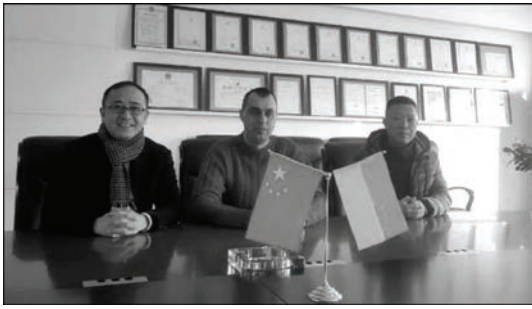


INTERNATIONAL COOPERATION



During the negotiations, from left to right: Gao Fen, Director General of New Huayang Company, P.S. Shlenskii, Director of Scientific-Engineering Center «Explosion Treatment of Materials», Li Jingwei, Explosion Welding Production Manager of New Huayang Company

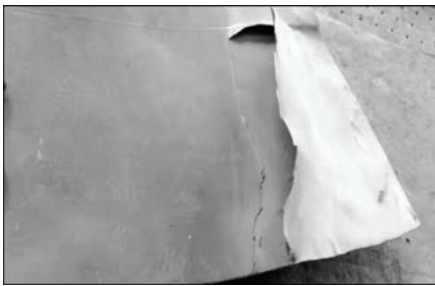
In 2019 by the initiative of China-Ukraine E.O. Paton Institute of Welding (CUIW), specialists of the E.O. Paton Electric Welding Institute of the National Academy of Sciences of Ukraine (PWI) and Guangdong Association for Science and Technology (Guangzhou, PRC) business contacts were established and a cooperation agreement was signed between PWI and Chinese Company Liaoning New Huayang Weiye Equipment & Manufacturing Co., Ltd (New Huayang), Tieling, Liaoning Province, PRC. In July and November-December 2019 PWI specialist travelled to China, in order to discuss a number of tasks on the explosion welding technology, which are to be jointly solved.

New Huayang Company is located in the high-tech industrial zone of Tieling City. It is a limited liability company reorganized from the Shenyang Titanium Equipment Plant, founded in 1988. In PRC territory the Company is one of the pioneers in the field of explosion welding with more than 30 years experience of operation.

The Company has two production shops — the Eastern and Western one, and its own explosive storage and an open site for performance of explosion welding operations with the allowed blasting mass of 500 kg of explosive in TNT equivalent. At present the following bimetals are produced: steel + stainless steel, steel + titanium, steel + copper alloys. The Company is one of the few enterprises in the world, which make bimetal plates of about 20 m² area. In the near future it is planned to increase the plate area up to 33 m². Achieving such a result will bring the Company closer to achievements of leading world producers. A feature of New Huayang Company is the fact that the produced bimetal is not only sold to customers, but is also extensively used in domestic manufacturing of chemical and petroleum equipment.

By the results of the first visit (July, 2019) of PWI specialist to New Huayang Company, the first contract was signed for rendering the scientific-consultation services on supporting the explosion welding technology.

In November-December 2019 within the scope of the contract, PWI specialist performed studies of the detonation properties of explosives used by the Company in explosion welding operations.



Defects in titanium-steel bimetal production

Until recently, the New Huayang Company performed explosion welding with explosive of one composition that does not allow welding a broad range of bimetals.

In this connection, special experiments were performed on measurement of the detonation velocities of mixtures of this explosive with different percentage of salt (NaCl) and sand, at different charge heights.

As a result of the performed work, the New Huayang Company was able to regulate (control) the velocity of detonation in a specified

layer of explosive during performance of explosion welding operations that, in its turn, improved the finished product quality.

As such defects as violation of the cladding layer integrity can develop in production of the bimetal by explosion welding, model experiments were conducted to determine the possibility of restoration (repair) of titanium-steel bimetal.

The conducted experiment showed the possibility of restoration of a defective bimetal plate and its application in further work that, in its turn, will allow improving the production cost-effectiveness.

The directions of further joint work were discussed, which implies signing a new contract.



In the production site



Appearance of bimetal after restoration

P.S. Shlenskii, Gao Fen