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DEAR READERS,

**THE ISSUE OF JOURNAL
“ENGINEERING EDUCATION” IN
FRONT OF YOU IS DEDICATED
TO THE EDUCATION QUALITY
OF SPECIALISTS WITH HIGHER
EDUCATION DEGREE IN THE
FIELD OF ENGINEERING AND
TECHNOLOGY WITHIN NEW-TYPE
INDUSTRIALIZATION.**

Technological modernization of Russia, the need for which was announced in many stump speeches, is impossible without highly skilled engineering staff. Today, engineering training in higher education institutions should be run taking into account current state-of-art characterized by a loss of Russia its advanced position in the world in many technical areas. Requirements to graduates from engineering educational programs must be substantially modified. University graduates in engineering are expected not only to have a range of professional competences, but also to be able to apply these competencies for real practice, be able to formulate and solve engineering problems. They are required understanding of business processes, ability to effectively use systematic approach for solving problems, ability to work as a team member and team leader, ability to take responsibility for decisions. They are required to be highly-motivated and competitive in their professional field.

Graduates of engineering programs especially need all these qualities within new-type industrialization, which essence was described by V. Putin in his article “We need a new economy”, when formulation and solution of engineering problems should lead to the development of new industries. Finding own “competitive niche” in the existing global markets, creating markets of new products, winning the global competition all these steps should lead to the development of new Russian

brands and, ultimately, to the definition of Russia’s place in the global division of labor.

After transition of Russian higher education system to a two-tier degree structure, Bachelors and Masters have become the basis of engineering staff. Academic staff of technical universities, teams of university managers, organizers of higher education at the regional and federal level concentrates their efforts to ensure students’ training for real engineering practice.

Familiar to many Russian people system of training when graduate of a technical university or faculty was qualified “engineer” and in accordance with the job description and company schedule of positions and salaries, was enlisted as an engineer, moved to the past. One can be glad or regret it, but the reality is that, in accordance with the principles of the Bologna Declaration also signed by Russia, the fact of transition from university training with awarding qualification “engineer” to training with Bachelor and Master degrees took place. Graduating student who was awarded an engineering degree, of course, was not an engineer in the full sense of this term, but after a year or two, based on the acquired at university knowledge, gained experience and got the opportunity to apply his or her engineering skills. Approximately after five years many of them became real engineers.

The System of Certification of engineering qualifications that exists for a dozen of years in many countries, in fact, resembles the above described system of becoming engineer in Russia. The only difference is that engineers in these countries after graduating from university continued working in their professional field and demonstrated their ability to solve real engineering problems. And in our case, an engineering degree just permitted to get certain engineering positions or any position in general that needed higher

education degree, but did not require solving engineering problems. Many of them were able to retain qualified engineers for the whole their life without real engineering practice for a single day, however being enlisted in the engineering staff of the country.

We used to think that Russian engineers were among the best in the world. And now, in the context of globalization and competitive environment, our educational system has to prove that the quality of Russian bachelors and masters will help to form engineering staff of the country able to provide Russia a leading position in the world in the field of engineering and technology.

Study of employers opinion in the level of training in the field of engineering and technology shows that the quality of graduates training often does not meet their requirements.

In particular, the list of disadvantages of engineering learning outcomes includes the following: lack of necessary teamwork skills, lack of key business process awareness and ignorance of the Russian business environment in general, inability to apply systematic approach, extremely low efficiency and performance of engineering work.

Graduates of engineering programs lack knowledge and skills in the use of high-performance integrated computer network design (CALS-technologies). They do not know the methods of nonlinear physics and nonlinear dynamics of complex systems (synergy), fractal concepts.

They often lack skills in business communication and negotiation, presentation and language skills are poor developed. Young specialists lack professional skills, knowledge of laws and methods of Theory of Inventive Problem Solving, motivation, focus on professional development and career advancement, ability to present themselves and the results of their work

in professional sphere.

At the same time, employers note overestimated requirements and ambitions of graduates that do not match the level of their training, the failure to adequately assess their value in the labor market.

It is important to make review and analysis of engineering educational programs content and educational technologies regarding graduates' disadvantages listed by employers when planning and carrying out work to improve the training of specialists in the field of engineering and technology. At least today, this analysis shows that universities do not teach future engineers in accordance with employers' expectations within new-type industrialization.

Quality Assurance of Engineering Education suggests close cooperation of universities with leading companies and research institutions. This cooperation is required at all stages of training, including the design of educational programs using a competency approach, the organization of problem-based and project-organized learning process, block-module curriculum, providing a large amount of independent students' work to solve real industrial problems, graduates' career support .

In this issue of the journal "Engineering Education" the authors of the published articles share their views on how to improve the training of future engineers at universities within new-type industrialization.

Sincerely,
Editor-in-Chief,
Prof. Yury Pokholkov

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