"Metallurgical Examination" Research Testing Laboratory

The Joint Institute of Science and Technology integrates resources of Peter the Great St. Petersburg Polytechnic University in order to launch innovations of the University's research groups into industry. The affiliate of the Joint Institute - Testing Center "Polytechtest" - holds broad authority to conduct mechanical testing, metallographic testing, and other types of tests of materials. For instance, Research Testing Laboratory "Metallurgical Examination" deals with developing standards to assess the quality of material structure, quality management systems for metal products; developing techniques to measure steel and alloy structure etc

The Head of the Laboratory Dr. A.A.Kazakov commented on its developments and achievements:

- Alexandr Anatolyevich, why is the "Metallurgical Examination" Laboratory so unique?

- It is unique because it supports exclusive Russian Mastery Centers established by manufacturing companies Thixomet ltd. (Russia), Buehler GmbH (Germany), Meiji Techno ltd (Japan). Their objective is to develop techniques of the research on the material structure and the usage of these techniques in the form of separate software modules for an image analyzer; promotion and development of the technique to prepare samples for quantitative metallography. These Mastery Centers annually conduct workshops on various issues of metallurgical examination, including the seminars with the participation of George Vander Voort, the author of eight ASTM standards for quantitative metallography.

- Could you tell us about the latest developments of the Laboratory?

- One of the most important is Thixomet image analyzer for the complex research on the material structure which provides high-resolution quality images. A panoramic image is created by the precision stitching the adjacent fields of view: while an object table is being moved to the neighboring field of view, the preceding field links up "pixel to pixel" with the field captured before. Hereby it is possible to form a panoramic image of any size structure with high resolution. Therefore, using the panoramic image, we can see not only a macro defect, but all details of the microstructure around the defect, which can be the cause of defect arising.

- What is the contribution of the Laboratory researchers into the development of the Russian manufacturing industry?

- Taking into account the results of international round-robin tests, the State Test and Measurement Instrument Certification Centre "D.I. Mendeleyev Institute for Metrology" (VNIIM) certified Thixomet software as a measurement instrument. The panoramic research has become the foundation for developing the first Russian standards to evaluate steel pollution with non-metallic inclusions and banding structure. These standards can be regarded as an attempt to correlate national and international regulatory documents for assessing the quality of material structure; the developers of the standards are the Laboratory researchers.

One of our Laboratory works was recognized by the President of the Russian Federation Award in 2012. Within the frameworks of implementing the most significant state innovative projects "Metal" and "Pipeline", there was developed and launched a brand-new technology, - which had

never been used in Russia, - of manufacturing high-strength cold-resistant ship steels and tube steels with strength classes as high as X80 – X120. The adopted production of high-strength steel rolled sheets contributed to constructing the strategic multi-line gas pipeline system "Bovanenkovo-Ukhta" and the offshore ice-resistant oil-producing stationary platform "Prirazlomnaya".