPRISE

Rudenko N., Falendysh O.
National Aerospace University «Kharkiv aviation Institute»

One way to reduce the cost of goods is to reduce the cost of transporting its components. Thus, in order to reduce the cost of production of the JSC "Plant for the rep

air and construction of railway vehicles" (Zvolen, Slovenia), it is necessary to choose a rational route for the delivery of components from Ukraine (Kharkov) in the amount of 2,000 units.

With the dimensions of the part A, B, C, its volume will be determined by the formula

$$V = (A \times B \times C) \quad (1)$$

Where A is the width of the part, A = 286, B is the length of the part, B = 206, C - height of the part, C = 385.

It is accepted that the package is 1.5 times larger than the part itself, so we have the following dimensions 429×309×578.

Knowing the dimensions of the package and the quantity of goods, the total volume and weight of the order will be determined by the formulas:

$$\sum V_{заказа} = \sum_{i=1}^{n} V_i = V_{уп} \cdot n \quad (2)$$

$$\sum M_{заказа} = m_{упаковки} \cdot n_{заказа} \quad (3)$$

As a result of calculations $\sum V_{заказа}$ =153,2 м^3, $\sum M_{заказа}$ = 42 t.

In order to choose a rational cargo delivery route, it is necessary to know all possible variants of its transportation, representing an array A_i.= (A_1, A_2, A_3, A_4). Transportation goods can be four types of transport: automotive; Railway; Aviation; Water. And also by their combination.

In the beginning it was considered the advantages and disadvantages of these types of transport for this task. Automobile transportation of goods is the most popular type of transportation of goods. The foregoing is explained by the fact that the automobile way of transporting goods is the most convenient. It makes it possible to carry out the delivery of goods to the most remote locations, which can not be transported by other means of transport.

By water transport this cargo can not be transported as there is no possibility to pave the way of transportation.

By air transport cargo can be delivered, but only to the nearest airport. Because of what will have to unload and switch to another mode of transport.

Railway type of transportation is suitable, but it has in this case, a number of reasons for which it is not effective: different track widths; We need covered wagons, wagons provided by companies for transportation in Ukraine do not meet the standards of the European Union.

From the above listed species, it can be concluded that it is expedient to transport goods to motor vehicles.

After choosing the company and the way the cargo was delivered, the delivery route and cost were determined. Using Google Maps, the routes of the goods were laid (Fig. 1).

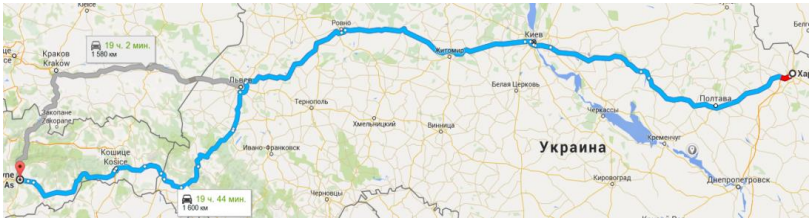


Fig.1. Route of cargo from Kharkov to Zvolen

Figure 1 shows that there are two ways of following. One is smaller in distance and time, but crosses two border points, and the second is 20 km longer, but crosses only one border point. Taking into account the reduction of the delivery time, we select the second way. Its length is 1600 km. and one border point.

Next, transportation was selected, taking into account transportation tariffs, wages and payload. As a result of the analysis of existing cars [2] a general purpose truck, length gauge, closed (up to 120 m^3) was selected. Its main characteristics are shown in Table 1.

Table 1

Technical and economic characteristics of a general purpose truck

Cost	From 240 UAH./ hour
Minimum payment amount	1400 UAH.
Rate	From 12 UAH. for 1 km.
Lifting capacity	Up to 22 tons.

Calculation of the number of such cars was carried out according to the formula, pcs,

$$K = \frac{\sum V_{заказа}}{Q_{авт}} \quad (4)$$

where $Q_{авт}$ is the carrying capacity of the vehicle.

As a result of calculations, K = 7 pcs.

Costs for the delivery of cargo are calculated by the formula, UAH,

$$З_{доставки} = (l \cdot a) \cdot n, \quad (5)$$

where *l* - is the path length, km, *a* - tariff, UAH / km, *n* - is the number of units of transport.

In the course of the work, a road transport was chosen to deliver 2,000 units to the JSC Zavolen Plant, Zavolen, Slovenia, and a rational route for delivery of components from Ukraine (Kharkov) was chosen. At the same time, it is necessary to use 7 general purpose trucks. The cost of this will be about 134.4 thousand UAH.

References:

1. Methods of transporting different types of cargo / http://www.logist-service.ru/sposoby-transportirovki-razlichnyx-tipov-gruzov.html.
2. Stand "Classification of trucks" / http://www.logist-service.ru/sposoby-transportirovki-razlichnyx-tipov-gruzov.html.
3. Red L.B. Transport logistics / L.B. Red // - M, Izdatelstvo «Ekzamen», 2005. – 512p.

MAIN FAILURES AND DAMAGE OF CARRIED STRUCTURES OF FREIGHT CARRIDGES MEANT FOR THE EXTENSION OF SERVICE LIFE

Sapronova S., Bulich D., Tkachenko V.

State Economy and Technology University of Transport

The total park of freight cars of JSC "Ukrzaliznytsya" as of the end of 2016 has more than 105 thousand wagons, of which the working park is about 64%, non-working - 36%. The structural freight park of wagons by types in percent is shown in Fig. 1.

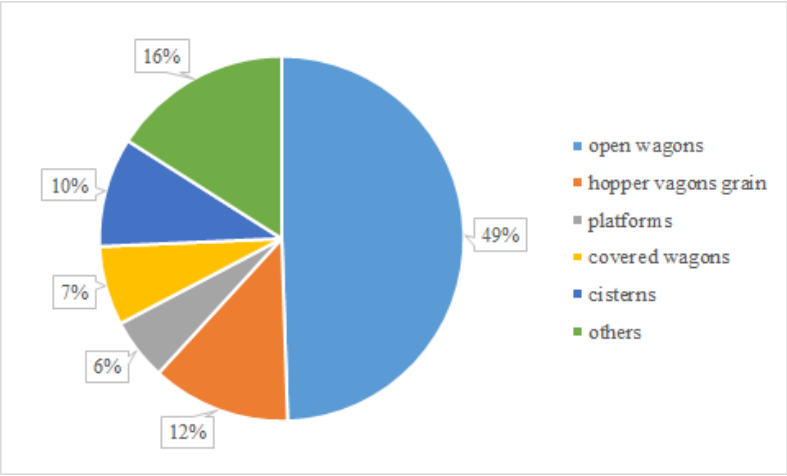


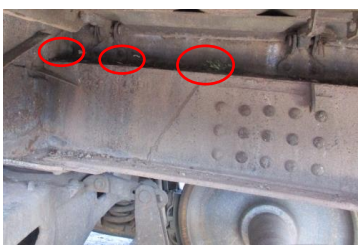
Fig. 1 Structure of freight park by types of wagons

Today, 30 thousand freight cars of Ukrzaliznytsia inventory park are operated outside the allotted service life [1]. The consequences of this are natural aging and the accumulation of fatigue changes in the material of the supporting structures, due to which their destruction occurs. The main task in the operation of freight cars that have exhausted their assigned service life are: high-quality and timely non-destructive testing of load-bearing structures; determining the places of failures and damages; restoration of damaged places of load-bearing structures; when restoration of the load-bearing structures of the car is impossible - the exclusion of the car from the freight park.

Based on the performed work on the diagnosis of freight wagons that are to be extended, the specialists of the reliability department of the "Ukrzaliznytsya" branch "NIKTI", there were found the main typical places of failures and damage to the frame and body of the cars: deformations, kinks, drifts, bends, deflections, breaks, loosening of units and details fastening, holes, cracks [2].

The main critical damages of half-wagons were [2]:

- excessive corrosion wear of load-bearing metal structures (Fig. 2a);
- breaks of the carcass racks (Fig. 2b);
- cracks in the pivot beams (joints with the spinal beam) (Fig. 2c).


a)


b)


c)

Fig. 2.The main damage of gondola cars

In grain wagons, there were found the same types of cracks in the spinal beam at the junction with the pivot beam (Fig. 3).

Fig. 3. Cracks in the spinal beams of grain-wagon cars

The purpose of the report is to determine the main damage and failure of load-bearing structures of freight cars, which significantly affect the performance of the car. Wagons with such damages and failures should be excluded from the inventory park.

References:

1. Belchenko T. Terminated deficit. - Ukrainian transport newspaper "Magistral", 2016. - №17(2107) from 12-18 March: http://ru.magistral-uz.com.ua/articles/vidterminovanij-deficit.html.

2. Petrenko V.O., Bulich D.I. Evaluation of state of cargo wagons bearing constructions with prolonged exploitation term / V.O. Petrenko, D.I. Bulich // Railway transport of Ukraine. – 2017. – 1 (122). – P 48–52.

RESTORING OF RAILWAY ROLLING STOCK WHEELS

Sapronova S., Tkachenko V., Zub E.
State Economy and Technology University of Transport

Increase of wheel ridges wear for rail adversely affects their operational regulations geometric parameters [1]. With the reduction of the minimum standard, wheelsets areremoved from operation for a full recovery of wheels bearing surfaces with performance of turning behind remount profiles, which leads to reducing their resource.

Numerous improving of design and implementation of new methods to reduce wear and tear of rolling stock wheels ridges have not solved this problem. The main task of almost all known studies of wheel ridges wear and tear was the increase of overhaul runs total over the life of the wheels of locomotives and cars by reducing the wear rate.Technological wear during recovery of wheels was not taken into account. But this type of wear has a significant impact on reducing of wheels resource [2].

Studies of rolling wheels surface dynamics have led to the conclusion of inappropriate full recovery of wheels rolling profile surface in a situation where in achieving minimally acceptable parameters of one of the other options have substantial margin. In this case, more appropriate would be incomplete application of turning, whereby only one option has reached the limit value. This principle is based of the method of turning of rolling stock wheel part surfaces [3], which is built on the turning of the wheelset with profiles tires ДСТУ 11018:2005with the following values of the geometric parameters of wear and tear:

- rolling $\delta = 0{,}9$ mm with the boundary permissible – $[\delta] = 7$ mm;
- ridge thickness $b_г = 27{,}4$ mm at the minimum permissible thickness

$$[b_г] = 23 + 0{,}65 \cdot \delta = 23 + 0{,}65 \cdot 0{,}9 = 23{,}58 \text{ mm},$$

- the thickness of the new ridge – 31,2 mm;
- parameter of ridge steepness qR = 6,0 mm at the minimum permissible value of $[qR] = 6{,}0$ mm.

At such geometric figures of wear and tear according to the current instructions [1, 4] the wheelset must be identified as defective and there must be done complete turning of wheels on the new profile. Thus, for this example, durign the turning there must be removed a layer of metal weighing about 30 kg, and the thickness of the bandage to be decrease by 10 mm. The turned profile receives the geometric parameters of a new profile:

- ridge thickness b_r* = 31,9 mm;
- rolling δ = 0,0 mm;
- ridge steepness parameter qR* = 10,3 mm.

Given that the turning of bandage in this example had a significant margin in turning (86%) and the thickness of the ridge (50%), it is advisable not to do a complete turning, leaving intact those profile settings whose values have stock, but to be limited to incomplete turning (fig. 1).

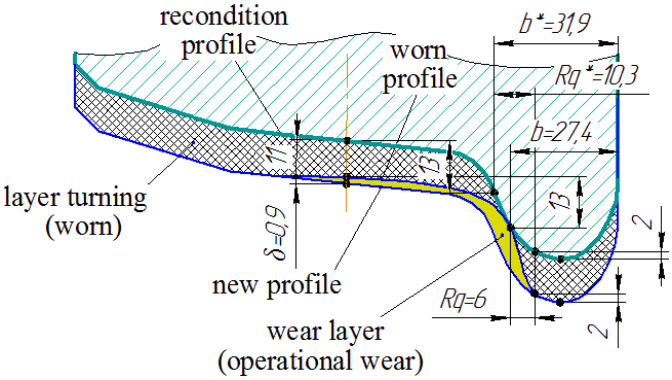


Fig. 1. Diagram of wheel turning ДСТУ 11018:2005 in accordance with the "Instructions"

During the incomplete turning, the profile ridge part form is renewed and the rolling and thickness of the ridge remain the same as before the turning, namely δ = 0,9 mm, b_r = 27,4 mm, which are allowed the "Instruction" [1, 4] for further operation of the wheelset. This option increases the steepness of the ridge to the nominal value for the output profile qR = qR * = 10,3 mm [5].

The method of wheels profiles recovery with incomplete turning leads to the reduction of technological wear and tear and increases the life of wheels by about 20 ... 40%. At the same time with using this method it is advisable to introduce non-mechanical methods of recovery.

References:

1. Instruktsiya z formuvannya, remontu y utrymannya kolisnykh par tyahovoho rukhomoho skladu zaliznyts′ Ukrayiny koliyi 1520 mm // VND 32.0.07.001.2001. Ministerstvo transportu Ukrayiny. − Donets′k: TOV «Lebid′», 2001. − № 305-TS. − 152 s.
2. Sapronova S. YU. Analiz i vplyv vydiv znoshuvannya kolis rukhomoho skladu na yikh resurs / S. YU. Sapronova // Visnyk Skhidnoukrayins′koho nats. un-tu im. V. Dalya. – Luhans′k : SNU im. V. Dalya, 2010. – №5 [147]. – CH. I. – S. 32–40.
3. Pat. 33471 Ukrayina. MPK V 61 V 12/00. Sposib vidnovlennya profilyu poverkhon′ kochennya kolis zaliznychnoho rukhomoho skladu / Holubenko O. L., Didenko D. M., Kompaniyets′ I. S., Sapronova S. YU., Tkach I. H., Tkachenko V. P.; zayavnyk i patentovlasnyk Skhidnoukr. nats. un-t im. V. Dalya. − № 01729/08 ; zayavl. 11.02.08 ; opubl. 25.06.08, Byul. № 12.
4. Nakaz Ukrzaliznytsi № 598-TS vid 18.12.2007 «Pro vnesennya zminy №2 do VND 32.0.07.001-2001».
5. Sapronova S. YU. Optymizatsiya profiliv bandazhiv kolis lokomotyviv: monohrafiya / S. YU. Sapronova. − Luhans′k : Vyd-vo SNU im. V.Dalya, 2011. −171s.

CASE STUDY METHOD IN THE CONTEXT OF PROFESSIONALLY ORIENTED FOREIGN LANGUAGE TEACHING TO STUDENTS OF TRANSPORT TECHNOLOGIES DEPARTMENT

Svitlichna O.
Volodymyr Dahl East Ukrainian National University

Nowadays the educational system of our country is being in the process of integration into the European educational space. The need for specialists with a high level of foreign communicative competence actualizes the problem of introduction of modern methods of developing professionally oriented language communication skills.

Professionally oriented language teaching is based on the needs of future graduates in the process of foreign language learning, which are determined by the characteristics of the future profession or academic speciality [2].

The Industrial revolution introduced the steam engine and combustion engine, which became a key factor in the process of globalization. It re-

sulted into road, rail, sea and air travel transformation. Nowadays it is difficult to overemphasize the importance of foreign languages, English in particular, for the development of transport technologies. The expansion of international cooperation in the sphere of transport, the need to establish new business contacts requires language skills. Knowledge of English greatly influences the competitiveness of future transport technologies' specialists and increases their employment opportunities around the world.

Unfortunately, despite ever-increasing interest to foreign languages in non-linguistic departments, teachers and students are facing the problem of limited number of foreign language class hours. Thus, it is being crucially important to involve those training methods and technologies, which provide the opportunity to use teaching hours in the more rational and effective way. Among the above-mentioned technologies, an important place is occupied by case-study method.

The method of case study or specific situations is a method of active problem-situation analysis based on learning by addressing specific problems — situations [1]. Case studies examine the operation mechanisms in individual case in detail [4].

The essence of this method is to use the descriptions of specific situations, problems, life patterns of organizations or specific individuals. It stimulates students' thinking and makes them formulate the problem and search for various options for its solution. Students are more inductive than deductive personalities, which means, they learn better from examples than from logical development starting with basic principles [5].

Examples selected for this method when teaching foreign language to students in class should be similar to natural working situations, problems and challenges, typical for their future profession. It is important to keep in mind that studies in second language acquisition consists of more than just rule memorization, it involves learning to express communicative needs [3]. Practical training assignments in class should be developed in such a way to get the students maximally involved in the study of the suggested problem. Such kind of training requires group work and is carried out in the form of a discussion, where students defend their opinions. While giving arguments in favor of their point of view, they can apply knowledge and skills previously acquired during foreign language classes.

Case study method is gaining more and more supporters, especially among university teachers. Obviously, its use is completely justified when teaching foreign languages to students of non-linguistic departments, since it allows students to acquire professional and communicative competences, the ability to independently organize their educational activities, creatively

participate in the discussion and analysis of the professionally oriented foreign language material.

References:

1. Solieva.M.A. Case-study method in teaching English for Specific Purposes// Problemy i perspektivy razvitija obrazovanija: materialy VIII Mezhdunar. nauch.konf. (g.Krasnodar,fevral'2016g.).– Krasnodar: Novacija,2016.– S.19-22
2. Shaimova G.A., Shavkieva D.Sh. professional'no-orientirovannoe obuchenie anglijskomu jazyku v nejazykovyh vuzah// Molodoj uchenyj. –2013. –№11. – S.692-694.
3. Gass, S., Selinker L., Second language acquisition (3rd edition). Routledge: Taylor & Francis, 2008.
4. George, A.L., Bennet, A. Case studies and theory development in the social sciences. Cambridge, MA: MIT Press, 2005.
5. Sazukina T.P. Case studies method in teaching the professional English language in higher school// Publichne urjaduvannja: zbirnik. –№ 1(2) – Kiïv.:DP «vidav-nichij dim «Personal»,2016.–S.212-217.

ANALYSIS OF CARGO DELIVERY IN INTERNATIONAL TRAFFIC

Semenov S., Kravchenko S., Shepit'ko L.
Volodymyr Dahl East Ukrainian National University

The problem of choosing a rational scheme of cargo delivery is considered on the example of the organization of transportation between the CIS countries and the EU countries in the direction of Georgia – Poland. Georgia is a country that like Ukraine is striving to integrate into the European space, so studying the possibility of increasing the efficiency of cargo transportation by analyzing ration schemes of cargo delivery is topical.

The effectiveness of long distance transportation is reduced by the detention of mover vehicles (from several hours to several days) at each border, by high fuel cost and relatively high cost of ling distance transportation itself. These factors force to apply a logistical approach(LA) to the transportation process organization.

While creating LA mathematical model a comparative assessment of cargo delivery time by multimodal transportation in 3 variants of the route was carried out [1].

$$\begin{cases} 0+2,7+3,78=6,48 \rightarrow \max \\ 2,7+2,48+1,21=6,37 \\ 2,7+1,78+1,05=5,53 \rightarrow \min \end{cases} \quad (1)$$

In the paper [2], alternative variants of cargo delivery in the international traffic in view of interaction of different kinds of transport have been considered. Be means of is this case Ukrainian as a transit state participates directly in the process the linear programming method [3], an evaluation of the rational variant freight traffic organization is carried out, this being determined by the criterion of the cargo delivery time.

References:

1. Rezer, S. M. Kompleksnoe upravlenie perevozochnyim protsessom v transportnyih uzlah / S. M. Rezer – M. : Transport, 1982. – 160 s.
2. Pravdin, N. V. Vzaimodeystvie razlichnyih vidov transporta v uzlah [Tekst] / N. V. Pravdin, V. Ya. Negrey. – Minsk : Vyisshaya shkola, 1983. – 247 s..
3. Golshteyn E.G.Zadachi lineynogo programmirovaniya transportnogo tipa / E.G.Golshteyn, D.B. Yudin. – M.: Nauka, 1969. – 382 s.

DEVELOPMENT AND IMPROVING TRENDS OF LOGISTICS SERVICE IN THE WORLD AND UKRAINE

Sydorenko V.
National Transport University

The world market for logistics services is characterized by dynamic development of international transportation, as well as logistic services are inseparably connected with the transport services and vice versa. The main problem for further development of this market is the cooperation disagreement of transportation entities, lack of quality tracking of cargo during delivery.

In this regard, it is urgent to carry out the research on improving the quality of logistics services in Ukraine and increasing its competitiveness in the international freight market.

The state of the international freight transport market is inextricably connected with the state of Ukraine foreign economic activity, its social and political stability. To construct indicators affecting the efficiency of logis-

tics services in most detail, it is necessary to implement the statistics system of logistics activities to take into account performance of the private sector enterprises that are directly involved in logistics activities. It is connected with the main task of logistics activity statistics which should be fulfillment of business entities and managers' needs for credible and reliable statistics data about the amount, structure and dynamics of resources, namely: logistics activity infrastructure, including transportation systems, storage systems, information sharing systems and so on.; financial resources and investment in logistics systems; logistics centers network, their distribution by regions and sectors of the economy; resources that move in the logistics chain of some enterprises; results of logistics activities in the context of its kinds in the enterprises; internal and external information exchange in the supply chain; effectiveness of logistics systems activity.

The statistics subject of logistics activities should include developing classification and system of logistics activity statistical indicators, statistical reporting of logistics activities, elaborating quantitative methods to assess statistical indicators of logistics activities automatically, monitoring the results of logistics activities and comparing them with the average statistic data in the industry or region.

The main object of study of logistics activity statistics is material flows and all activities related to the process of promoting them to the logistics chain and logistics infrastructure.

To assess Ukrainian logistics services and its competitiveness on the world market objectively, it is appropriate to review LPI – Logistics Performance Index, the indicator determined by the World Bank through its departments of logistics and trade. The Logistics Performance Index is an interactive benchmarking tool created to help countries identify the challenges and opportunities they face in their performance on trade logistics and what they can do to improve their performance. The LPI is based on a worldwide survey of local operators (global freight forwarders and express carriers), providing feedback on the logistics "friendliness" of the countries in which they operate and those with which they trade. The LPI 2016 allows for comparisons across 160 countries. First research of LPI was published in 2007, since that it has been publishing every two years.

International Logistics Performance Index provides qualitative evaluations of a country in six areas by its trading partners—logistics professionals working outside the country, including customs performance, infrastructure quality, and timeliness of shipments - that have increasingly been recognized as important to development. The data used in the ranking comes from a survey of logistics professionals who are asked questions about the foreign countries in which they operate. The components analyzed

in the International LPI were chosen based on recent theoretical and empirical research and on the practical experience of logistics professionals involved in international freight forwarding. They are:

1) The efficiency of customs and border management clearance ("Customs").

2) The quality of trade and transport infrastructure (Infrastructure").

3) The ease of arranging competitively priced shipments (Ease of arranging shipments").

4) The competence and quality of logistics services—trucking, forwarding, and customs brokerage ("Quality of logistics services").

5) The ability to track and trace consignments ("Tracking and tracing").

6) The frequency with which shipments reach consignees within scheduled or expected delivery times ("Timeliness").

The LPI uses standard statistical techniques to aggregate the data into a single indicator that can be used for cross-country comparisons.

Analyzing Logistics Performance Index (LPI)in Ukraine, it can be noticed, that in 2016 the country dropped down by 19 positions. Ukraine ranked 80th place out of 160 countries with an index LPI - 2.74. If you consider the index components in more detailed, it can be seen that efficiency of the customs clearance granted 116 position with an index of 2.3, quality of trade and transport infrastructure - the 84th place with an index of 2.49, ease of arranging shipments competence - 95th place with an index of 2.59, quality of logistics services – 95th place with an index of 2.55, tracking and tracing - 61st position with an index of 2.96, timeliness (the best position) – 54th with an index of 3.51

The main indicator that the World Bank considers and for which there is a division into the groups, is the Gross domestic product (GDP) per capita. Ukraine is assigned to the group of countries with income below average (786 - 3125 USD). According to statistics of the Ministry of Finance, if in 2013 Ukraine's GDP reached 183.31 billion USD, then at the end of 2014 it decreased to 131.805 billion USD, and in 2015 - 90.615 billion USD. This surely shows that the condition of logistics services is closely connected to the economic situation in Ukraine. According to the latest data published by the Ukraine Ministry of Finance - Gross Domestic Product (GDP) of Ukraine in 2016 has increased by 1.8%. So we can predict that the year 2016-2017 has to impact positively on Ukraine logistic service and increase the rate of World Bank LPI. Besides Ukraine in this group in Eastern Europe enters only Moldova. Top 10 countries by index LPI occupy countries with high income rate. In general list of indexing the first place among all countries holds Germany with the index LPI - 4.23, then goes Luxem-

bourg (4.22), Sweden (4.2), Netherlands (4.19), Singapore (4.14), Belgium (4.11), Austria (4.1) United Kingdom (4.07), Hong Kong (4.07) and USA (3.99). Compared with the previous indexation in 2014 among post-Soviet countries also such countries lost its position as Latvia (dropped by 7 positions from 36th to 43d) and Poland (dropped by 2 positions from 31th to 33d).

Ukraine strategic partnership with foreign states is a necessary component of reforming the national economy and foreign trade expansion areas to attract foreign investment and additional budget revenues from the performance of export and import operations. The standardization of separate processes in accordance with standards the world trade leading countries needs implementing measures aimed at increasing the level of logistic service and infrastructural providing processing cargo both the private sector side and at the state level.

References:

1. Gaidabrus N. V. Analysis of Logistics Service and Innovation Activity of Enterprises of Ukraine/ N. V. Gaidabrus // Business-Inform. - 2015. - № 4. - pp. 123-129.
2. Melnykova K. V. Statistics of the Logistic Activities of Enterprise / K. V. Melnykova // Business-Inform. - 2015. - № 5. - pp. 244-247.
3. Ministry of Finance. http:// www.minfin.com.ua/
4. The World Bank. Logistics Performance Index. http://lpi.worldbank.org/

ANALYSIS ACOUSTIC POLLUTION OF KYIV ON TRAFFIC FLOW

Solodenko Y.
National Transport University

Analyzing the acoustic environment of Kyiv city it can be seen that it is characterized by a large car park (per 1000 population accounts for more than 300 vehicles, not including transit traffic) that create significant acoustic load on the adjacent residential areas. With increasing speed of the vehicle increases work of motor, systems of engine clutch, gearing system, friction of tyretread with the roadway, vibration of carbody, self levelling suspension and fixation devices [1, p. 106]. As a result, increases noise and its duration. The greatest problems created by low-frequency noise. The

problem is compounded by the fact that most of the highways are closely related to the residential area, resulting in a significant number of the city's population that is under the effect of significant noise pollution.

Noise reduced productivity in 15-20%, substantially increased incidence. Experts believe that in the big cities noise reduces life by 8-12 years. Noises adversely affect human health, reduce their efficiency, cause disease hearing (deafness), endocrine, nervous and cardiovascular systems (hypertension). Fiziolohobiological adaptation to noise is virtually impossible because of regulation and restriction noise pollution - an important and indispensable event.

Corrective effect on power distribution and acoustic waves with geographical conditions, micro and direction and wind speed. When the longitudinal slope of the road noise increases by 2-5 dBA. The roads in the depressed areas of transport noise by 10-15 dB less than on roads located on flat areas. In addition, the intensity of the acoustic pressure urboecosystem affect planning structure, including coating carriageway (asphalt or paving), its quality, height and density, availability of green spaces and so on. The roads are paved with cobblestones, acoustic pollution by 5-7 dB higher than on paved roads. With the closed-type buildings are protected only intra spaces and exterior facades fall to adverse conditions such as motorway construction causes some reservations. The presence of green space also reduces the load on the acoustic urboekosystem. It was found that the noise wave on the ground, which is planted with trees and bushes every 30 m attenuated by 10 dB while outdoors on almost the same distance is not reduced. The most effective lush green band width of over 50 m [2].

Noise measurement were taken in an hour of "peak" on the areas near the highways of tho city. To compare noise levels on the streets and identify the most noisy streets on the maps were constructed diagrams of noise in exaggerated scale, which allowed clearly grasp the difference in noise levels on highways with different intensity of traffic. Thus were established the most problematic highways according to their noise level. Then levels of noise on the streets were compared with standard values. In excess of statutory noise levels soundproofed were developed special measures that can reduce the impact of road transport on the environment.

For a more complete assessment of the contribution of road transport in the acoustic pollution estimated extension of motor noise from pipeline depth to the areas near the highways. For defined corridors of noise pollution of the territory adjacent to the linear cause of harmful interference. Estimated corridors noise extension from road transport can be drawn on the map as a linear scale plan.

An analysis of the measurement results and their comparison with regulatory requirements, the most significant excess of noise observed on the main transport arteries of the city; highways, where trucks are allowed, have excess of the allowable noise level; level of acoustic pressure in the courtyards of houses that are far from traffic arteries of the city are within acceptable limits.

Normal ambient noise varies from 35-50 dBA. However, modern acoustic situation in big cities do not fit within this limit, often resulting in noise exceeds 80 dBA.

Based on the research results, it is necessary to take measures to reduce of the acoustic load on the residential areas of the city, adjacent to highways, particularly in the researched areas, because here is concentrated a large number of residential houses, public buildings, office buildings.

The main directions of reducing noise pollution are the following actions:

1. To determine and control of noise pollution the complete city map of noise should be made.

2. To limit the traffic noise is necessary to more efficiently divide traffic, waves especially freight and transit traffic, bring it outside the city. Road construction and their maintenance in good condition also will reduce acoustic load. For public transportation used it must be more trolleys, which least create noise pollution.

3. As for the cars the main factor is the noise reduction mode of movement, it is necessary to limit the maximum speed on streets and roads, avoid sharp braking and accelerating the vehicle

4. Tighten control over the technical condition of the vehicle that is privately owned as much of it does not respond the technical requirements.

5. In residential areas to reduce the level of noise is necessary to plant additional green spaces, as in the areas near the city section, as near highways territories. As noise absorbs ability of deciduous trees in winter goes down, it is necessary significantly increase the planting of conifers.

6. The use of green space as noise protection screens. Planting trees near highways may be tissue or chess (most are soundproofed property stands chess). Construction noise protection strips should ensure a tight closing of tree crowns and filling the space under the canopy to the ground shrub species. When selecting tree species preference should be given a high proportion of green mass, dense crown, rapid growth in the first year after planting. First of all, it concerns coniferous trees.

7. Some progress in reducing noise can be achieved through appropriate configuration of tread and tire design.

However, designing tires with substantially Noise comes into conflict with the urgent need to ensure safety, prevention heating pattern and ensure efficiency of the vehicle. So great opportunity to reduce noise creation reveals promising alternative designs coating. Important in terms of noise limit is the structure of the pavement; or formed his bituminized coating material or concrete, with a dominant transverse structure.

The need for protecting expensive device structures with high sound insulation characteristics can be minimized if the shape and orientation of the building plan taking into account the action of noise from the road. The form of the building can be used to ensure huge acoustic protection. Some parts of this building (walls with terraces and balconies) provide acoustic protection against noise from the road. For soundproofing walls use gypsum boards or special pads under natural cork linoleum, carpet or flooring.

References:

1. Pidlisna M.S. Environmental security forces / M.S. Pidlisna, I.G. Mazor, B.A. Katerynchuk. - K: 1998. - 122 p.
2. Noise Management for the Building Industry [electronic resource]. - Access mode: www.adfa.edu.au/amec/avu/
3. V.N. Denisov, V.A. Rohalev Problems cleaner road transport. - St. Petersburg: 2005. - 311 p.
4. Environmental Safety transportnыh flows / Ed. A.B. Dyakov. - M .: Transport, 1989. - 128 p.
5. Shestopalova L.M. Fundamentals of Safety / L. M. Shestopalova. - K .: Yurinkom Inter. 2001. - 96 p.

PROFESSIONALLY-ORIENTED LEVEL OF TRAINING A FOREIGN LANGUAGE IN NON-LINGUISTIC HIGH SCHOOL

Solopova T.

Volodymyr Dahl East Ukrainian National University

The question of a language training of specialists has acquired special relevance today, since a foreign language for a modern graduate of the university is simultaneously a means of production, a part of culture, and a means of humanizing education. It is a foreign language that allows a specialist, regardless of the field of activity, to maintain his professional form,

to keep abreast of the latest achievements of science and technology in his field, to take part in various international programs, etc.

Professionally-oriented teaching a foreign language is now recognized as a priority in the renewal of education. There was an urgent need to take a fresh look at the process of teaching a foreign language. Communication with business partners from different countries becomes an essential component of the professional activity of specialists, and the role of the discipline "Foreign Language" in non-linguistic universities significantly increases in their professional activities. The analysis of pedagogical and scientific methodological sources showed that there were countless methodological directions and technologies for teaching a foreign language in non-linguistic faculties of universities. Currently, the task is not only to learn the skills of communication in a foreign language, but also to acquire special knowledge in chosen specialty.

The goal of a professionally-oriented level of teaching foreign language at a university is to give the student a language competence that allows them to professionally communicate in all situations where such communication is necessary. The content of the professionally-oriented level is determined by this target setting. Within this level, we teach the language of the specialty. This means, first, the accumulation - on the basis of knowledge of general language lexical and grammatical components - of special terminology; Secondly, the active development of those grammatical features that characterize the scientific style of speech. At the same time, it is necessary to draw the attention of students to the peculiarities of the language of the specialty that they study. Thirdly, it is necessary to teach the student the principles of structuring the scientific statement, both written and oral: we mean the methods of commenting, analysis, synthesis, argumentation and discussion. It is here that exercises on understanding headings (of all kinds), on the isolation of key words, on the recognition of definitions, on the establishment of the role of connectors acquire special significance. The student must acquire the skills of working with information sources-determining the main idea of the text, the logical basis of the statement, extracting various types of information (working with diagrams), methods of compressing the text and, of course, be able to activate these skills in an oral statement. At the same time, the question of what kinds of work - with oral speech or written - should prevail, is solved differentially, in the application to each separate specialty.

So in the conclusion we can say that learning a foreign language has been and remains an integral part of the process of forming a specialist with higher education. Modern specialist must actively master a foreign language

as means of communication in socially-conditioned spheres of daily life and in their professional activities. Training in the university should provide a future specialist a solid foundation of basic knowledge and skills for this and teach methods of independent work after graduating from the university.

References:

1. Inostrannyj jazyk kak faktor stanovlenija professional'-nyh kachestv sovremennyh specialistov // Sbornik tezisov nauchno-prakticheskoj konferencii – Rostov n/D, 2000. – s. 52-53.
2. Passov E.I. Novaja koncepcija inojazychnogo obrazovanija. // E.I. Passov – M., 2000, s.16
3. Professional'no-orietirovannyj podhod k prepodavaniju inostrannyh jazykov v tehnicheskom universitete // Materialy nauch-no- prakticheskoj konferencii – Rostov n/D, 2000. – s. 80-82

ORGANIZATION AND MODELING OF THE LOGISTIC SYSTEM OF THE ENTERPRISE (GERMAN AUTO) USING THE MEDIUM 1C. ENTERPRISE AND ANYLOGIC

Solyanik T., Osolikhin N.

National Aerospace University «Kharkiv Aviation Institute»

In the report automation of logistical activity of the enterprise «Germans_cars», engaged in sale of German cars was considered. Automation was carried out using the software product "1C. Company".

In the course of the work, the warehouse area was calculated, as well as the warehouse complex of cars in the Microsoft Visio software environment.

Using the software product "1C. Enterprise ", a settlement account was created in the name of the virtual company" Germans_Cars ", a currency was chosen, within which conditional purchases and sales of cars were made, as well as a range of goods in the warehouse was created.

Two conditional purchasers were chosen: the branch of the main company, called Germans_Cars_UA, which was engaged in the purchase and sale of products on behalf of the focus company, as well as the Kharkov Automobile Salon, which is an independent buyer and direct competitor to Germans_Cars_UA on the territory of Kharkov in Ukraine.

An analysis was made of the availability of goods in the warehouse. For a visual analysis of the profitability of the enterprise, ABC / XYZ - sales analysis was produced, as well as a sales diagram by sectors, dividing two buyers into sectors. The diagram showed the percentage of purchases of two consumers, which allowed to determine which supplies bring more profit to the enterprise.

In the program environment "AnyLogic" a route from Berlin to Kharkov was taken, taking into account the passage and delays at the customs offices "Germany-Poland" and "Poland-Ukraine".

References:

1. Nerush, Yu.M. Designing of logistics systems: a textbook and a practical workshop for bachelor's and master's degrees [Text] / Yu. M. Nerush, SA Panov, A. Yu. Nerush. - Moscow: Publishing House Yurayt, 2014. - 422 p.
2. Gorev, A.E. Freight road transport: training for a student. Supreme. Training. Institutions [Text] / A. E. Gorev. - 5 th ed., Rev. - Moscow: Publishing Center "Academy", 2008. - 288 p.
3. Bowersox, D.J. Logistics. Integrated Supply Chain [Text] / DJ Bowersox, JJ Closs. - Moscow: Izd. CJSC "OLYMPUS BUSINESS", 2001. – 640 p.
4. Tatarchuk, M.I. Corporate information systems: Посібник [Text] / M.I. Tatarchuk. - К .: КНЕУ, 2005. - 150 p.

INFORMATION SUPPORT OF RESULTS TOPOGRAPHIC ANALYSIS OF ROAD ACCIDENTS

Tarasenko A., Kuz'kin O.

Zaporizhzhya National Technical University

The primary problem on the state level in any country is the reducing number of road accidents and victims in ones. It is important because the population of Ukraine constantly decreases each year. Detection of subjective factors which have a negative impact on the demographic situation in the country, especially the implementation of the active protection programs for workers and employees as well as any kind of people, has great importance for the social and economic development of the country.

The severity of the road accidents increases every day as result of increasing speed, vehicles construction changing towards to magnify of engine power and reducing the weight of vehicles. Therefore, statistical analy-

sis of the road accidents (in particular, their topographical analysis) is the actual task which allows avoiding much more serious accidents.

As result of the carried out researches, the most dangerous road sections on highway M18 within Zaporizhzhia region were detected and presented in the Fig.1.

Detected 27 accidentally dangerous sections of road have different impact factors on traffic safety. However, the current state of Ukraine's economy doesn't allow to expect on short-term implementation road reconstruction and repair projects. Consequently, actions with small investments are more effective.

To reduce the number of road accidents, improve traffic safety, increase attention of drivers while driving on such emergency dangerous road sections, the greater visualization of factors which have a decreasing impact on accidents level on detected road sections is offered.

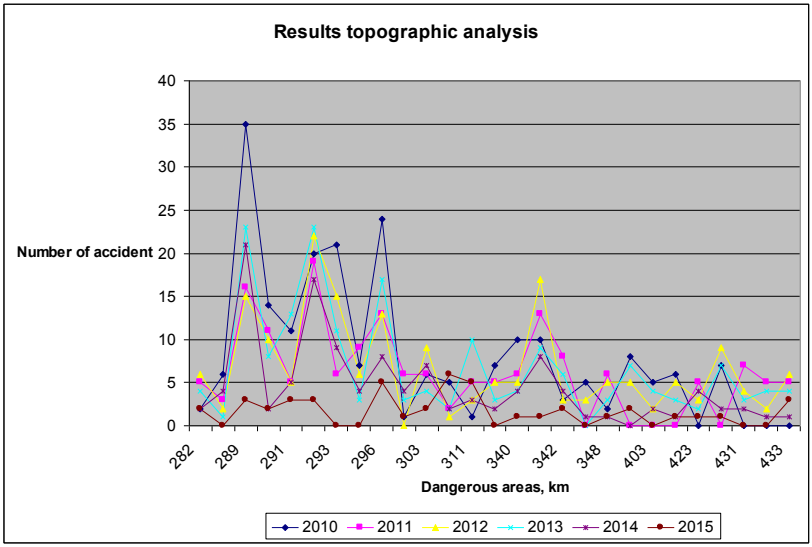


Fig.1. Topographic analysis results of accident statistics

It is proposed to use the less expensive resources, including modern IT- technologies, which include:

- installation of information boards, which indicate to drivers about the accident dangerous road section at a distance 150-300 meters before the start such section;

- distribution the information leaflets, which contain information about dangerous road sections of the region, among drivers at the gas stations;

- development the Internet site named “Interactive map of emergency hazardous road sections in Zaporizhzhya region". This site will contain information with warning to drivers about the location of dangerous road sections of the region;

- to make a proposal to GPS map designers to include into maps information about dangerous road sections on the vehicle route along with the names and location of streets, road intersections etc.

References:

1. Tarasenko O.V. Topographic analysis of road accidents on the road M-18 within Zaporizhya region/O.V. Tarasenko// Science Week - 2014 Abstracts annual reports scientific conference of teachers, scientists, young scientists and students ZNTU, Zaporozhye, 14-18 April 2014 in 5 volumes. T. 1 / Redkol. : Y. M. Vnukov (acc. ed.) and others. - Zaporozhye: ZNTU, 2014. – p.p. 34-37.

THE EVALUATION OF THE "DRIVER-LOCOMOTIVE" ERGATIC SYSTEM PERFORMANCE QUALITY

Tartakovsky E., Gorobchenko A., Antonovych A.
Ukrainian State University of Railway Transport

According to the statistics [1], the proportion of the safe railway operation violations in the locomotive facilities is 31% of the total amount of the Ukrzaliznytsya. And on analyzing dangerous situations causes the human factor is 27%. These indicators prove that there is a significant reserve for improving safety of operation by minimizing human beings’ harmful impact on operating.

The criterion of the "driver-locomotive" ergatic system performance quality in control can be represented as the correlation between various quality indicators reflecting different properties of the system.

Complex criterion of the system quality defined in the form of:

$$K = \sum_{i=1}^{n} \gamma_i I_i \,, \qquad (1)$$

where γ_i is the weight coefficient of the i indicator I_i, $i \in [1, n]$;

n – number of partial criteria.

Each of the partial criteria is functionality

$$I_i = I_i\left(x, u, x_{зв}, x_{пу}, x_{кс}, q_{лб}, t\right) = I_i\left(\bar{\mathrm{X}}\right), \quad (2)$$

where x is the vector of the locomotive technical state;

u is the control vector;

xse is the specifying effects vector;

xic is the initial conditions vector.

xfs is the vector of final state;

qlc is the locomotive crews work quality;

t is the time during which system is investigated.

The factors of utility given in the work [2, 3] are used as criteria. Parameters that characterize the utility of a decision taken by the system are the values of the emergency situation complexity, deviations from the schedule and power consumption for traction.

The utility of decision is defined in the three-dimensional coordinate system (Xec; G; Δt), where Xec is the emergency situation complexity, G is the energy consumption for the movement of trains, Δt is the deviation from the schedule. The utility of the action in this case will be determined by the length of the vector, deferred from the origin of coordinates to the point (Xec; Gi; Δti), which is determined by the forecasted value of the specified values in the result of a decision made by the system [4].

Thus the expression (1) can be substantiated and presented in the form of

$$K = \sum_{i=1}^{3} \gamma_i I_i \quad (3)$$

where I1 is partial criterion of safe railway operation; I2 is partial criterion of energy consumption for haulage of train; I3 is partial criterion for the on-time train performance; γi is weight coefficient of i-th partial criterion.

When operating locomotive decision making depends on many circumstances. It is proposed to determine the basic train control strategy that can be applied in various situations.

Control strategy is introduced as the set containing its characteristic parameters $S_l \in (\pi_1, \pi_2, ..., \pi_j)$, where π1 is the j-th indicator of the implementation of the strategy sl. There are functions $\pi_j = f(I_i)$ that determine the impact of each criterion on the performance of this control strategy. The influence of the value of a control quality criterion on the indicator πj characterizing each particular strategy is evaluated by comparing deriva-

tives $\frac{d\pi_j}{dI_i}$. And the total impact of criterion Ii on the strategy si is taken as the arithmetic mean of the derivatives

$$A_{I_i/s_l} = \frac{\sum_{j=1}^{k_{s_l}} \frac{d\pi_j}{dI_i}}{k_{s_l}} \quad (4)$$

where A_{I_i/s_l} is the magnitude of the Ii criterion influence on the sl control strategy;

is the number of sl strategy indicators.

So the absolute indicators of influence of each control quality criterion on the implementation of the particular control strategies are received.

To obtain the values of the weight coefficients when calculating control quality with different strategies it is necessary to use a well-known transition from absolute indicators to relative ones:

$$\gamma_i(s_l) = \frac{A_{I_i/s_l}}{\sum_{i=1}^{n} A_{I_i/s_l}}, \quad (5)$$

where $\gamma_i(s_l)$ is the weight coefficient of the i-th criterion for the l-th strategy.

A_{I_i/s_l} is the magnitude of the Ii criterion influence on the sl control strategy;

$\sum_{i=1}^{n} A_{I_i/s_l}$ is the summary absolute value of all control quality n criteria influence on the implementation of the l-th strategy.

Thus, using different strategies the formal indicator of the train control quality has been obtained.

References:

1. Analiz stanu bezpeki ruhu, polotiv, sudnoplavstva ta avariynosti na transporti Ukrayini za 2014 rik. [Tekst] – K.:Departament bezpeki na transporti Mininfrastrukturi Ukrayini, 2015. – 124 s.
2. Babanin, O. B. Viznachennya tsilovoyi funktsiyi dlya optimizatsiyi protsesu keruvannya v ergatichniy sistemi «mashinist-SPPR-poyizd» na pidstavi kriteriyu korisnosti. [Tekst] / O. B. Babanin, O. M. Gorobchenko // Zbirnik naukovih prats Derzhavnogo ekonomiko-tehnologichnogo universitetu trans-portu. – K.:

DETUT, 2014. – Vip. 25. – S. 92 – 99. – (Seriya «Transportni sistemi i tehnologiyi»).
3. Tartakovskyi E., Improving the process of driving a locomotive through the use of decision support systems [Text] / E. Tartakovskyi O. Gorobchenko, A. Antonovych //Eastern-European Journal of Enterprise Technologies. – 2016. – T. 5. – №. 3 (83). – C. 4-11.
4. Gorobchenko, O. M. Viznachennya korisnosti diyi intelek-tualnogo agenta keruvannya ruhom poyizdu. [Tekst] / O. M. Gorobchenko // Tezi dopovidey 71 Mizhnarodnoyi naukovo-praktichnoyi konferentsiyi "Problemi ta perspektivi rozvit-ku zaliznichnogo transportu", 14-15 kvitnya 2011 r. – D.:DNUZT, 2011. – S. 63.Servis na transporte : ucheb. poso-bie dlya stud. uchrezhdeniy vyissh. prof. obrazovaniya / [V.M.Nikolashin, N.A.Zudilin, A.S.Sinitsyi na i dr.] ; pod red. V.M. Nikolashina. — 4-e izd., pererab. — M. : Izdatelskiy tsentr «Akademiya», 2011. — 304 s.

CONDITION AND TRENDS RENEWAL OF DIESEL LOCOMOTIVES IN UKRAINE

Tartakovsky E.[1], Sumtsov A.[1], Artemenko O.[1], Bragin N.[2]
[1]Ukrainian State University of Railway Transport
[2]Volodymyr Dahl East Ukrainian National University

Inventory traction rolling stock fleet in Ukraine in 2488 constitute main and shunting diesel locomotives, including locomotives is used 1343. Over 95% of inventory fleet of diesel locomotives has worked established manufacturing plants normative service life and need immediate replacement or overhaul of renewal [1 - 3].

Currently, the park main railway locomotives Ukraine, most of which made for 1970 - 1980 years, is in this state:

- M62 diesel locomotives for cargo - 46 units. All M62 from 1990-1996 years operated outside the regulations set by the manufacturer of the life that is 20 years old. The current operation is possible through a package of measures to extend the maximum possible service life of 40 years. In 2015 60% of the fleet of locomotives M62 requires a complete write-off.

- other locomotives series - 916 units (2TE116, 2TE10, 2M62, TEP70). In 2010 the number of locomotives depreciated reached 743 units, or 81% of the said park. But extended for 20 years the life of these series

2020 will not be reached. At the same time predicted that some of the locomotives will be written off because of poor technical condition.

- locomotive TEP-150 - 4 units. All locomotives of this series produced for 2005 - 2009 years in operation and do not need replacing in the next 20 years [1].

So fleet with 966 units of freight and passenger diesel locomotives operated outside the regulatory deadline of 290 units, or 30% of the fleet.

Park shunting diesel locomotives consists of different series, but the vast majority of them in diesel locomotives CHME3 different indexes. In total, the park contains 1554 such locomotives. [1]

Over 90% of shunting diesel locomotives chme3 operated outside the regulatory deadline of service, which is 25 years (Fig. 1). Only CHME3E diesel locomotives operated on the verge of normative lifetime, but they've appointed a resource in the next 3 years. Further operation of diesel locomotives CHME3 possible through a package of measures to extend the maximum possible service life of 40-50 years [1, 2].

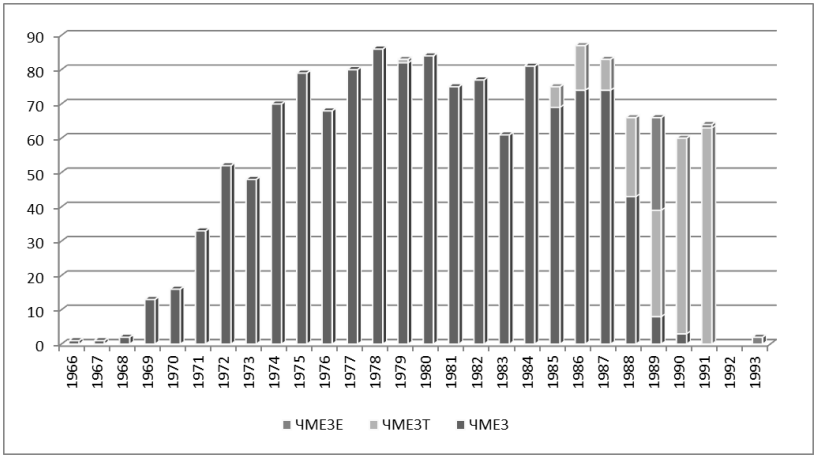


Fig.1. Distribution of diesel locomotives fleet by year CHME3 building

Maneuver diesel locomotives other series 24 units (13 units, THM23 9 units. THK2 1 units, THK21 1 units, TEM103) do not require write-off by 2020. Diesel locomotives series CHME2 operated in locomotive depots mainly for their own needs for 2015 - 2020 should be removed from the inventory of the park because of the high degree of wear and run out of regulatory and extended service life [1, 3].

Thus the technical state fleet of locomotives is unsatisfactory. The bulk of the locomotives are depleted and in need of updating, especially shunting locomotives. Thus there is a practical need for renewal of locomotives to meet the needs of traffic and shunting work. For this there are two main areas: the purchase of new units or upgrade existing ones. Due to insufficient amounts of funding programs purchase new locomotives series of national railways is the most promising replacement of obsolete, having exhausted its resources, locomotives by their partial or comprehensive modernization.

Studies show [4-11] recent comprehensive modernization is becoming larger volumes and is the most promising area of renewal of the locomotives.

References:

1. Integrated program rolling stock Ukraine in 2008 - 2020. [Text]. - Kiev: UZ, 2009. - 300 p.
2. Belous Y.A. The results of the locomotive of the economy in 2012. [Text]. / Y.A. Belous. // Lokomotiv-inform 4, 2013 - p. 22 - 24.
3. Sergienko N.I. The rolling stock of Ukraine's railways: the state and prospects. [Text]. / N.I. Sergienko. // Carriage Park 6, 2011. - p. 11 to 22.
4. Horunzhyj S.V. Modernization of locomotives M62 on the railways of Ukraine. [Text]. / S.V. Horunzhyj, A.L. Sumtsov, A.M. Zenkovsky, O.V. Kamchatnyj. // Proceedings of Ukrainian State Academy of Railway Transport, 2011. - Vol. 127 - c. 122 - 126.
5. Tartakovsky E.D. Prospects for modernized locomotives M62 [Text] ./ E.D. Tartakovsky, A.P. Falendysh, A.L. Sumtsov, S.O. Mikheev. // Proceedings of Donetsk Institute of Railway Transport. - 2012. - №32. - p. 155 - 157.
6. Pavlyuchenko S.N. Modernization as a profitable investment [Text]. / S.N. Pavlyuchenko. // Lokomotiv-inform 9, 2007 - p. 8 to 13.
7. Kritsky S.V. Diesel locomotives M62: some facts and reflections [Electronic resource]. - Access mode: http://perecheek.narod.ru/mashki.
8. Falendysh A.P. Analysis of upgrade options diesel locomotives series chme3 [text]. / A.P. Falendysh, A.L. Sumtsov, A.V. Klimenko. // Proceedings of Don-IZT 2013 - Vol. 36 - p. 162 - 166.
9. Skala B., Frank V. Modernization of the ChME3 - new opportunities. [Text]. / B. Scala, V. Frank. // Lokomotiv-inform 4, 2006. - p.20 - 24.
10. Skala B., Frank V. Modernization of ChME3 - new opportunities [Text]. / B. Skala, V. Frank. // Lokomotiv-inform 5, 2006. - p.20 - 25.
11. Ilin Yu. Upgrade or buy? [Text]. / Yu. Ilyin. // Transport 10, 2011. - p. 5 - 6.

USE OF GENETIC ALGORITHMS FOR SOLVING THE PROBLEM OF OPTIMIZATION OF INTERCITY FREIGTH TRAFFIC USING ROAD TRANSPORT

Tkachenko S.
National transport university

Presently, the problem of development and implementation of methods allowing to solve routing issues is getting more and more relevant in Ukraine. Additionally, it is vitally important to automate them taking into account many parameters, conditions and restrictions applied to all participants of the logistics chain. These routing and automation methods aim mostly at reducing the cost of goods transportation, transport logistics and personnel, carrying out transportations within set deadlines, minimizing the risk of empty trips as well as optimizing the use of vehicles with regard to their specifics and geographic factors of their operation.

In today's tough economic competition, to ensure strong positions on the market, manufacturers and retailers should primarily solve the problem of minimizing the cost of production, which largely depends on the costs of transport logistics.

For transport companies that carry out intercity transportation of goods, it is essential to have work constantly as well as minimize transportation costs by reducing empty trips.

Therefore, development and implementation of methods for solving routing issues and their automation are crucial for all participants of the logistics process (carriers, consignors, consignees). Using the methods aimed at reducing the budget spent on transport logistics can significantly minimize the overall cost of production, and thus increase enterprise competitiveness and increase its profits.

In practice, there is a constant need to solve the problem of routing and automation taking into account many parameters, conditions and limitations of all participants in the supply chain.

To solve them, it is necessary to consider methods used for routing cargo transportation, and the ones aimed at solving the problem of searching routes and transport automation in compliance with all set parameters, conditions and limitations, which relate to all the participants of the supply chain.

You can implement the search method using the genetic algorithm (GA). The advantages of using GA to solve the problems of routing and automation are as follows: 1) it does not use such properties as continuity and differentiability, 2) it does not process the values of the parameters of the

task itself, but focuses only on their encoded form, 3) it searches for the solution considering not only one single point, but a set of points, 4) it uses only the objective function, not its derivatives, or other additional information; 5) it applies probabilistic, rather than deterministic, selection rules.

Genetic algorithms (GA) are adaptive search methods, which have recently been used to solve problems of functional optimization. They are based on the genetic processes of biological organism: biological population develops over several generations being subject to the laws of natural selection and the *survival of the fittest* principle discovered by Charles Darwin. Imitating this process, genetic algorithms are able to *develop* solutions to real problems if they are coded accordingly [1].

The basic principles of GA were formulated by Holland in 1975 and are well described in his work [2]. Unlike evolution taking place in nature, GA only simulate those processes in populations that are essential for development.

Genetic algorithms are commonly used to generate high-quality solutions to optimization and search problems by relying on bio-inspired operators such as mutation, crossover and selection [3].

In a genetic algorithm, a population of candidate solutions (called individuals, creatures, or phenotypes) to an optimization problem is evolved toward better solutions. Each candidate solution has a set of properties (its chromosomes or genotype) which can be mutated and altered; traditionally, solutions are represented in binary as strings of 0s and 1s, but other encodings are also possible [4].

Setting the goal for the research: solving routing and automation issues taking into account all essential parameters, conditions and restrictions being relevant for all participants of the supply chain. There is certain amount of transport, consignors and consignees. Considering all the parameters, conditions and limitations of the participants, it is necessary to work out routes and accordingly to select a carrier for the transportation of goods thereon.

References:

1. Goldberg David E. Genetic Algorithms in Search, Optimization and Machine Learning / Goldberg David E. – Addison-Wesley Publishing Company, 1989.
2. Holland John H. Adaptation in natural an artificial systems / Holland John H. // The MIT Press edition. – Massachusetts, London, England, 1992.
3. Mitchell, Melanie (1996). An Introduction to Genetic Algorithms. Cambridge, MA: MIT Press.
4. Whitley, Darrell (1994). "A genetic algorithm tutorial". Statistics and Computing. 4 (2): 65–85.

ENERGY EFFICIENCY MANAGEMENT OF TRAIN TRAFFIC VOLUME AS A MEANS OF IMPROVING TRANSPORTATION PROCESS

Troyan A., Muzykin M.
Dnipropetrovsk National University of Railway Transport named after Academician V. Lazaryan

Nowadays, Ukraine has chosen the path of energy independence so activities concerning energy saving and energy efficient management in all sectors of economic activities is a priority and is supported at the national level. In railway transport there were also policies for the reduction of energy consumption for transportation of freight and passengers. Development and improvement of methods of train control associated with the need to use the criteria of minimum cost of energy consumption allows reducing the total operational expenses of transportation [1]. In the conditions of constant rise in prices for fuel and energy resources (FER), technologies and methods of energy saving, fuel is a priority type of economic activity for each train unit [2].

One of the main measures savings operating costs is the efficient use of fuel and energy resources (FER) to ensure the movement of trains and to meet the production needs of the economy and implementation of measures aimed at reducing the expenses of electricity and diesel fuel. This is one of the priorities of state policy.

In the conditions of world financial crisis for Ukraine it is important not to lose the positive direction, which increase production efficiency, including transport. Electrification of railways is one of those areas. Electrified Railways is given a clear advantage in the transportation process, they realized much more freight traffic and reduced transportation costs compared to diesel traction, save fuel and energy resources, improvement of ecological state of the environment [3].

To achieve this goal have been carried out scientific research on section of diesel traction Ivano-Frankivsk Directorate of railway transportation of the regional branch “Lviv railway”: Khryplyn – Khodoriv. Was studied the technical and operational characteristics of the station Khryplyn and section Khryplyn - Khodoriv developed the general phases of the improvement project section by electrification and the economic evaluation of the project. Based on data, built simulation model of train operation direction according to the train diagram of passenger trains and main characteristics of the section, the parameters of the flow of trains and their impact on the overall per-

formance of the railway section. Also defined rational parameters of train traffic on the criterion of energy consumption [4], [5], [6].

On the basis of these studies identified economic evaluation of the electrification project: the total estimated cost of construction – 469750000,0 UAH.; the construction period - 16 months; the payback project of 5.6 years; expected economic efficiency 163,45 M UAH/year; increase of the capacity of line – 25%. Also, it is determined that is optimal freight trains with a length of 54-57 conventional cars and loading section should be 80-85% (25 pairs of trains/day) from the available bandwidth.

Further developed efficient institutional arrangements to manage the flow of trains, which include: optimizing the train diagram by a uniform distribution of train traffic on the time of day; the planning of train operation with standby personnel management, and prevention of condensed arrival of trains; minimize the number nongraphic of stops and parking of freight and passenger trains on the section, etc., that will reduce the energy consumption of the skipping train traffic by 15-20%.

References:

1. Mozolevych G.Ya. The influence of the main parameters of train traffic volume on total profits of railways / G.Ya. Mozolevych, A.V. Trojan // Visnyk of Dnipropetrovsk National University of Railway Transport named after Academician V. Lazaryan. - 2015 - Vol. 3 (57). - pp. 58-76.
2. Logvinova N.O. Reducing expenses operation-using energoobedineny train / Logvinova N.O., Bosyi D.O., Poliah O.M..// Visnyk of Dnipropetrovsk National University of Railway Transport named after Academician V. Lazaryan. - 2012. - Vol. 42 - pp. 110-113.
3. Pull trains, history and development. [Electronic resource] - Mode accessibil-pu: http://odz.gov.ua/lean_pro/materials/20141223-143142--2014_12_23_1.pdf - screen name. Checked: 21.02.2017.
4. Practical advice on technology and economic management operational work of Railways (CSD-0068), approved by the order of Ukrzaliznytsia from 05.08.2008 No. 128/3, Main Department of transport:- Kiev, 2006;
5. The method of calculation of norms of consumption of diesel fuel and electricity for traction trains, approved by the order of Ukrzaliznytsia from 09.06.2004 No. 113-C;
6. Kochnev F. P., Sotnikov I. B. Operation Management Railways: Textbook. Manual for universities. - M.: Transport, 1990. - P. 490.

OPTIMIZATION OF THE RAILWAY TRANSPORTATION SCHEDULE OF METALLURGICAL ENTERPRISE

Turpak S., Vasilyeva L., Lebid H., Padchenko O., Sidorenko Yu.
Zaporizhzhya National Technical University

The basis of the planning the shipping schedule of metallurgical enterprise is the technological transportation of metals and slags in a molten state and transportation according to the contact schedules. Mainline cars coming to the driveway from the external railway network, have a lower priority in maintenance than cars serviced according to the contact schedules. Therefore, the organization of technological transportation should be aimed at minimization of the time spent on its execution, in order to form larger gaps for processing the rolling stock of the common use and operation companies.

Urgency on development schedules and analysis of the railway transportation, in particular those made contact schedules requires the development of tools and methods to improve them [1-7]. Semigraphical methods are most common in the planning of rail transport on industrial enterprises, be stressed. In rail transport of domestic enterprises, be stressed significantly affect production processes [1, 2, 6]. To clarify certain parameters used logistic approach, mathematical and simulation of transport processes. However, the final decision is usually accepted by experts. For its decision it is important to visualize the possible options for transportation. Therefore, significant practical value are the applications and graphical analysis methods of transport [8, 9].

Frequency of car spotting of the local park to the discharge spots is determined by the capacity of receivers and the intensity of transferring the goods to the production. Frequency of car spotting to the loading spots is determined by the parameters and quantity of trucks (bunker devices) and others. Performance of transportation according to the contact schedules involves a cyclic alternation of the following operations: loading – transportation to the discharge point – discharge – transportation to the loading point.

The stochastic nature of some production processes requires the establishing of the longer period of cars' staying at the freight points than the estimated time of performance of cargo operations. Delivery of the sets of cars will also require more time than calculated, as traction equipment can be involved in other jobs at the moment of car readiness for transportation. It is meaningless to plan its spotting to the freight points at the exact time of completion of processing the cars according to the schedule, as they can be ready earlier. Or vice versa, there can occur some delays that will lead to the

disruption of servicing the following freight point (in case of allocation of minimum time required for delivery according to the schedule).

Taking into account periodic changes in the transportation service of some production processes, contact schedules require regular review. After developing some schedules in pairs loading-discharge, it is required to improve the methods of their total analysis to optimize by criterion of reducing the time needed for transportation service.

There was proposed the method of graphical analysis of contact schedules of internal transportation of industrial enterprise on the basis of the software "TrainGraph" [10]. This program allows you to create in-plant contact graphics and motion graphics railway transport.

Application of the method that allows to combine the threads of individual transportation schedules allows to receive the economic benefit of about UAH 54,3 thousand by reducing the duration of the work of locomotives.

Reference:

1. A.T. Popov Analiz vliyaniya neravnomernosti proizvodstvennykh protsessov metallurgicheskogo kombinata na velichinu rezervov vagonov [Text] / A.T. Popov, O. A. Suslova, O.V. Voronina // Problemy sovremennoy nauki // sbornik nauchnykh trudov konferentsii Lipetskogo gosudarstvennogo tekhnicheskogo universiteta. – 2016. – Pages 189-200.
2. A.T. Popov Issledovanie vliyaniya neritmichnosti proizvodstvennykh protsessov na kolichestvo vagonov v oborote [Text] / A. T. Popov, O. V. Voronina // Transport Urala. – 2016. – No. 3 (50). – Pages 54-59.
3. Popov A. T. Problemy sushhestvuyushhej organizacii vnutrizavodskix perevozok v usloviyax metallurgicheskogo kombinata / A. T. Popov, O. V. Voronina // Sovremennye problemy transportnogo kompleksa Rossii. – 2014. – T. 4. – No. 1 (5). – Pages 29-37.
4. Balgabekov T. K. Problemy promyshlennogo transporta Kazaxstana / T. K. Balgabekov, S. K. Malybaev, S. O. Frolova // Mezhdunarodnyj zhurnal prikladnyx i fundamentalnyx issledovanij. – 2015. – No. 6-3. – Pages 392-394.
5. Rahmangulov A. N. Metodika vybora racionalnogo varianta vnutrizavodskix perevozok (na primere Be-loreckogo metallurgicheskogo kombinata) / A. N. Rah-mangulov, S. E. Gavrishev, S. V. Trofimov, S. N. Kornilov, V. A. Lukyanov // Nauchnye soobshhe-niya NTC-NIIORG. – Chelyabinsk, 1999. – Pages 63-65.
6. Voronina O. V. Issledovanie organizacii vnutrizavodskix zheleznodorozhnyx perevozok v usloviyax aritmii proizvodstva / O. V. Voronina // Sbornik materialov oblastnogo profilnogo seminara «Shkola molodyx uchenyx po problemam gumanitarnyx, estestvennyx i texnicheskix nauk». – Lipeck, 2016. – Pages 253-265.

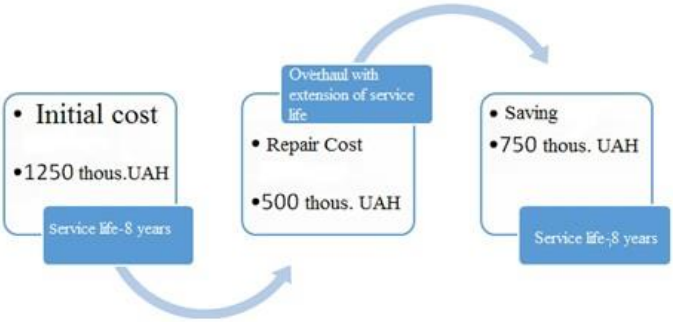
7. Kornilov S. N. Podxod k vyboru prioritetov pri ob-sluzhivanii proizvodstvennyx podrazdelenij zhelez-nodorozhnym transportom / S. N. Kornilov, A. N. Antonov // Sovremennye problemy transportnogo kompleksa Rossii. – 2011. – No. 1. – Pages 95-99.
8. Turpak S. M. Razrabotka kontaktnykh grafikov obsluzhivaniya transportno-proizvodstvennogo komplexa na osnovanii mikrologisticheskikh printsipov [Text] / S. M. Turpak, D. V. Bondarenko // Tyzhden nauky: naukovo-praktychna konf., April 12-16, 2010 : tezy dopovidey. – Zaporizhzhia : ZNTU. – 2010. – Vol. 1. – Page 201.
9. Turpak S. M. Optymizatsiya marshrutiv perevezen vantazhiv na pidyizniy koliyi metalurgiynogo pidpryiemstva [Text] / S. M. Turpak, O. V. Svitlytskiy // Tyzhden nauky: naukovo-praktychna konf., April 14-18, 2014 : tezy dopovidey. – Zaporizhzhia : ZNTU. – 2014. – Vol. 1. – Page 42.
10. A. s. 65138 Ukraine. Programa dlya pobudovy kontaktnykh grafikiv transportnogo obslugovuvannia vyrobnychykh pidrozdiliv metalurgiynogo pidpryiemstva [Text] / S. M. Turpak, S. V. Grytsay (Ukraine). Registered on May 04, 2016. – 1 page.

ECONOMIC EVALUATION OF USING UPGRADED HOPPER CARS FOR TRANSPORTATION OF HOT PELLETS AND AGGLOMERATE OF 20-9749 MODEL

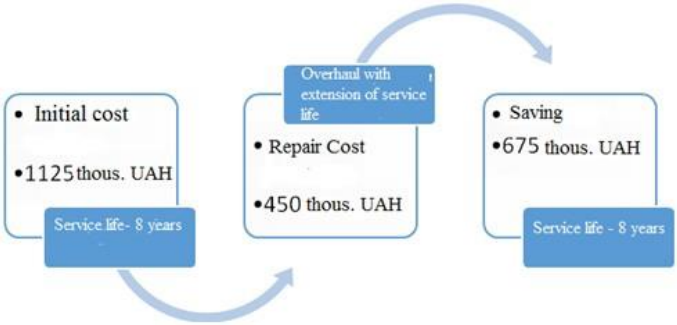
Fomin A., Braykovska N., Nechyporuk A., Kovalchuk G., Fomin V.
State Economic and Technological University of Transport

The rolling stock is the basis for efficient and high-quality transportations; the level of its technical condition and structure influences the quality of the transportation process, productivity and final financial performance of the rail transport. However, the state of transport vehicles, their physical and moral deterioration have reached a critical level today. The article analyzes the results and peculiarities of the evaluation of effective use of freight cars of improved designs, reduction of expenditure for the renewal of freight cars rolling stock and rail transportations. As an example, the calculation of the projected economic benefits from the improvement of hopper car through the introduction of the elements in the system that significantly reduce the cost of this type of cars was represented. According to the results of the calculations, the projected economic benefits from the use of modernized cars of 20-9749 model were determined and the cost-

effectiveness of the implementation of measures to improve the cars design was proved. The results of this analysis suggest that the improvement of the hopper cars design for the transportation of hot pellets and agglomerates of 20-9749 model has a significant economic effect that is more than 60 million UAH; at a projected purchase plan of these cars in the next 5 years, it will be about 600 units, which will allow the economic feasibility of introduction of these modernization methods.



a – before improvement



b – after improvement

Fig. 1. Savings due to the extension of pellet cars service life

At a projected purchase plan of these cars in the next 5 years, it will be about 600 units that proves the economic feasibility of imple- mentation of these modernization methods.

Table 1

The calculation of the projected economic effect

Years	Plan of pellet cars purchases	The projected economic effect of improving the design, thousand UAH	The projected economic effect of improving the design and operation of cars, thousand UAH
2016	250	24250	26375
2017	150	14550	15825
2018	10	970	1055
2019	100	9700	10550
2020	100	9700	10550
Sum	**610**	**59170**	**64355**

References:

1. Fomin, O.V. (2015) Increase of the freight wagons ideality degree and prognostication of their evolution stages / O.V. Fomin // Scientific Bulletin of National Mining University . 2015, Issue 2, p.68-76.
2. Kelrykh M. (2014) Perspective directions of planning carrying systems of gondolas. Scientific and technical journal «Metallurgical and Mining Industry». No 6, p.p. 64-67
3. Fomin O. (2015) Improvement of upper bun-dling of side wall of gondola cars of 12-9745 model. Metallurgical and Mining Industry. No 1, p.p. 45-48

SYNOPSIS OF THE THERMAL METHOD FOR STRAIGHTENING TECHNOLOGICAL-DEFORMED CAR PARTS

Fomin O.[1], Logvinenko O.[2], Burlutskyi O.[2]

[1]State Economy and Technology University of Transport

[2]Ukrainian State University of Railway Transport

Welding production, as one of the leading technological processes in the creation of welded structures, is of great importance in the development of car building, the use of which provides significant savings in materials and manpower. The successes of welding science and technology made it possible to carry out a real revolution in car building, to create fundamental-

ly new, competitive, highly economical rail car designs in which the productivity of labor in their manufacture was many times increased [1 - 3]. Currently, welding is the basis for making the components of the cars and largely determines their reliability and durability. Compared to other types of permanent joints, the advantages of welding are obvious, but post-weld residual deformations and stresses can significantly reduce the quality of the welded structures. The main reason for their appearance is the formation of the so-called zone of thermal influence or the zone of plastic deformations. It is also known that residual welding stresses increase the potential energy accumulated in the construction, which in turn increases the negative consequences of fatigue failure [4], and under operating conditions, residual deformations and stresses reduce the strength, corrosion resistance and accuracy of the welding structure. Traditional methods of reducing them to which include increasing thickness by carrying out stabilizing treatment of post-welding operations, removal of allowances does not always correspond to modern requirements for labor, energy and metal capacity of structures. Due to the fact that none of the existing welding methods provide a guaranteed defect-free welding joint, much attention is paid to post-welding methods of processing welded joints, namely, straightening methods that allow to restore the geometric shapes of parts after welding. These include general or local heat treatment, as well as appropriate mechanical treatment by rolling, impact pneumatic tools, shock-ultrasonic treatment, active loading, cold and hot deformation, etc. According to the normative documentation, the technologically deformed components of the wagons are subjected to mechanical (cold) or thermal correction to ensure their strength [3, 5, 6].

The method of cold dressing consists in stretching or shortening the elements of welded products to the design size, with the editing done with presses, jacks, rolls or manually with a forging tool. Currently, the cold correction of car parts is the simplest and most common way, but it often does not provide a stable form of corrected parts and in the process of operation, the deformed correction can occur again. The reason for the unstable shape of the corrected parts during cold correction is due to the heterogeneity of the residual stresses that arise as a result of the uneven deformation of the metal. In addition, the properties of the base metal deteriorate, namely, the toughness decreases and the yield strength rises. Due to the fact that the devices for cold dressing are bulky stationary equipment for its application, it is usually limited by the design and geometric characteristics of the presses.

One of the most rational from the point of view of reducing residual deformations and stabilizing the structure is the thermal method of straightening, by which the dressing of welded products is carried out due to plastic deformations arising from local high-temperature metal heating by a gas

burner. This is explained by the fact that when the article is heated to a temperature equal to $0{,}8-0{,}9$ melting points, the plastic deformation forces are reduced by $12-15$ times without significant changes in the physico-mechanical properties of the metal. Compared with the cold-edging method, thermal correction does not require any special equipment, other than a conventional gas welding machine.

One of the most economically viable methods of thermal straightening of technologically deformed car components, as shown by the analysis of the scientific literature, is the method of thermal dressing with local heating [1, 6 - 8]. The main advantage of this type of dressing is its versatility, that is, it can be used to fix any welding structure, which has a complex configuration and dimensions (for example, the girder beam of a gondola car). Thermal correction consists in heating the corresponding sections of the welding structure and then cooling them. At a heating temperature of the deformed portion that fluctuates within $750-850^{\circ}C$, the heated portion tends to expand, but the surrounding cold metal surrounds this possibility, resulting in plastic compression deformations. After cooling, the linear dimensions of the heated section decrease, which leads to a reduction or complete elimination of deformations.

It should also be noted that thermal corrections with local heating can be performed in almost the entire range of work to correct the vertical deflection of the elements of the car's bearing systems (in particular the spinal beams) and the body's mushroominess, while cold straightening has areas where it is impossible to implement. Thus, the potential for thermal edging is higher than cold.

References:

1. Fomin O.V. Doslidzhennja defektiv ta poshkodzhen' nesuchih sistem zaliznichnih napivvagoniv: monografija / O. V. Fomin. – Kii'v: DETUT, 2014. – 299 s.
2. Fomin O.V. Analiz ekspluatacijnyh poshkodzhen' kuzoviv zaliznychnyh napivagoniv / O.V. Fomin, O.V. Burlutskyi, V.V. Fomin // Budivnyctvo Ukrai'ny: naukovo-vyrobnychyj zhurnal. – 2013. – №3. – S. 37-48.
3. Shljapin V.B. Remont vagonov svarkoj / V.B. Shljapin, A.F. Pavlenko, V.Ju. Emel'janov // Spravochnik. – M.: Transport, 1983. – 246 s.
4. Fomin O.V. Osoblyvosti metodyky vyznachennja vtomnoi' dovgovichnosti napivvagonu z urahuvannjam ekspluatacijnyh ushkodzhen' / O.V. Fomin, O.V. Burluc'kyj // Shidno-Jevropejs'kyj zhurnal peredovyh tehnologij. –H., 2013. – Vyp. 2/7. – S. 12-16.
5. Vinokurov V. A. Svarochnye deformacii i naprjazhenija / V.A. Vinokurov. – M.: Mashinostroenie, 1968. – 235 s.

6. Burlutskyi O.V. Zastosuvannja matematychnogo modeljuvannja procesiv pravky pry vygotovlenni elementiv napivvagoniv / O.V. Burlutskyi, O.A. Logvinenko // Zbirnyk naukovyh prac' Derzhavnogo ekonomiko-tehnologichnogo universytetu transportu (serija «Transportni systemy i tehnologii'»). – Kyi'v: DETUT, 2016. – № 28. – S. 110-123.
7. Burlutskyi O. V. Vyznachennja zvarjuval'nyh deformacij jaki vynykajut' pid chas zhyttjevogo cyklu napivvagona / O.V. Burlutskyi, N.S. Kocheshkova // Zbirnyk naukovyh prac' Derzhavnogo ekonomiko-tehnologichnogo universytetu transportu (cerija «Transportni systemy i tehnologii'»). – Kyi'v: DETUT, 2015. – № 26-27. – S. 92-101.
8. Burlutskyi O.V. Application methods changes plastic deformation after welding sill gondola cars / O.V. Burlutskyi // Metallurgical and mining industry (Machine building). – Dnipropetrovsk, 2015. – No.10. – P. 190-197. (www.metaljournal.com.ua).

THE STRUCTURING POSSIBILITIES OF RESISTANCE OF USE TATINIUM LOAD WAYS THE OPPOSITE OF THE STRESS AND/OR STRAIN STATE OF WAGON DESIGNS

Fomin A., Stetsko A.
State Economic and Technological University of Transport

At present after prolonged use a large number of railway cars has signs of physical deterioration. There is an urgent need for strengthening of structures by physical aging and during maintenance and repair [1, 2].

Perspective directions of constructive solutions to these problems may be:

- development and implementation in the design of freight cars of advanced engineering solutions;
- development of methods of finding and implementing resource-saving designs, designs of freight cars;
- search designs wagons places with insufficient or excess reserves of strength.

Significant potential in solving this problem is to introduce a method of creating controlled stress and/or strain state of structures.

There is a need to analyze the application schema loads, which is necessary when estimates of the strength of body components for cars modes Normy [3].

According to the classification [4] methods of creating pre-stress and/or strain state is graphically convenient to associate with basic account maintenance and additional schemes of work for freight wagons (Fig. 1).

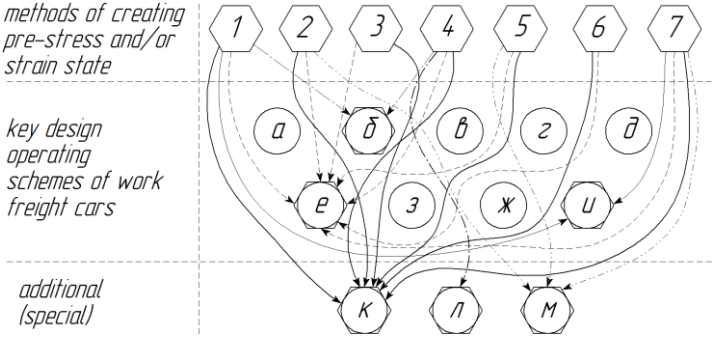


Fig. 1. Auxiliary graph structuring possibilities of creating a countervailing force means pre-stressed and/or deformed state of the wagon designs

According to the schedule in the diagrams *б*, *е*, *и*, *к*, *л* and *м* is the ability to reduce stresses in the frame and body through the use of ways to create a countervailing force means pre-stressed and/or deformed state. For scheme *б* – possible to apply methods 1 and 4; *е* – 1-7; *и* – 1 and 4; *к* – 1-7; *л* – 4; *м* – 2, 5 and 7.

The essence of the method: reduce the growth of the movement by creating forces of opposition, by creating a directional pre-stressed and/or deformed state.

Analyzing the diagrams of the loads, we can formulate the total load for modes Normy and point scheme is the ability to reduce stress through the use of ways to create pre-stressed and/or deformed state of elements or nodes of the car.

Built synthesis of structural-logical field, determining a compensation direction of the introduction of pre-stress and/or strain state in the wagon design, depending on the estimated cases in the life cycle.

A series of technical decisions concerning improvement of the freight cars that was patented.

Structured in graphical form and given in the report of the possibility of constructive implementation of pre-stressed and/or deformed components of freight cars appropriate to use in conducting further research and development work on the creation of freight cars of new generation, as well as improving the system efficiency of their existing models.

References:

1. Fomin, O.V. Modern requirements to carrying systems of railway general-purpose gondola cars / O.V. Fomin / Scientific and technical journal «Metallurgical and Mining Industry». 2014, No. 5 – P.31-43.
2. Fomin, O.V. Increase of the freight wagons ideality degree and prognostication of their evolution stages / O.V. Fomin // Scientific Bulletin of National Mining University . 2015, Issue 2, p.68-76.
3. Normy dlya rozrakhunku i proektuvannya vahoniv zaloznykh dorih MPS koliyi 1520 mm (nesamokhidnykh) i zminy ta dopovnennya. - M.: DerzhNDI - VNYYZHT, 1996. - 319 p.
4. Fomin, O.V Mozhlyvosti zastosuvannya poperedn'o napruzhenykh konstruktsiy v zaliznychnomu mashynobuduvanni / O.V Fomin, M.I. Horbunov, A.A. Stets'ko, V.V. Kovalenko // Zbirnyk naukovykh prats' Derzhavnoho ekonomiko-tekhnolohichnoho universytetu transportu Ministerstva osvity i nauky Ukrayiny: Seriya «Transportni systemy i tekhnolohiyi». – Kyyiv: DETUT, 2016. – Vyp. 29. – pp. 37-53.

ROLLING STOCK MAINTENANCE SCHEDULING OPTIMIZATION

Kharlamov P., Kharlamova E.
Ukrainian State University Railway transport

Rolling Stock Management (RSM) is the main cost factor for Rail Undertakings. For example, for high-speed trains, more than 30% of the lifecycle costs is spent for maintenance operations. In order to reduce the costs due to railway operations, every company should address the joint problem of rolling stock rostering and maintenance scheduling since they are strongly related parts of the same problem. Maintenance optimization can be a key factor to increase the productivity of railway companies. At the same time, in a competitive globalized and multimodal market, RSM is one of the competitiveness key factors because services quality level depends on it. The strategic relevance of RSM, in particular of maintenance scheduling, is thus due to the reduction of needs (such as platforms and human resources) and to the enhancement of quality standards (such as vehicle reliability and cleaning). A key problem in railway planning process requires to cover a given set of services and maintenance works with a minimum amount of rolling stock units. Additional objectives are to minimize the number of empty runs and to maximize the kilometres travelled by each

train between two maintenance operations of the same type. The constraints of the maintenance optimization problem require that the different types of maintenance operations must be carried out for each train periodically. The various maintenance tasks can only be done at a limited number of dedicated sites. [1]

Any organization running machinery needs to plan for routine maintenance and deal with unforeseen breakdowns, and so they have a supply chain for spare parts and materials. However, running a railway is a bit more complicated than most manufacturing companies; the infrastructure can extend over hundreds of miles and the 'machinery' keeps moving about. Add to that the problems of breakdowns in remote locations, public safety issues and penalty clauses for late running and disruption to the network and it's obvious that getting maintenance right is a key issue.

The traditional method of dealing with non-critical failures is for the driver to leave a written comment for the maintenance engineers to read when the train is next in a depot, which works most of the time. But if on investigation the engineers decide the fault needs immediate attention they then have to go through the business of creating work orders, and raising purchase orders for parts or service kits.

Wouldn't it be better if the maintenance team knew of the issue as soon as the driver did, or even before? If they could track the issue, watch it develop, compare it with similar issues in the past, decide when to fix it, where to fix it and make sure all the right parts and materials were in the depot waiting for the train to arrive? That is the reasoning behind next maintenance system, which include:

1. a module added to the train's control system monitors changes in its major components and reports via radio transmission to a ground-based server. Engineers can remotely analyse and understand what's happening on board, anticipate any problems or troubleshoot failures (TrainTracer, Alstom)
2. leading railway maintenance management product enabling depots to maintain what they need to, when they need to, rather than adhering to a set maintenance schedule (DeltaRail XV)
3. organizing all the data coming into an engineering department to facilitate rational decisions (TACT/XV, Ramsys)
4. using a terminal to see the complete service history (Spear system).[2]

References:

1. Giovanni Luca Giaccoa,b, Donato Carilloa , Andrea D'Arianob , Dario Pacciarellib, Ángel G. Maríno. (2014) Short-term rail rolling stock rostering and maintenance scheduling. Transportation Research Procedia. Vol. 3. pp. 651-659.

2. Managing Rail Maintenance. http://www.railway-technology.com/features/feature89011

ECONOMIC-TECHNOLOGICAL MODELS FOR TRUCK ARGUMENTATION

Khmelyov I.
National Transport University

High rates of technological progress in the world, uneven economic and social development of individual countries over time, integration processes on the basis of international labor division facilitate rapid growth of foreign trade in all countries [1]. It is forecasted that in a few years about one-third of the entire world's production will be the subject of international exchange.

In this regard, the importance of transport in securing foreign economic relations increases. Growth in gross domestic product and foreign cargo transportation are impossible without proper transport support. Road transport is especially important in the economy of Ukraine, as it is widespread. However, the increasing need for transportation causes increasing the number of heavy-duty vehicles – trucks (road trains). Motor vehicle fleet is mostly updated by second-hand ones (i.e. those which have been used previously). Thus, the number of trucks under 8 years old is only 10% in Ukraine. Technical condition, environmental and fuel-economic indicators these vehicles often do not correspond to Euro emissions standards [2].

At the same time, vehicle manufacturers' offers arise from industrial-branch providing idea of new design models technical competitiveness. Moreover, the new product main feature is a technical novelty of any truck design element. If there is no relevant valuation method of the new car consumer properties, consumers (buyers) are imposed on unprofitable strategy of forming a new rolling stock consumer quality under the scheme "technical innovation - the price". It can only approach the simple goods marketing. But the car is a complex and unique scientific-technical goods, as in the transportation process simultaneously realized their properties as product-creating mean of transport work and as an technological impacts' instrument on cargoes and the environment [3]. In consideration of these properties, in marketing it is necessary to provide the cars options range that would correspond to the transport system technical basis development ac-

cording to energy-saving concept and the strategy of future transport proposals technique-technological competitiveness increasing.

To evaluate the car efficiency in the theory of transport processes [4] and transport economy [5] the models of cost and profit are used. Existing methods have several disadvantages which follows:

1) taking into account only one technical parameter – loading capacity;

2) the settlement scheme in the theory of transport processes [4] is not consider functioning of the vehicle, but its presence in the end-terminals to provide formal acts of delivery;

3) it is not considered the main transportation factors - energy conversion processes, technology influences and use of technological resources [3].

4) in economic calculation schemes [5] the process of resource use is replaced by their value write-off into cost.

It makes it impossible to use indicators mentioned above as efficiency criteria for vehicles argumentation within the same segment as the loading capacity of different trucks for international transport is almost identical (in practice, it is often taken up to 20 tons). In these circumstances, it is necessary to analyze the rolling stock efficiency including other truck's design parameters change.

In this regard, the energy equivalent cost model for new trucks economic-technological argumentation is developed in the National Transport University. It is based on energy and resource saving concept. The features of the model are:

1) the use of energy-normalized scheme transportation process;

2) functioning analysis of truck as complex scientific and technological product;

3) forecasting the impact of structural parameters, traffic conditions and road characteristics;

4) the use of reference prototype comparison method.

To develop the energy equivalent cost mathematical model the reference prototype analogy method is used [3]. By comparison energy index given truck and its reference prototype mileage K_e and time K_t energy indexes are determined. They are substituted in the formula for determining the cost S_W. Thus, energy equivalent cost S_{WE} is received:

$$S_{WE} = \frac{C_{\text{var}} l_c K_e + C_{fix}(t_d K_t + t_{lu})}{W} = K_s S_W, \qquad (1)$$

where C_{var} – variable costs, €/km; l_c – mileage with cargo, km; K_e – mileage energy index (truck fuel consumption in a cycle relation to reference truck fuel consumption moving at a constant reference speed); C_{fix} – fixed costs, €/h; t_d – truck driving time, h; K_t – time energy index; t_{lu} – truck idle time during loading-unloading, h; W – truck transport work, tkm; K_s – transport cost energy index:

$$K_s = K_e(A_1 + A_2 \frac{C_{fix}}{C_{\text{var}}}), \quad (2)$$

where A_1, A_2 – indexes that take into account operational factors.

The advantage of the developed models is that mileage K_e and time K_t energy indexes are equated to 1 if just organizational problems are solved. If both organizational and technological problems are solved, these indexes are taken into account. To determine these indexes mathematical models and simulation methods are developed. They help to solve technological and organizational transportation tasks.

References:

1. Tereshina N. P. Economics of railways / N. P. Tereshina, V. G. Galaburda, M. F. Trikhunkov and others // – Moscow: UMC ZHDT, 2006. – 801p.
2. Khmelyov I. V. The method of vehicles' energy efficiency analysis considering the traffic conditions / I. V. Khmelyov, A. V. Gusev, M. H. Pitsyk // Visnyk NTU, 2014, №29. – pp. 348–353.
3. Khabutdinov R. A. Systemic problems of innovative development of road transport in a theoretical denial of transport technologies and production / R. A. Khabutdinov // Visnyk NTU, 2016, №34. – pp. 491–498.
4. Gorev A. E. Freight transportation / A. E. Gorev // – Moscow: Academia, 2013. – 304p.
5. Budrina E. V. Transport Economy / E. V. Budrina // – Moscow: Yurait, 2016. – 366p.

INVESTIGATION RHEOLOGICAL AND HYDRODYNAMIC CHARACTERISTICS OF WATER COAL FUEL

Chernetskaya-Beletskaya N., Baranov I., Ostapenko V., Miroshnykova M.
Volodymyr Dahl East Ukrainian National University

Modern fuel must meet the stringent requirements modern market, such as stable values of main technological characteristics set by consumer, profitability production and minimum possible dangerous environmental impact on environment when it is received and used. Effective use and processing coal into energy fuel is directly related environmental problems, which inevitably arise. Increasing energy efficiency should be considered within the coal-energy complex on all links technological chain: extraction - processing - production and consumption energy. Technological processes coal-energy production, complementing each other, allow efficient use natural resources, create and apply wasteless, low-waste and energy-saving technologies taking into account advantages an optimal production cycle.

Promising direction is being implemented in many countries is development technologies for obtaining and transporting highly concentrated water coal fuel (WCF) [1-3]. The development effective processes for production and application WCF should be based on scientifically based methods of physical and physicochemical effects on initial coal, taking into account properties its organic and mineral constituents [4].

The paper established that with help methods colloid chemistry and physico-chemical mechanics is possible to efficiently create highly concentrated water coal fuel based on coal various grades with a concentration 75% with necessary colloidal-chemical properties. Analysis studies showed prepare water-coal fuel much possible concentration, it is necessary refine coal granulometric composition of maximum package, which is described by Alfred formula.

Obtaining WCF with necessary technological properties is possible when bimodal granulometric composition is reached, as well by introducing reagents make it difficult coagulate coal particles and form electrostatic barrier between particles of solid phase. It is established that bimodality granulometric composition helps reduce viscosity suspension due to role fine fraction solid component WCF. The rheological and hydrodynamic characteristics WCF are determined, regularities influence of granulometric composition solid component WCF on its characteristics are studied.

After analyzing experimental data granulometric distribution of initial coal and carrying out an evaluation significance coefficients regression equation, insignificant terms of equation were excluded [5,6]. In this con-

nection, regression equations for selected planning matrix will be written in form coded parameters:

$$y(\eta) = 0{,}518 + 0{,}0744x_1 + 0{,}0465x_2 + 0{,}0369x_3 + 0{,}00263x_1x_2 - 0{,}00513x_1x_3 + 0{,}00363x_2x_3 - 0{,}00438x_1x_2x_3 \quad (1)$$

$$y(\tau_0) = 6{,}236 + 2{,}61x_1 + 1{,}064x_2 + 0{,}826x_3 + 0{,}159x_1x_2 + 0{,}846x_1x_3 \quad (2)$$

where $y(\eta)$ - effective viscosity WCF;

$y(\tau_0)$ - ultimate shear stress WCF.

Analysis existing theoretical studies and experimental data shows that most important factors affecting parameters of hydrotreating water-coal fuel are concentration solid component (C) and parameters characterizing bimodality grain size distribution solid phase WCF [7].

As result experimental studies, rheological and hydrodynamic characteristics WCF were determined, regularities of influence granulometric composition solid component WCF on its characteristics were studied. In the paper, it was found most promising direction for further research is the application regression equation obtained to determine resistance to movement of WCF by pipeline transport according to Bukingam equation.

References:

1. Makarov A.S., Kobitovich O.M., Savic'kij D.P., Egurnov O.I. Koloïdno-himichni metodi otrimannja paliva na osnovi vidhodiv vuglezbagachennja // Visnik NAN Ukraïni. – 2009. - №1. – S.56-67.
2. Savickij D.P., Makarov A.S., Zavgorodnij V.A. Reo-logicheskie svojstva vodougolnyh suspenzij na osnove buryh uglej v prisutstvii natrievyh lignosulfonatov i shhelochi // Himija tverdogo topliva. – 2009. - №5. – S.73–77.
3. Makarova K.V., Savickij D.P., Makarov A.S., Egurnov A.I. Vodougolnoe toplivo na osnove antracita // Jenergotehnologii i resursosberezhenie. – 2010. – №5. – S. 3–5.
4. Mosa E.S., Saleh A.M., Taha T.A. Effect of chemical additives on flow characteristics of coal slurries // Physicochemical Problems of mineral Processing. – 2008. – Vol. 42. – P.107–118.
5. Longlian Cui, Liqian An, Hejin Jiang. A novel process for preparation of an ultra-clean superfine coal–oil slurry // Fuel. — 2007. — Vol. 83. — P. 1016.
6. Gjulmaliev A.M., Golovin G.S., Gladun T.G. Teoreti- cheskie osnovy himii uglja. — M.: Izd-vo MGGU, 2003. — 524 s.
7. Helle G., Nygaarda B, Søren Kiilb, Johnssonb Jan E., Jørgen N. Jensena, Jørn Hansenb, Folmer Foghc, Kim Dam-Johansenb. Full-scale measurements of SO2 gas phase concentrations and slurry compositions in a wet flue gas desulphurisation spray absorber // Fuel. — 2004. — Vol. 83. — p. 151–164.

MODERN PRINCIPLES OF MARKETING IN THE RAILWAY TRANSPORT ENTERPRISES

Chernetska-Biletska N., Golovina Yu.
Volodymyr Dahl East Ukrainian National University

In modern terms of development marketing is becoming more widespread in the management of sales activities of enterprises, including transport. Marketing is one of the most powerful tools used by different organizations for institutions and organizations by creating demand and maximizing consumer needs satisfaction. Regarding the railway enterprises the basic principles of transport marketing are: focus on the interests of consumers; provision of financial and economic stability of railways; constant updating of equipment; improving the quality of transport services; analysis, accounting, etc.

The chosen theme is relevant as marketing is one of the most major sources in transport companies, using a complex analysis of the transport market study of consumer demand for transport services that affects the development of the most important components of transport marketing system and is the entry point for transport companies' marketing activities on demand and services.

The problem of the marketing at the railways enterprises was addressed mostly by such scholars as: Anikieiev S., Kotler P., Hrutskiy V. and others. In current conditions the outstanding scientists who are analyzing the problems of marketing at the railway enterprises are: Kurbatov A.V., Lapydus B.M., Shatilov S.V.

At all stages of the railway enterprises development, the marketing had been paid high attention in domestic literature. The theory was developed, various aspects of marketing influence were studied, and its place and its role in the railway enterprise system were analyzed. These changes have contributed to a new search of adequate ways and methods of organizing entrepreneurial activity focused on accelerating scientific and technological progress and increasing emphasis on the final consumer. As an evidence, we can refer to the interpretation of the expert in marketing P. Kotler, who in his works in marketing in railway enterprises wrote: "Marketing in transport is usually called the transport marketing, noting not only the field of application, but also peculiarities that distinguish it from marketing of the other types of services and marketing of industrial and consumer products. These differences are determined by the features "production and sale" of transport services (transportation) and general transport market" [2, c. 11].

According to this concept, transport marketing is defined as the system of organization and management of transport businesses, companies and firms providing transport services to transport users on the base of the comprehensive study of the transport market and demand for transportation products in order to create the best conditions for its distribution for the market players.

Due to this, in the modern world there is a number of services in which the content and presentation of components are reflected; that make up the key factors of marketing, so M.I. Shkuryn in his messages gives this definition: “The main transport product is movement of goods and people and additional services associated with that movement. In general, all types of basic transport products can be considered as transport services, having the same features as any other services: intangibility, inability to store, inseparability from the source and impermanence in quality” [1, c. 579]

Currently, a "service" is understood as the direct movement of goods in space, and any other operation which is not mobile, but ensures its preparation and implementation, namely: packing and marking of goods, their packaging, intermediate storage, providing the owner of the cargo with the necessary information and etc. Thus, the main type of transport services - is transportation, but usually it is accompanied by the provision of a range of additional services.

General principles and functions of marketing can be used for transport taking into account specificity of each type of transport and peculiarities of selling this basic product of transport - transport services. The main functional directions of transport marketing can be formulated as follows: elaboration of a flexible tariff policy based on the analysis of the demand and supply, tariffs of competitors and own expenses in order to ensure a certain level of income and profit of transport enterprise; active impact on the transport market, organization of advertising and promotion of consumer preferences; planning and forecasting for transportation of cargoes, passengers and other types of transport services, optimization of commodity circulation; elaboration of measures to expand the transport market, diversify it, enhance the quality of transportation and efficiency of transport production, improve the production management system, interact with subcontractors and customers; formation of orders, completing of travel documents and payments for transportation and services; marketing management, control over execution of transportation plans and timely response to the dynamics of the transport market [12, c. 52].

The use of marketing principles to form the demand makes it possible to improve the competitiveness of the railways by taking more careful consideration of users' requirements for service quality, the practice of mu-

tually beneficial discounts to tariffs, the provision of certain benefits to the clientele, etc.

The main directions of further development of marketing in railway transport Ukraine should be as follows [11, c. 156]:

- improvement of Ukrzaliznytsia's organizational structure by creating an integrated marketing system;
- ensuring the necessary conditions for the marketing structures functioning in all railways of Ukraine in accordance with its data profile tasks and coordinate their activities at the level of the Marketing Department of the Main Passenger Transportion Board of Ukrzaliznytsia;
- elaboration of Ukrzaliznytsia marketing strategy and marketing plans;
- development of methodological support on technology marketing research;
- use of forecasting methods of economic conditions;
- improvement of tariff and communication policy;
- the use of marketing and logistics approach to transportation.

Thus, from all of the above, we can conclude that the process of marketing management in transport involves work on the organization of production and sale activities of transport enterprises, carrying out marketing research of the transport market, revealing the existing and potential demand for transport services, creation of favorable economic and technical conditions for their sales and ensuring efficient operation of transport enterprises. At this stage of the Ukrainian economy development, there are problems in marketing management at transport enterprises. In practice, there is a common understanding of what a marketing specialist in a transport enterprise should do, specifically for railways. At present, rail transport focuses mainly on passenger transport, and freight traffic is left aside. Therefore, the application of the principles and elements of marketing is extremely important for transport enterprises of Ukraine. This will allow businesses to survive the economic crisis and take a strong position among competitors.

References:

1. Kotler P. Principles of Marketing [Text]: translated form Engl. - M.: “Rostinter”, 1996. – 579 p.
2. Marketing in Transport: Textbook for University Students Majoring in Transport / Shkurin M.I. - Gomel: BelGUT , 2003. - 179 p.
3. Harkavenko S.S. Marketing [Text]: textbook. - Kyiv: Libra, 2002. - 156 p.
4. Tereshina N.P., Halaburda V.G., Trihunkov M.F. et alias. Economics of Railway Transport: teach. for universities of railway transport // Ed. Tereshina N.P., Lapidus B.M., Trihunkova M.F. - M.: ZhDT UMTS, 2006. - 996 p.

5. Transport Marketing: Textbook / V.G. Halaburda, G.V. Bubnova, E.A. Ivanova et al .; ed. V.G. Halaburda. - Ed. rev. and add. - M.: FGCU "Training Center for Education in Railway Transport", 2011. - 452 p.

INTERMODAL SHIPMENT: EXPERIENCE, FAULTS, PROSPECTS

Chernetskaia-Biletskaia N., Plotnikov D.
Volodymyr Dahl East Ukrainian National University

Currently the world economy has reached such a level of development that it is becoming more demanding in the transport sector. First of all, we are talking about cost effectiveness and speed of delivery, cargo safety, and overall sustainability of the process.

European experience

One of the main transport policy directions in the European Union in recent years has been the development of a system of combined (intermodal) cargo shipment that provides on the basis of logistical principles the operation of continuous transport chains as a single "conveyor belt". International practice shows that more than a third of all international cargo transportations carried out on a "door-to-door" basis is fulfilled with the help of container trains. When choosing the most priority directions of the transport industry development the governments of the European states give considerable prominence to clear air ensuring, preservation of the environment from harmful emissions, and ensuring the safety of people's lives.

The results of the Commission of the European Union's transport research revealed significant advantages of containerized transport over conventional transport by road. Rail Intermodal method of goods delivery is widely used in Western Europe, because it provides:

- high speed and guaranteed delivery of goods in accordance with the schedule of the train;
- guaranteed transportation safety in all weather conditions;
- guaranteed protection of vehicles and goods during the movement and stops of the train;
- significant reduction in the time for border and customs control;
- safety of the vehicle, saving its motor and fuel economy;
- safety of motor roads;
- preservation of the ecology of the environment;

- savings in fuel costs and registration of shipping documents.

Rail intermodal technology originated in the United States and Canada, and when transferred to the Western Europe faced considerable challenges: Many man-made constructions such as bridges, tunnels, the height of the suspension of power supply, did not allow the successful application of this technology. To solve this problem some part of man-made constructions were redesigned, deepened the pockets in the bottom of the flatcars, where the wheels of road trains and trailers fall. Such a technology is called "rolling motorway". This is transportation of the truck with the trailer or semi-trailer on a railway flatcar with the lower floor. At the same time, if the driver follows together with the cargo, in a special passenger car, then this will be accompanied intermodal transportation (combined transport). If the cargo goes without the driver – it is unaccompanied intermodal transportation (combined transport). The car factories have established production of road tractors equipped with a berth for one of the drivers, with a large fuel reserve and with the speed of 100 km/h and above. A hitch of such a road tractor with the trailer or container chassis was called a road train.

Disadvantages of intermodal shipping

The disadvantage of intermodal shipping is the need to transport the truck itself (the coefficient of utilization the railcar load capacity decreases and there is a loss of productivity of the car), as well as the driver for whom it is necessary to create comfortable conditions.

On some railways in England, United States, Germany, cargoes are transported in semi-trailer wagons Road Railers with combined chassis. The semitrailer is mounted on a railway trolley by means of a cascade connection of the semitrailer's support parts with a railway trolley. Wheels of semitrailers rise when moving on rails.

The disadvantage of such transportation is the low efficiency of using the load capacity of railway transport. This is due to the fact that, in addition to cargo, it is necessary to transport both the trailer or the car.

Now practically in every country of the world there are problems connected with highways: these are traffic jams, poor quality of road pavement or a complete lack of roads in some regions of the country. And all of these problems require huge financial investments for their solution. Intermodal transport can partially solve them. If it will be proposed to auto carriers to avoid the loaded or critical sections of the motorway by rail, saving time and avoiding emergency situations, especially with favorable tariff rates, then their interest will be huge.

Problems of implementation

The essential problem is that to organise the rail intermodal transport links as profitable and attractive business, it is necessary to develop an own specialized rolling stock. Currently known cargo transport technologies of this type cannot be used in a network-wide model on 1520 mm gauge railways due to its structural features, which do not comply with the specifics of the operational rolling stock in the network of Ukrainian railways. It is necessary to create conditions for speeding up the process of introducing rail intermodal transportation to freight companies. In "Ukrzaliznytsya" they also hope for state support – that is the subsidy for rail intermodal shipments from the state budget. As arguments, they constantly remind abound the environmental problems and the condition of highways in the country, the need to unload and reduce accidents on the roads. But meanwhile the lobby of the relevant innovations in the legislation of the UZ is not successful.

Obviously, the rail intermodal transportations themselves are quite contradictory, and their organization requires an integrated approach, but the fulfillment of the above conditions will favorably affect the development of the intermodal freight in Ukraine.

References:

1. Using discrete event simulation to evaluate different railway container wagon alternatives, Hilmola Olli-Pekka, Saranen Juha.
2. Christian Wüst. Rail Freight Revolution: A Possible Solution to Europe's Clogged Roadways / Spiegel Online. International [Электронный ресурс]. URL: http://www.spiegel.de.
3. Technical and Technological Parameters Choice of the intermodal system on the Railway Lines of the Network; Cand. Tech. Science / Shapkin Andrei Sergeyevich. – M., 2004.
4. Parametrization Of Technology Of Intermodal Traffic Of Foreign Trade Cargoes; Cand. Tech. Science / Snigur Olga Valeryevna. - M., 2006.

PERSPECTIVES AND PROBLEMS OF USING THE INTEROPERABILITY PRINCIPLES ON RAILWAYS OF UKRAINE

Shvornikova A., Barabash V., Marchenko A.
Volodymyr Dahl East Ukrainian National University

Legal regulation of the transport complex plays a significant role in ensuring high quality and customer service culture.

The need to create new standards aimed at ensuring work on the harmonization of technical requirements and the adaptation of rail transport for its integration into adjacent transport systems are combined under the definition of interoperability [1].

According to the definition given in ISO / IEC 24765, Systems and Software Engineering Vocabulary, Interoperability is the ability of two or more systems or elements to exchange information and use this information. However, the term "interoperability" defines not only a simple exchange of information and its use, but also ensuring the coordinated interaction of participants, for which a common notion of goals and methods of interaction should be achieved [2].

So, interoperability is the ability of the Trans-European railway system to provide safe, unhindered and continuous train traffic, to meet the operational requirements for these lines. This ability is based on a set of regulatory, technical and operational conditions that must be met to meet the basic requirements [3].

The possibility of solving the problem of actualizing the railway messages scheme by improving the efficiency of application of the interoperability principles in the implementation of the program for the redistribution of freight train traffic within the international transport corridors of Ukraine is proved. In turn, carrying out technological and technical transformations in railway transport will help accelerate the pace of European integration, establish closer international economic cooperation, and will also provide an opportunity to effectively use the advantageous geopolitical location of Ukraine [4].

Ensuring the interoperability of railway systems 1520/1435 is based on the optimal level of technical harmonization, the provision of which makes it possible:

- simplification, improvement and development of international rail transport;
- support for the gradual establishment of an internal equipment market and services for the construction, rehabilitation, modernization and operation of the Trans-European Railway system;

- promoting the interoperability of the trans-European railway system.

The introduction of interoperable transport has many complexities and requires the solution of problems [5]:

- difference in track width;
- difference in dimensions of structures and rolling stock;
- voltage difference of electrified lines;
- the need to renew the funds of locomotive and haulage farms;
- the need for IT;
- the need to create transport and logistics distribution centers and terminal complexes;
- the need to develop the economy of electrification and power supply on the basis of advanced achievements in the field of electric power and rail transport;
- active international cooperation.

References:

1. Sirijchik T. Transportna politika Ukraïni ta ïï nablizhennja do norm Єvropejs'kogo Sojuzu / T. Sirijchik ta in. ; za red. Marchina Svєnchicki. – K. : Analit.-doradch. centr Blakitnoï strichki, 2010. – 102 s. – Rezhim dostupu :http://www.undp.org.ua/files/en_76033Transport_Syste m_Reform_Jun2010.pdf
2. Interoperabel'nist' jak neobhidna skladova funkcionuvannja zaliz-nici ta ïï pidrozdili [Elektronnij resurs] / T.Ju. Kalashnikova, S.O. Masalov // Zbirnik naukovih prac' UkrDAZT. – 2015. – vip. 152. – S.30-36. – Rezhim dostupu: irbis-nbuv.gov.ua/cgi-bin/irbis_nbuv/cgiirbis_64.exe?...2...1...
3. Direktiva 2001/16/ЄS vid 19 bereznja 2001 r. shhodo ekspluatacijnoï sumistnosti zaliznichnih sistem
4. Kozak V.V. Analiz efektivnosti zastosuvannja principiv interopera-bel'nosti pri realizaciï programi pererozpodilu vantazhnih poïdo-potokiv u mezhah mizhnaronih transportnih koridorah Ukraïni.
5. Visnik sertifikaciï zaliznichnogo transportu

INCREASE IN OVERALL PERFORMANCE OF LOAD-LIFTING CRANES

Shevchenko S., Denisova N., Polupan E.
Volodymyr Dahl East Ukrainian National University

One of the directions of support of effective and safe operation of load-lifting easels is increase in their productivity and service life by improving of response characteristics. It is known that the principal reasons which restrict service life of load-lifting easels are residual deformations and fatigue cracks which collect and develop in a metalwork, especially during transient phenomena. These processes are followed by sharp increase in additional dynamic loads of oscillatory character which need to be reduced to smaller value. One of the directions of the decision of this task is calculation of rational parameters of transient phenomenon. One of transient phenomena of operation of load-lifting easels is process of braking of the mechanism of movement of the bridge easel.

For determination of the rational brake characteristics of the mechanism to movements of the bridge easel assuming determination and implementation of such law of change of brake force in case of which key parameters of transient phenomenon (time of braking of t_T, value of the maximum horizontal inertial load on $P_м^{max}$ metal construction, value of a maximum load of P_n^{max} arising in the drive when braking, the maximum deviation amplitude of a load after an easel A^{max} stop) accept the most acceptable values we will use application of mathematical methods of planning of experiments in technique. Efficiency of use of methods of planning of experiments in case of a research of dynamics of easels is justified in operations [1, 2]. The task, determination of the rational mechanical characteristic of the mechanism of movement of the easel in process braking, taking into account minimization of time of process of braking is set.

As the parameter of process optimization of braking of the easel, the simultaneous assessment of four parameters is: t_T, $P_м^{max}$, P_n^{max}, A^{max}. As prior information allows to give preliminary estimate to each separate parameter, as the generalized criterion of optimization we use the generalized function of desirability offered by E. C. Harington [2]. For its creation parameters need to set boundary values, having given it the appropriate marks in a scale of desirability and to transform parameter values of optimization of t_T, $P_м^{max}$, P_n^{max}, A^{max}. to the dimensionless scale of desirability allowing to define the private desirabilities of d_1, d_2, d_3, d_4 of fig. 1 corresponding to them.

As time of braking of bridge t_T cranes is limited on the one hand to the minimum time of braking of t_{min} at which it isn't broken coupling of

driving running wheels with rails, and with another by the maximum time of braking of t_{max} of the technological process [3, 4] defined from conditions, we will use function of transformation for bilateral restrictions.

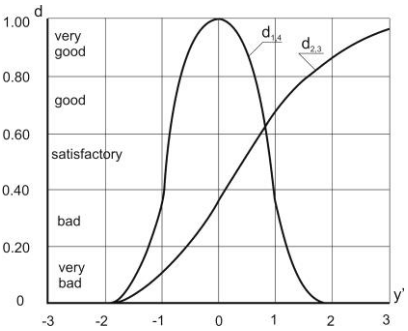


Fig. 1. Functions of desirabilities for bilateral d_1 and unilateral d_2, d_3, d_4 of restrictions

Transformation of t_T values to a scale of d_1 is made for bilateral restriction of a type of $t_{min} \le t_T \le t_{max}$ by means of function:

$$d_1 = \exp\left[-\left(|y'|\right)^w\right], \tag{1}$$

where $y' = \dfrac{2 \cdot t_T - \left(t_{\max} + t_{\min}\right)}{t_{\max} - t_{\min}}$, then from (1) $w = \dfrac{\ln \ln \dfrac{1}{d_1}}{\ln |y'|}$.

The exponent of w can be calculated if to set to some value y' d_1 value, it is preferable in the range of $0{,}6<d_1<0{,}9$.

Restrictions for the parameters $P_м^{max}$, P_n^{max}, A^{max} have unilateral character. As a convenient form of their transformation to d_2, d_3, d_4 serves dependence:

$$d_{2,3,4} = \exp\left[-\exp\left(-y'_{2,3,4}\right)\right], \tag{2}$$

where $y'_2 = b_{02} + b_{12} \cdot P_м^{max}$; $y'_3 = b_{03} + b_{13} \cdot P_n^{max}$; $y'_4 = b_{04} + b_{14} \cdot A^{max}$.

Coefficients of b_{02}, b_{03}, b_{03}, b_{12}, b_{13}, b_{14} define, having set for two values $P_м^{max}$, P_n^{max}, A^{max} the corresponding values of desirabilities d_2, d_3, d_4 (see fig. 1).

Combination of private desirabilities in the generalized desirability of D is carried out on a formula:

$$D_i^э = \sqrt[4]{d_{1i} \cdot d_{2i} \cdot d_{3i} \cdot d_{4i}}, \quad (3)$$

where 4 – number of private functions of desirabilities;

d_1, d_2, d_3, d_4 – dimensionless estimates of the studied optimization parameters;

i – serial number of experience.

The generalized desirability of $D_i^э$ represents the generalized criterion in which size it is possible to estimate "quality" of transition process of braking, it is also possible to call it criterion function.

References:

1. Boutiques L.Ya. Multiple parameter analysis of dynamics of load-lifting cranes of bridge type. – Luhansk: Look-in the EUNU of. V. Dahl, 2010. – 210 pages.
2. Sidnyaev N. I. Theory of planning of an experiment and analysis of statistical data. 2nd prod., lane. And additional. The manual for masters – M.: Yurait, 2015. – 395 pages.
3. Starchenko V. N., Shevchenko S. I., Kobzeva L. I., Mushkayev Ya. V., Ignatyev O. L. Increase in overall performance of the bridge crane in the course of braking//Vesnik Of Volodymyr Dal East Ukranian National University No. 5(123) 2008. – Luhansk: Look-in the EUNU of. V. Dahl, 2008. – Page 112-117.
4. Shevchenko S. I. Decrease in dynamic loadings of cranes of bridge type by use of brake mechanisms with self-strengthening//Naukovo-tekhn_chny that the virobnichy magazine "Podyomno-transportna of a Tekhnik" No. 4 2008. – Dnepropetrovsk: Look-in DIIT, 2008. – Page 38-46.

OPTIMIZATION OF TECHNOLOGY OF TRANSPORTATION OF PASSENGERS IN LARGE CITIES USING MATHEMATICAL MODELING

Yanovski P.[1], Nesterenko H.[2], Ozerova O.[2]

[1]Kyiv National aviation university

[2]Dnipropetrovsk National University of Railway Transport

Transport infrastructure is one of the most important infrastructures, ensuring the life of cities and regions. In the last decade in many major cities have been exhausted or close to exhaustion possibilities of extensive development of transport networks. Therefore, special attention is acquiring the optimal network planning, traffic flow improvements, optimization of systems of public transport routes. The solution of such problems is impos-

sible without mathematical modeling of transport networks. The main task of mathematical models – identify and forecast all parameters of functioning of the transport network, such as traffic on all network elements, the traffic volume in public transport, average speed, delay and loss of time.

The mathematical model adopted for the analysis of transport networks, significantly different problems solved, mathematical apparatus, according to the used level of detail of the description of motion. Therefore, it is not supposed possible to give a complete classification of these models. Relying on functional role models, that is, those tasks for which they are accepted divided into three main classes: predictive models, simulation models, optimization models.

Forecast model flows and simulation models set themselves adequate playback of transport streams. There is a greater number of models designed to optimize functioning of transport networks. In this class of models solved the problem of optimization of routes of passenger transport, an optimal network configuration. Methods of optimization of transport networks represent a significant area of research that is beyond the scope of this review.

The choice of technological problems, subjective, and primarily associated is associated with the release of new scientific tasks, solution of which can provide improved process control of passenger traffic, which will increase the efficiency of the industry. One of the challenges for improving technologies of transportation process is the creation of models (system models) the process of transporting passengers to major nodes. The most important conditions of the modern stage of development of methods of management is the increasing knowledge-intensity and complexity of problems that require solutions.

Information level simulation is the most time-consuming, and it describes the possibility of solving problems on different levels. At the same time, models and methods of the upper levels (economic analysis, planning, management, etc.) to form and evaluate problems arising in the organization and implementation of transportation processes. Development and creation of multilevel system of models for the transportation process is a complex and urgent scientific and technical problem in the field of urban passenger transport.

The structure of the system models control the process of transportation of railway transport is multi-layered and can be represented as follows: information-analytical representation of the transportation process (monitoring of the functioning processes of passenger transport); economic models of transportation process; mathematical modeling of the carriage of passengers; the model to represent the socio-economic needs of the people in the carriage (assessment of the efficiency of rail transport). The list of problems

of mathematical and information modeling to improve the technology of process of transportation of passengers in cities renewed through the high complexity and magnitude of these processes and the growth of requirements to quality management.

The peculiarity of the tasks of improving the technology of process of transportation of passengers in cities is the need of the formation of dynamic models for estimating the time of use of public transport. Analyzing some economic appearances can be distinguished system of operation which meet the mass random flow requests of the same type of action (for maintenance). Such systems are called queueing systems.

In the middle of characteristics, which are investigated in queueing systems are of particular importance to the characteristics of the incoming stream of requests (service calls); the characteristics of the system that serves the requirements coming from which is often called the service mechanism (for example, the structure of the maintenance mechanism, the duration of the individual maintenance requirements of certain elements of the mechanism); the adopted service requirements or the service discipline.

References:

1. Sklozub V.V. Procedury mnogokriterial'noj optimizacii v zadachah s sovokupno protivorechivymi kriterijami // Algoritmizacija reshenija zadach optimal'nogo proektirovanija: Sb. nauch. tr. / AN Ukrainy. In-t kibernetiki im. V.M. Glushkova. – K.: 1997. S. 53–56.
2. Bek N.N., Golenko D.I. Statisticheskie metody optimizacii v jekonomicheskih issledovanijah. – M.: 1971. s.135.
3. Janovs'kij P.O. Pasazhirs'ki perevezennja / P.O. Janovs'kij – K.: NAU, 2012. – 436 s.

THE EFFECTIVENESS OF COMBINED STORAGE OF ELECTRICAL ENERGY ON SHUNTING LOCOMOTIVES

Yarovoy R.

Ukrainian State University of Railway Transport

To determine the energy efficiency of the combined energy storage during operation of the locomotive CHME3 shunting work was the development of simulation model for a given mode of operation locomotive to determine the required power of the heat engine and to estimate the value of fuel savings resulting from the use of energy storage.

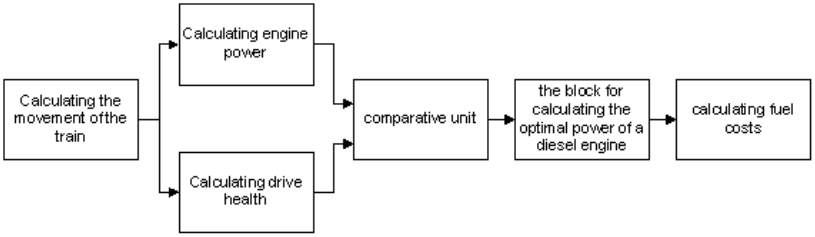


Fig. 1. Structural scheme for calculation of efficiency of use of energy storage

Scheme of mathematical models for calculation of efficiency is shown in Fig. 1. It presents six blocks.

In the first block is calculated tractive power of the locomotive on the rim of the wheel pairs according to the known dependency of the velocity from the path and tractive (braking) performance, or a given mode of reference of the train (position controller, the position of the brake valve driver).

The second block is used to determine engine power, which takes into account losses in the power transmission and the power consumption for K-pain load.

A third block determining the drive status (degree of charge, stored energy).

The compare unit is used to adapt parameters of the energy Ministers of all components of the power plant of the locomotive. This block contains all the constraints on the parameters of engines and energy storage. Depending on the power at the wheel rim and their condition (degree of dawn-genest) drive, or collects or releases energy.

Next is optimization of modes of power set key of the locomotive at a minimum fuel consumption, which is carried out in the block selection of the optimal power diesel and modes of its work. This unit is associated with a block definition consumption fell Islands, which use-able analytical relationships you waste fuel from the power and frequency of rotation of the motor shaft.

The method of the gradient determines the optimal charge level of the drive before leaving the train at the station. In the analytical models, the optimal values of the power of a diesel engine, not the bypass for charge storage in the partial modes of traction, coasting and regenerative braking.

In the simulation with the experimental da-regimes work of the locomotive is selected the working position of the controller that provides the minimum fuel consumption for the trip in comparison with other modes taking into account the possibility of charge storage in the recovery mode.

The study of the modes of operation of the diesel storage ene-l models allowed us to determine the energy efficiency of the wreck operativnih power plants and to assess the economic effect of their implementation.

Thus, the combined use of energy storage in the power circuit shunting locomotive allows you to reduce costs of fuel for shunting work

References:

1. Krasnyanskaya S. N. Investigation of electric brakes with the aim of increasing efficiency and of exploitation of operational reliability of locomotives: author's abstract of dis. kand. tech. Sciences./ S. N. Krasnyanskaya, M.:engineering, 1979. – 26 S.
2. Kazantsev V. P. the Choice of optimum capacity shunting locomotive to work on the hood in ongoing operating conditions and future prospects [Text]: dis. ... Ph. D. / V. P. Kazantsev. – M:1966. – 156s anchor.
3. Goncharov N. E. Shunting work on railway transport [Text] / N. E. Goncharov, V. P. Ka-tancev – M.: Transport, 1978. – 183 S.
4. Nicely S. O. Improving the efficiency of the locomotives in the application of energy storage in the power circuit [Text]: dis. ... Ph. D.: spec. 05.22.07 – dvojnoj of Railways, traction of trains and electrification of the S. O. Nicely. – M.: Moscow state railway University, 2011. – 167 p
5. Losev E. P. Efficiency of use of energy storage in power plants of Autonomous Loco-motives [Text] : dis. ... Ph. D. : spec. 05.22.07 – dvojnoj of Railways and deadlifts train / E. P. Lo-SEV. – M.: Moscow state railway University, 2000. – 211c.
6. Kossov, E. E. influence of the effectiveness of energy storage to fuel efficiency of locomotive E. E. Kossov, V. A. Azarenko, A. N. Kornev, M. Komarnicki // Locomotivity. – Kharkiv:Tekhnostandart. No. 3, 2008. – S. 44 – 45.
7. Golubenko A. Energy of diesel locomotive's elec-trodynamic braking for increase of efficiency of diesel locomotive engines / A. Golubenko, V. Mogila, Nozhenko H. // Coll. of scientific labours. - 2007. – Issue 69. – P. 147 - 153

DEVELOPMENT OF INFORMATION SYSTEM CONCEPT FOR MONITORING THE MOVEMENT OF PUBLIC TRANSPORT

Drevetskyy V., Klepach M.

National University of Water and Natural Resources

At present, the provision of public transport services in most cases do not meet the requirements of today. This applies both to the comfort of the vehicle and charting his movements. The lack of controls and account-

ing of passenger flow and therefore leads to costs that the price does not always meet the quality of service.

The developed concept includes the following components. The first is - special devices - GPS-trackers installed on transport and track the coordinates of the vehicle and transmit them via GSM / GPRS cellular network to the cloud server. Such devices can be supplemented with additional modules for reading electronic tickets, electronic payment for transit through bank cards or mobile phones.

The second part - "smart stop", i.e. public transport equipped with complex technical equipment. Such stops may have a separate closet in crowded areas and transport, or installed separately terminals. Regardless of the method of execution, electronic components must be compatible to facilitate unification of equipment and services.

Thus, electronic components stops terminals must fulfill the following functions. First of all, a reflection of rapid and timely information about the arrival of public transport. Useful additions can be Wi-Fi access points to the Internet, the availability of slots for USB with high reliability and protection against short-circuit for charging mobile devices. In the case of the use of electronic ticket - printing terminals and calculation. Additional devices that provide revenues and in part will seek funds to operate advertising modules can be in the form of traveling bands, in the case of terminals or electronic banner to a complete stop. An important and necessary is a subsystem protection and warning against unauthorized access. The presence of cameras that support modern P2P protocol will enable monitoring of public transport routes holders, providing information to the public and will provide an opportunity to reduce the crime situation in the city by connecting to dispatchers and police information centers.

A key component of the concept is a specialized server software. Its main task is to intake information from trackers, calculate approximate arrival time route vehicle and transfer this information to the appropriate terminals stops and display this information in mobile applications and search for maps and information systems. When using the electronic ticket server software and perform computational functions, or act as a "mediator" between the client and the bank. In addition, electronic data processing enables rapid processing and issuing them in a convenient way for both government organizations and owners routes.

Thus developed the concept solves some important problems at present transportation systems and management of settlements passenger traffic.

OPTIMIZATION OF TRANSPORT SERVICES FOR INDUSTRIAL ENTERPRISES

Bekh P.
Dnipropetrovsk National University of Railway Transport named after academician V. Lazaryan

Creation of the powerful long-range jet of car traffic volume is comparable to the emergence of large rivers that are gaining its power from furrows, which, in turn, are fed from many sources. As the numbers and capacities of these sources are important for river, as an organization of working with enterprises, served by rail (not only for mass transportation) is important for car traffic jets.

In addition, to provide its services to enterprises, railways need also to profit from their activities.

The dependence of the number of supplies per day from their cost and the dependence of the railway car-hours of lay-over time (while waiting for supply) from the number of delivers have been researching by the authors.

If K – the number of rail cars per day, and E – the earnings of railway, then the selection of the optimal option is reduced to the most simple tabular form in Table1

Table 1

The selection of the optimal number of delivered railway cars

K	1	2	3	4	5
E	*y*	*z*	*x*	*a*	*b*

Railway profit can be calculated by the formula:

$$E = C_1 - C_2 \quad (1)$$

C_1 is defined by the formula:

$$C_1 = (D - C_{sp})K, \quad (2)$$

On condition that $D > C_{sp}$,

where *D* – the tariff or contractual fee for one supply to the enterprise,

Csp – the cost of delivery, maintenance of the staff, infrastructure, etc.

The definition of C_2 is shown in the formula:

$$C_2 = nt\,C_{rc-hr} \quad (3)$$

where *Crc-hour*, - flow rate per 1 railway car-hour, *n* – daily or weekly number of cars on arrival, which is predicted from the data of ACK BP UZ-E, *t* – the time of lay-over of the railway cars at the station, waiting on being supplied.

Calculate and accomplish all railway cars supplies to coincide it with the beginning of their arrival time in trains is practically impossible. If we assume that the railway cars supply to industrial enterprises is conducted with an average interval I_{avg}, then the time of arrival of cars at the station as an event, regardless of supplying schedule, can happen at any time, ie the average idle time of the railway car supply to the station can be taken as approximately half of the interval between supplies. Then *t* can be calculated by formula:

$$t = \frac{24}{2K} = \frac{12}{K} \tag{4}$$

From here:

$$E = \frac{(D - C_{sp})K - 12nC_{rc-hr}}{K} \tag{5}$$

Limitations on the number of locomotives, customers served by one station, where K_i and t_i are the amount and the duration of the supplies to the enterprise, are entered with the following formula:

$$K_1 t_1 + K_2 t_2 + \cdots + K_i t_i \leq (24 - t_{tech}) M_{man} \tag{6}$$

In formula (5) D_i and $C_{sp.i}$ are entered in accordance.

Considering of the leased and own railway cars is proposed to be counted by making changes to the formula (3):

$$C_2 = (n - n_{own}) t_{uz} C_{rc-hr} \tag{7}$$

Refernces:

1. Bekh, P.V. The ways to improve the competitiveness of rail transport in modern conditions. /P. V. Bekh, G. I. Nesterenko, S. I. Muzikina, S. V. Lashkov, M. I. Muzikin// Science and transport progress. Bulletin of Dnipropetrovsk National University of Railway Transpot, 2015, № 5 (59). - P. 25-39
2. Yanovskiy P.O. The role of marketing in cargo transport service // Collection of scientific works of Kiev University of Economics and Technology of Transport. – Edit. 5. – K.: KUETT. – 2004. – P. 125-129.

Theses
of international scientific conference
“Globalization of scientific and educational space. Innovations of transport. Problems, experience, prospects”

Responsible for release	N. Chernetska-Biletska
Layout	A. Shvornikova

Materials published in author's edition

Signed for printing 31.03.17
Format 148x210mm. Offset Paper. Headset Times.
Offset. conventional printed sheets 12,4
Circulation 100 copies. Price free

Printed in private enterprise "Polygraph-Service"
The certificate of registration series AOO №049269
93406, Severodonetsk, Prospect Gvardeysky,30
tel.: (0645) 70-14-41, (095) 850-61-53
e-mail: poligrafsdlk@ukr.net

Severodonetsk 2017