

# International Innovative Mining Symposium at T.F. Gorbachev Kuzbass State Technical University: to the global "Think Tank" of mining science in Kuzbass

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**Abstract.** The transition to the sustainable development posed new challenges to the system of mining education, determined by the acceleration of scientific and technological progress and the widespread introduction of innovations, the convergence of technologies from various industries. Globalization and the rapid pace of technologies' development put forward constantly growing demands on the quality of the labor resources of mineral and raw materials complex, and constant growth of their qualifications. The accelerated innovative development of the mineral and raw materials complex carries new meanings of cooperation between mining universities, representatives of academic science, industrial enterprises and government bodies. The global expansion of the horizons of cooperation between raw materials universities of different countries is designed to accelerate the diffusion of innovation, the growth of labor productivity and safety, and increase the economic stability of extractive enterprises. The need for improving the social well-being of the population of extracting territories makes the discussion of humanization of mining engineering, the social responsibility of enterprises urgent. Such a broad understanding of mining development problems contributes the transformation of the regular International Mining Symposium center – T.F. Gorbachev Kuzbass State Technical University – into the "Think Tank" of Russian mining science.

## 1 Introduction

The creation of international platform for discussing the problems of innovative development of the mineral and raw materials complex reflects not only the process of globalization of extractive industries, processing of raw materials and mining machinery, but also training of innovative competences of mining engineers. That is why, finally, T.F. Gorbachev Kuzbass State Technical University (KuzSTU) was chosen as a place for permanent holding of the Innovative Mining Symposium.

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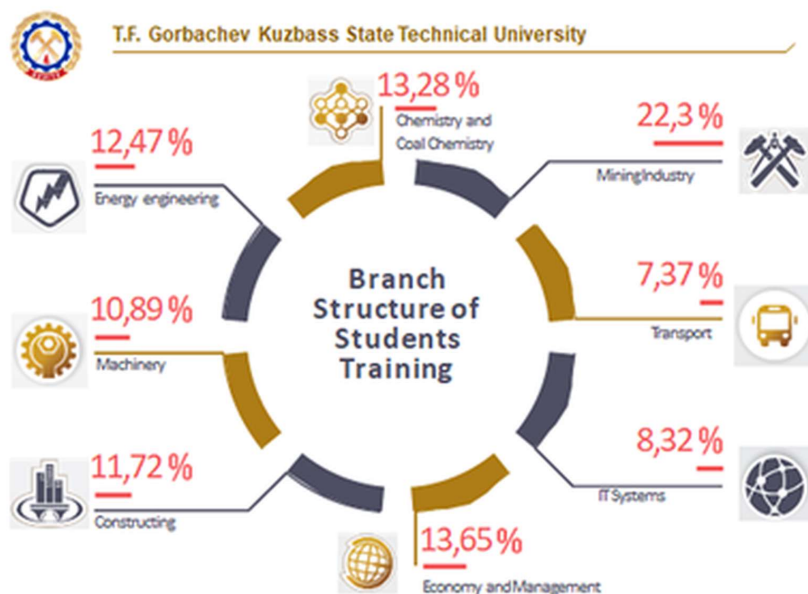
The relevance of the International Innovative Mining Symposium organized on the basis of T.F. Gorbachev Kuzbass State Technical University was long overdue. Innovative development of extractive industries requires a broad acquainting of future mining engineers at the stage of university training, as well as managers of enterprises and companies of the mineral and raw materials complex with the achievements of scientific and technical progress in mining business.

## 2 Materials and Methods

T.F. Gorbachev Kuzbass State Technical University is the only university in the region that provides multi-level training of highly qualified personnel for enterprises and companies:

- more than 100 bachelors and masters for power industry, almost completely covering its needs in the region;
- more than 1000 students on educational programs that provide engineering personnel for all manufacturing processes of engineering;
- more than 500 students are trained on educational programs that ensure the functioning and development of chemical industry enterprises, with the subsequent 100% employment;
- more than 200 mining engineers graduate annually, the experience of their training exceeds 60 years.

In close cooperation with SB RAS institutes, the University makes a significant contribution to the functioning of the technological platforms of the Russian Federation: "Technological platform of solid minerals", "Technologies of hydrocarbon production and use", "Deep processing of hydrocarbon resources". It is important that the platform interactions of the University are linked to the branch structure of engineering staff training (Figure 1).



**Fig.1.** The structure of training personnel at KuzSTU in 2017.

The sustainable development of mining region is impossible without the existing system of training highly qualified personnel on postgraduate and doctorate training programs at Kuzbass State Technical University ready to develop innovative competencies for future scientists.

The decision to organize the Innovative Mining Symposium on the basis of T.F. Gorbachev Kuzbass State Technical University was determined, on the one hand, by the unique scientific and production potential of the region, on the other – by the traditions and opportunities of the University in the educational market.

Developed infrastructure and a high level of teaching staff allow KuzSTU graduates to be in demand on the labor market, supplying the personnel for the largest industrial companies in Siberia and Russia (Siberian Coal Energy Company – SUEK, Kuzbassrazrezugol, Stroyservis, Siberian Business Union - SDS, Mechel Mining and so on).

At the same time, T.F. Gorbachev Kuzbass State Technical University cannot eliminate challenge, which technical universities involved in mining engineers' training will inevitably face in the first half of the 21st century: global inter-industry and interdisciplinary integration; development of geo-information technologies and unmanned mining of minerals; increasing the role of IT in training of future mining engineers; replacement of fossil fuels with synthetic ones; development of post-mining and ecosystem restoration [1].

It was these challenges that were used by the organizing committee in making the agenda for the I-st and II-nd Innovative Mining Symposiums, organized on the site of T.F. Gorbachev Kuzbass State Technical University in 2017 together with the partners: scientific (the Federal Research Center for Coal and Coal Chemistry of the Siberian Branch of the Russian Academy of Sciences, the Scientific Center VostNII on Industrial and Ecological Safety in Mining Industry), industrial (SUEK-Kuzbass, The Stroyservis group of companies), educational (Technical University of Košice, Slovak Republic, Shandong University of Science and Technology (China) [2].

## **3 Results and Discussion**

### **I International Innovative Mining Symposium "Innovative Technologies in Mining and Education" (in memory of Professor V.G. Pronoza)**

On April 24-26, 2017 the first Symposium was held at T.F. Gorbachev Kuzbass State Technical University. Its participants were the representatives of the leading universities of mineral and raw materials complex of the Russian Federation, Germany, Slovakia, Turkey, and Kenya – more than 60 members. The purpose of the First International Symposium "Innovative Technologies in Mining and Education" (in memory of Professor V.G. Pronoza) was the creation of a platform for international discussions of mining problems by the specialists, experts and researchers. The main issues on the Symposium agenda were the development of innovative technologies for extraction and processing of solid minerals, training of personnel meeting the current challenges which precede the mineral resource complex of resource-producing countries, training mining engineers' global competencies [3].

### **II International Innovative Mining Symposium (dedicated to the Year of Ecology in the Russian Federation)**

On November 20-22, 2017 the Second Symposium was held at T.F. Gorbachev Kuzbass State Technical University. It became a logical continuation of the first Symposium, bringing together 705 participants from 11 regions of the Russian Federation and foreign scientists from such countries as Germany, the Slovak Republic, Turkey, Kenya, Ethiopia, and Ukraine. The Symposium was held in the form of plenary session, thematic sections (9 sections) and round tables (2 round tables). Actual tasks aimed at improving the environmental performance of mining enterprises, requiring economically sound solutions that provide the

development of production in compliance with the requirements of environmental legislation were discussed at the Symposium.

A. A. Krechetov, Rector of KuzSTU, noted in his welcoming speech that the Second Symposium was intended to expand the existing relations of the University with the leading Russian and foreign mining centers, enterprises and companies of the mineral and raw materials complex, state representatives and scientific community (Fig. 2). Innovative development of mining and processing technologies, energy and mining machinery, ensuring industrial and environmental safety should serve the purpose of improving mining education. Today, the engineer's thinking should not only contain knowledge and skills in professional activity, but be based on the abilities of independent work, resourcefulness, ingenuity, creativity, responsibility, the ability to analyze, predict, explore. Special attention should be paid to the ability to discuss professional topics in a foreign language. Realization of the key tasks facing the mineral and raw materials sector of the Russian economy is inseparably linked with training of high-quality professional engineering personnel capable of ensuring innovative production development in all industries.



**Fig. 2.** Opening of the Second Innovative Mining Symposium, opening speech made by A. A. Krechetov (top left), Rector of Kuzbass State Technical University

The participants of the plenary session addressed the half-thousandth audience with words of welcome and outlined the main program areas of the Symposium: the horizons of innovative development of the mineral resource complex, the prospects for industrial safety and ecology in the coal industry, new standards for mining engineers' training, and prospects for social-and-economic development of resource regions.

### **III International Innovative Mining Symposium (October 2018)**

The Third Symposium should be a high-level scientific event, an effective tool that helps to identify and discuss problems of innovative development of geo-technology, mining machinery and equipment, power engineering, deep processing of minerals, improving labor safety

and environmental friendliness of mining and processing of minerals, economic development of commodity clusters.

At present, the issues of developing international cooperation of universities and stakeholders in the development of new power industry technologies, improving the safety of mining and processing, the growth of labor productivity and added value are urgent. Modern society raises requirements to the quality of research in the field of technogenic and environmental safety, the convergence of environmentally friendly technologies and green energy, and the social-and-economic development of national energy-resource clusters.

It is also important to discuss the development of continuous education system, which contributes to full integration of graduates into the international professional environment.

The systematic and complex nature of the problems discussed at the traditional Innovative Mining Symposium in Kuzbass requires the participation of leading scientists and experts in various fields of mining, energy, ecology, occupational safety, economy, as well as representatives of government bodies, leading Russian and foreign companies in the mineral and raw materials sector.

The commonality of the problems preceding the national mineral and raw materials complexes in the context of globalization presupposes the participation of representatives of countries specializing in the extraction and processing of mineral raw materials, energy, training of personnel for the basic industries, and the production of modern equipment.

## 4 Conclusion

Innovative modernization, increasing industrial and environmental safety, sustainable social-and-economic development of mining regions is a complex task of national importance. It predetermines the transformation of T.F. Gorbachev Kuzbass State Technical University in the "Think Tank" of mining science, initiating a systematic discussion, development and participation in the implementation of a number of priority measures:

- economically feasible and effective economic solutions that allow developing mining production taking into account compliance with the requirements of environmental legislation;
- qualitative training of professionally competent engineering personnel in the field of ecology and environmental measures that can provide innovative trends in the development of mining;
- creation and implementation of Russian innovative technologies that promote the development of mining in the country on the basis of its environmental efficiency;
- accelerated adjustment of foreign technologies in the sphere of mining and deep processing of minerals, creating conditions for their reproduction in Russian industry;
- integrating the efforts of representatives of mining science and industry from Russia and foreign countries to develop a university research and production cluster in Kuzbass – the center of training and implementing the engineering competencies.

The establishment of fully functional "Think Tank" on the basis of T.F. Gorbachev Kuzbass State Technical University within the framework of international cooperation and inclusive access to educational and scientific infrastructure, including scientific centers, laboratories, unique installations and instruments for fundamental and applied education are considered to be of great importance.

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