

Editorial board

Editor-in-chief: Prof. Yu. P. Pokholkov, President of Association for Engineering Education of Russia, Head of Organization and Technology of Higher Professional Education Department, National Research Tomsk Polytechnic University.

Managing Secretary: Prof. B.L. Agranovich, Director, West-Siberian Regional Center of Social and Information Technology.

Editorial Board:

Prof. M.P. Fedorov Rector, St. Petersburg State Engineering University G.A. Mesjats, Vice-President, Russian Academy of Science (RAS) Director, Physical Institute n.a. P.N. Lebedeva Member, RAS (Moscow)

G.A. Mesyats Vice-President of the Russian Academy of Science, Director of RAS Lebedev Physical Institute (Moscow), RAS Full Member

Prof. S.A. Podlesni Vice-Rector, Siberian Federal University

V.M. Prikhod'ko Rector, Moscow Automobile -Road State Engineering University (MARU) Corresponding Member, RAS

Prof. D.V. Puzankov Department Head, St. Petersburg State Electro-Engineering University

A.S. Sigov Rector, Moscow State University in Radio Engineering, Electronics and Automatics (Engineering University) Member, RAS

Prof. U.S. Karabasov President, Moscow State Institute of Steel and Alloys (Engineering University) Deputy, Committee in Education, State Council of Federal Assembly RF

Prof. N.V. Pustovoy Rector, Novosibirsk State Engineering University

I.B. Fedorov President, Moscow State Engineering University n.a. N.E. Bayman President, Engineering University Association Academician, RAS

Prof. P.S. Chubik Rector, National Research Tomsk Polytechnic University Member, Public Chamber RF

Prof. A.L. Shestakov Rector, South-Uralsk State University



DEAR READERS!

In December 2012 the Russian Conference “Approaches to Reshaping the National Engineering Education Doctrine in Russia” was held in Tomsk. There were more than 200 delegates from different professional, academic and public spheres, including academia communities, rectors and vice-rectors of various engineering institutions, students, post-graduates, employers of enterprises and representatives of various federal/regional legislative and executive branches. Including amongst others: A.Ch. Erkenov, State Duma Deputy of the RF, Member of State Duma Committee of RF in Education; L. M. Ogorodova, State Duma Deputy of the RF, Deputy Chairwoman of State Duma Committee of the RF in Science and High-Technology; V.M. Kress, Deputy Chairman of Federation Council Committee in Science, Education, Culture and Communication Policy; and O.V. Kozlovskaya, Chairwoman of Legislative Duma, Tomsk Oblast. There were also representatives of 23 universities from 16 constituent entities of the Russian Federation. Numerous prominent international experts in engineering education also participated in this Conference: France – Rene-François Bernard, CEO of European Engineering Education Quality Assurance Network in the field of industry; Taiwan – Andrew Woo, Professor of Taipei University, and Vice-president of Global Alliance in Accreditation of Engineering Education Programs “Washington Agreement”.

To provide introductory concepts on the National Engineering Education Doctrine development, its form and content, the additional issue “Engineering Education” (№10, 2012) (prior to Conference opening date), was published in for all interested delegates. This document embraced the opinions of different representatives of engineering and academia communities concerning those processes in the reshaping of the National Engineering Education Doctrine in Russia. With a view of this, the Conference discussion session was mission-focused and constructive.

The discussion issue of the day in two plenary sessions and six panel discussions embraced the problems of specialist quality training in engineering and technology and the status of engineering education

both in Russia and abroad. Many delegates in their presentations highlighted the necessity of developing and implementing a “National Doctrine of engineering education in Russia”, i.e. a fundamental document determining the strategy and tactics of engineering education development pertinent to the current environmental challenges. The following questions were also issued: form and content of engineering education, shaping future engineers’ competency attributes throughout the learning of general engineering and professional core courses.

The priority question at the Conference was the so-called “comprehensive approach”, the application of which is significant not only in shaping the National Engineering Education Doctrine in Russia, but also in designing up-dated engineering education programs. Delegates emphasized the lagging in Russian engineering education to that of today’s development of engineering and technology. One of the main factors is that no engineering program course shapes the future engineer’s competencies in applied systems analysis, systematology and system engineering which results in the possible decline of student independent learning skills in system analysis and synthesis. This fact was outlined in the report of one of the most recognized world experts in applied systems analysis, professor of Tomsk State University, F.P. Tarasenko, whose article is being published in this issue.

This current journal “Engineering Education” includes proceedings papers, as well as, informative abstracts, either presented or sent to the Conference. As a result “Recommendations of the Conference” are published in this issue.

Editorial Board trust that all the articles published in this issue not only embrace those ideas and suggestions that would improve the quality training of Russian specialist in engineering and technology, but also would become that impulse in furthering the research development in updating domestic engineering education.

Editor -in-Chief
President of Russian Association of
Engineering Education
Professor Yu. P. Pokholkov

Contents

<i>Editor's letter</i>	2		
<hr/>			
ENGINEERING EDUCATION CONTENT AND EDUCATIONAL TECHNOLOGIES NEW-TYPE INDUSTRIALIZATION			
<hr/>			
Systemacity as a leverage point for Engineering Education Reformation F. P. Tarasenko	4		
<hr/>			
Engineering Education Concept in Modern Russia (Philosophic, Scientific and Pedagogical Aspects) N.P. Kirilov	8		
<hr/>			
Engineering Education and Engineering in Russia: Problems and Solutions L.M. Ogorodova, V.M. Kress, Yu.P. Pokholkov	16		
<hr/>			
Engineering Master's Graduates as Future Managers in New Economy I.E. Nikulina	22		
<hr/>			
Design and Evaluation of Engineering Curricula Learning Outcomes A.I. Chuchalin, Ye.A. Muratova, A.V. Yepikhin	28		
<hr/>			
IMPROVING ENGINEERING EDUCATIONAL PROGRAMS			
<hr/>			
Competence Approach and FSEP of the Third Generation A.V. Lagerev, V.I. Popkov, O.A. Gorlenko	34		
<hr/>			
Block-Modular Curriculum as a Tool of Prompt Reaction of HPE at Changes in an Employer's Requirements V.V. Yel'tsov, A.V. Skripachev	40		
<hr/>			
Competence-based System of Pedagogical Professionalism Development of Teachers in Engineering Universities M. Minin, E. Belomestnova, V. Pakanova	46		
<hr/>			
		Towards the Improvement of IT Education Programs S.M. Verteshev, Y.V. Bruttan, I.V. Antonov	52
<hr/>			
		TRAINING PECULIARITIES IN DIVERSE ENGINEERING PROGRAMS	
<hr/>			
		Innovative Business Safety Specialists Training According to Newly Developed Doctrine of Engineering Education in Russia A.P. Sterkhov	56
<hr/>			
		Specialist Training and Retraining in Building Reconstruction V.S. Plevkov, I.V. Baldin, D.G. Utkin	60
<hr/>			
		Third generation Federal State Educational Standards Requirements to Student Research Work V.N. Federov	64
<hr/>			
		Role and Place of the Course «Theoretical Mechanics» in Training of a Contemporary Mechanical Engineer A.K. Tomilin	68
<hr/>			
		SUMMARY Proceedings of All-Russian Scientific and Practical Conference "Approaches to Development of the National Doctrine of Engineering Education of Russia in the New Industrialization" (December 4 – 6, 2012 Tomsk Polytechnic University)	71
<hr/>			
		RECOMMENDATIONS All-Russian Scientific and Practical Conference "Approaches to Development of the National Doctrine of Engineering Education of Russia in the New Industrialization" (4 - 6 December 2012, Tomsk)	79
<hr/>			
		Our Authors	84
<hr/>			
		Summary	88
<hr/>			
		List of AEER Accredited Programmes	92