BRANCH MEETING-CONFERENCE «STATUS AND MAIN DIRECTIONS OF DEVELOPMENT OF WELDING PRODUCTION IN OJSC «GAZPROM»

On November 15–19, 5th Branch Meeting-Conference «Status and Main Directions of Development of Welding Production in OJSC «Gazprom» was held at OJSC «Gazprom VNIIGAZ» in Moscow.

Scientists and leading specialists of research institutes and educational establishments of Russia, specialists on operation, diagnostics and repair of gas pipelines, as well as welding equipment manufacturers, including foreign manufacturers, participated in the Conference.

Altogether 88 presentations were made at the Conference: 16 presentations in the plenary meeting and 72 — in the two session meetings. A collection of presentation abstracts was published by the time the Conference was held.

P.G. Tsybulsky, Director General of «Gazprom VNIIGAZ» opened the Conference, and also made the welcome address. He wished successful work and business cooperation to the participants, briefly described the Conference goals and addressed the organizational matters.

Plenary presentations addressed strategic problems of development of gas transportation system (GTS) of «Gazprom», and session papers covered the following topics: session A — welding and related processes in operation and repair of gas production and transportation facilities; session B — welding and related processes in construction of gas production and transportation facilities.

Some of the priority directions of development of GTS of Russian «Gazprom» are guaranteeing safe transportation and storage of gas, integrity and specified level of technical condition of GTS facilities, economic and industrial safety in GTS operation. It is intended to achieve the defined objective by performing the following tasks:

- development of a system of controlling technical condition and integrity of GTS facilities based on risk analysis;
- conducting comprehensive technical diagnostics, analysis and forecasting of technical condition of GTS facilities, performed on the basis of the methods and technologies that are the most effective in technical and economic terms;
- analysis of natural, technogenous, management and financial risks of GTS operation;
- introduction of new (innovative) energy-saving technical solutions, materials, technologies and equipment.

Solution of the above tasks becomes particularly important for new main pipelines, passing through difficult-of-access regions or regions with extremal nature-climatic conditions (shelf areas of northern seas, high seismic activity) and requiring nonstandard design schematics of gas pipelines and manufacturing technologies, including special methods of cooling, thermal insulation and seismic protection.

It is noted that ensuring a high reliability of GTS is largely determined by the level of welding fabrication of «Gazprom». «Purpose-oriented integrated science and technology program of development of welding fabrication of OJSC «Gazprom» and Coordination

Council have an important role in its improvement. Coordination Council determines, in particular, development of new standards on welding fabrication.

A positive tendency has emerged in Russia over the recent years in development of new local technologies of welding in construction, in reconstruction and repair of the main gas pipelines. Here investigations to finish development of scientifically grounded design norms of evaluation of welded joint quality are important.

As regards new innovation projects, it is necessary to perform qualification testing of the technologies of automatic, mechanized and manual welding, as well as development of technical requirements to welded joints. Here it is noted that requirements should be defined not only proceeding from the condition of ensuring the specified level of performance, but also cost-effectiveness.

PWI specialists presented to the meeting participants a new approach to assessment of fitness-for-purpose of circumferential welded joints of pipelines made by automatic flash-butt welding. This approach focuses the specialists' attention on the need to develop requirements to mechanical properties of the joints allowing for the features of their welding, depending on the used welding procedure and quality of the produced joints.

Over the next years, it is planned to set up at «Gazprom VNIIGAZ» laboratory facilities on the basis of experimental production, for studying and mechanical testing of pipe samples and products, as well as for certification of welding production technologies. It is intended to fit these facilities with modern testing and welding equipment, nondestructive and destructive testing instruments for quality control of welded joint quality. For the first time «Gazprom» has implemented in practice the complete procedure of engineering evaluation of critical condition of circumferential welded joints of sea gas pipelines in construction, including certification of welding technology, and automated ultrasonic testing of circumferential butt joints. In addition to assessment of impact toughness of joint metal, fracture mechanics criteria were also determined, namely critical values of crack tip opening displacement (CTOD) and J-integral (J_{1c}). Requirements to admissible dimensions of defects were defined proceeding from performed studies of stress-strain state of circumferential butt joints in pipe laying and their fracture toughness (CTOD, J_{1c}) Such an approach complies with the modern level of guaranteeing

performance of welded joints made by arc welding processes, where the probability of formation of crack-like defects, including cracks, is quite high.

To guarantee the currently required qualification level of welding fabrication specialists, one of the largest technical centers on comprehensive training of welding-mounting teams was opened in the city of Gagarin (Smolensk region) on a territory equal to 6 hectares. The complex includes lecture-rooms, shops and sites fitted with the same equipment as in pipeline construction. A unique 200-meter training site was created which simulates the actual route conditions in construction of 1220 mm pipeline. The complete package of welding-mounting operations is performed in the training site.

Meeting-conference participants were able to see demonstrations of technologies of automatic, mechanized and manual welding for construction and repair of gas pipelines, as well as equipment and technologies for preparation, cutting, assembly, heating and heat treatment of welded joints. Other welding equipment of the following Russian and foreign companies was also demonstrated, such as CJSC «Pskovelektrosvar» (heavy electric welding equipment for welding pipes of different diameters); «Tekhnotron» plant (manufacturer of inverter-type welding equipment); CJSC «Uraltermosvar» (manufacturer of a wide range of welding equipment); «Lincoln Electric» (official distributor is «Weldsol»); and KEMPPI: the Joy of Welding.

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