

International Engineering Alliance Congress

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Report of Association of Engineering Education in Russia on participation in International Engineering Alliance Congress, 2013. The major achievement of the Association of Engineering Education in (AEER) was its initiation as a provisional member of the International Agreement in professional engineer certification (IPEA). Besides, AEER discussed the formulation of accreditation criteria for programs of secondary vocational education and engineering Bachelor degree.



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Regular International Engineering Alliance Congress (International Engineering Alliance, IEA) was held in Seoul (Republic of Korea) from June 16–21, 2013, where a delegation of Russian Association of Engineering Education (AEER) participated.

International Engineering Alliance, IEA embraces public-professional organizations involved in the problems of engineering education quality and promotion of specialist qualification in engineering and technology within world leading countries [1]. These organizations in IEA include representatives of real economy employers, members of engineering communities, scientists and university instructors. In this case, such public-professional organizations represent the interests of different parties in a balanced way and define objectively development tendencies of technical education and engineering profession

including those factors that influence the scientific and technological progress.

The IEA structure includes those organizations that train professional engineers and technologists in accordance with competency requirements (International Professional Engineers Agreement / IPEA, APEC Engineers Agreement, International Engineering Technologists Agreement / ETA), and organizations elaborating relevant standards of engineering education in universities and colleges (Washington Accord, Sydney Accord, Dublin Accord). Based on approved requirements for specialist competencies, indicated organizations develop and apply the criteria and procedures for international certification of Professional Engineers, Engineering Technicians and Engineering Technologists, as well as, accreditation of specialist programs in universities and colleges.

Consistency of international standards of different specialist training levels in engineering and technology and competency requirements for professional engineers, technicians and technologists is a significant factor in improving not only the engineering education, engineering, production technology development but also, in the long run, the economy of IEA country-participants (USA, Great Britain, Canada, Japan and others).

AEER, member of APEC Engineers Agreement (from 2010), full member of Washington Accord (from 2012) and provisional member of IPEA (from 2013), is the representative of Russia within the International Engineering Alliance. Russian Association of Engineering Education, developing the national public-professional system of university education program accreditation in engineering and technology for the last 10 years and modeling the potential background for the certification and licensure system of professional engineers, coordinates and finalizes all criteria and procedures with the international IEA organization partners [2].

Within the framework of the IEA Congress, plenary sessions and workshops embraced the issues associated with management planning of the International Engineering Alliance it-self, changes in its structure and IEA Charter and discussions involving different important problems in engineering education and engineering profession. In particular, the updating of one of the basic documents - IEA Graduate Attributes and Professional Competencies. This document defines the requirements for university and college graduate learning outcomes of engineering programs, accredited within the framework of Washington Accord, Sydney Accord and Dublin Accord, as well as, those competency requirements for professional engineers and technologists striving for professional recognition through certification and licensure programs in accordance to international standards IPEA, APEC

Engineers Agreement and IETA, respectively.

Executive sessions of IEA organization partners were also held. Reports of different organization members describing their 2-year work after the previous Congress (IEA Congress in Taipei, 2011) were heard and discussed, as well as, other numerous issues including the election of new organization members.

At the executive session of International Accord in professional engineer certification IPEA (before 2013-Engineers Mobility Forum), Russian Association of Engineering Education was granted the status of a provisional member. The partners of this Accord, formulating the international standards of professional engineer competencies, are NCEES (USA), Engineers Canada (Canada), ECUK (Great Britain), IPEJ (Japan), KPEA (South Korea) and professional engineer organizations from 15 other countries. It was IPEJ (Japan) and KPEA (South Korea) that nominated AEER as a provisional member in IEA. The accession of AEER to the IPEA significantly broadens the international recognition of Russian engineer-specialist qualification and enhanced their competencies throughout the world.

IPEA standards, in many aspects, are analogous to the requirements stated in APEC Engineers Agreement, which, in its turn, are applicable within the framework of Asia-Pacific Economic Cooperation (APEC). Russian Association of Engineering Education is a member of the APEC Engineers Agreement from 2010 and in cooperation with Russian Alliance of Scientific and Engineering Associations is engaged in the implementation of national certification and licensure system of professional engineers, supported by Ministry of Education and Science RF, Federal Education and Science Supervision Agency, RF Chamber of Commerce and Industry, Association of Technical Universities (ATU), State Duma RF, Strategic Initiative Agency (SIA) and other organizations [3]. In 2010 the Russian Monitoring Committee of

Professional Engineers was established to provide and award the rank "APEC Engineer" through registration where appropriate (both Russian and international licensing). AEER experts have developed the normative framework applicable in evaluating the competencies of Russian engineers who work in different professional areas.

The first Certification Center supported by Russian Alliance of Scientific and Engineering Associations (RASEA) and AEER was established in 2010 within National Research Tomsk Polytechnic University (TPU). In 2012-2013 more than 200 applicant requests in pursuing registration as "APEC Engineer", including 9 enterprise-organization applicants from Russia and Kazakhstan were submitted to the Center of International Certification of Engineering Education and Engineering Profession, TPU.

A candidate interested in pursuing registration and certification is encouraged to check the criteria maintained by APEC Engineers Agreement and IPEA and should:

- be a university graduate of accredited engineering program;
- have the right to conduct individual engineering practice;
- have at least 7- year work experience after graduation;
- have at least 2-year executive experience in the implementation of an important engineering project;
- demonstrate a continuous improvement of one's professional qualification;
- show commitment to the understanding of the professional ethic Code.

More than 80 engineers have successfully passed and have been registered in the international register "APEC Engineer" (<http://www.ieagreements.org>). The distribution of certified engineers in different professional areas is shown in Fig. 1.

In 2012 Expert Council of Strategic Initiative Agency (SIA) approved

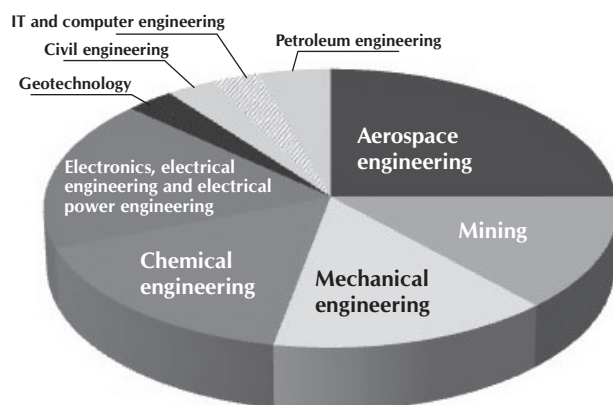
the following project "Network of International Engineering Education Accreditation and Engineering Qualification Certification Center" (ID 2012-1363). This Council initiated the Project development of certification centers in the Federal Districts of the Russian Federation within the regional structures of Russian employer organizations - Union of Industrialists and Entrepreneurs (RUIE) and Chamber of Commerce and Industry (CCI).

To monitor the national certification and registration system of professional engineers, in April, 2013 the unified Russian Monitoring Committee of Professional Engineers, being integrated into the international structures FEANI, IPEA and APEC Engineers Agreement, was established. The Committee includes representatives of organizations (RASEA, AEER, CCI, RUIE, ATU, National Fund of Personnel Training (NFPT), SIA), governmental organizations (Ministry of Education and Science RF, Federal Education and Science Supervision Agency, Federal Council RF), enterprises and businesses (Rosatom, Rosnano, Pharm-Cluster, , UAC-United Aircraft Consortium and other companies).

To provide operative functioning of regional certification centers throughout the entities of the Russian Federation, the Russian Monitoring Committee of Professional Engineers developed and approved relevant information-methodological resources.

The following supporting documents include [4]:

- Provision of Russian Monitoring Committee of Professional Engineers.
- Standard of Professional Engineers.
- Code of Professional Engineers.
- List of universal, professional and focused competencies for individual professional engineering practice in this or that area of specialization.
- Provision of evaluation procedure for engineering practice results in accordance with Standard of Professional Engineers.

Fig. 1. Distribution of Certified Engineers in Different Professional Areas


- Provision of examination procedure for evaluation of competencies of individual professional engineering practice in this or that area of specialization within the framework of Standard of Professional Engineers.
- Provision of suspension and cancellation of registration in the Russian register of professional engineers.
- Provision of continuous qualification improvement and enhancement of professional engineering competencies.
- Provision of Certification Council.
- Provision of Appeals Commission.
- Provision of Training Institute of Professional Engineers.
- Standard regulations for Certification Center.
- Standard instructions for employees of Certification Center.
- List of specialization areas of individual professional engineering practice for certification and registration of professional engineers in Russia.
- Retaining “engineer” title and strengthening his/her recognition in conditions of higher education level-system (Bachelor-Master).
- Improving domestic engineering education in accordance with world standards, promoting continuous qualification improvement system for professional engineers.
- Training specialists in engineering and technology with international qualification recognition.
- Enhancing the global competitiveness of national economy through the development of competencies of engineer corps.

The development of the national certification and registration system of professional engineers, being integrated into the international structures FEANI, IPEA and APEC Engineers Agreement, implement the following targets:

Russian Association of Engineering Education submitted a report to the Washington Accord session. This report included the details of its activities in the development of the national public-professional accreditation system for university education programs in engineering and technology, as well as, Gap Analysis in accordance to the accreditation requirements-Criterion 5 of AEER “Professional Training” and requirements of International Engineering Alliance “Graduate Attributes and Professional Competencies”.

At the Dublin Accord session AEER representatives discussed the formulation of public-professional accreditation criteria for programs of

secondary vocational education in technical specialties relevant to IEA Graduate Attributes and Professional Competencies, as well as, Dublin Accord requirements. AEER achieved a collaboration agreement with ECUK (Great Britain) and Engineers Ireland (Ireland) on the development of accreditation system for programs of secondary vocational education in Russian colleges and technical schools and request preparation of AEER accession to Dublin Accord in 2014.

Russian Association of Engineering Education has also developed quality assessment criteria for bachelor engineering degree programs relevant to IEA Graduate Attributes and Professional Competencies, as well as, Sydney Accord. In prospect, AEER plans to implement public-professional accreditation of engineering bachelor degree programs in Russian universities and accession to Sydney Accord.

Planned activities of AEER in the sphere of public-professional accreditation of secondary vocational education and engineering bachelor degree programs in accordance to Dublin

Accord and Sydney Accord, respectively, would provide the conditions to develop the national certification system of technicians and technologists in accordance to international standards Engineering Technicians и Engineering Technologists.

Interested parties in the establishment and development of national certification system and registration are graduates of technical universities and colleges (improve their competencies, qualification, competitiveness and mobility on the labor market), enterprises (enhance their human resources, expand production potential, advance competitiveness in the country and abroad), technical universities and colleges (improve graduate training quality in future professional engineering practice and enhance recognition of the education institution itself) and the country (deepen the international economic integration, increase the global competitiveness under conditions of accession to WTO).

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