

FLEXIBLE PRODUCTION OF WELDED HULLS FROM ENLARGED UNITS FOR LIGHT-ARMORED COMBAT VEHICLES

Nowadays, there is a tendency in the world to increase the operation of light-armored combat vehicles in the regional armed conflicts. At the same time, in Ukraine a centralized production capable to satisfy the need in welded hulls of light-armored wheeled and caterpillar vehicles is still absent, which negatively influences the country defense capability and reduces the attractiveness of Ukraine in the world market of this type of military equipment.



Light-armored wheeled machine

Welded hull of a modern light-armored vehicle is a complex three-dimensional structure weighing up to 5 tons and consisting of more than 2000 parts. The total length of welds is more than 800 m. The serial production of such a workpiece represents a complex technical and production problem. The experience of applying new armored materials produced in Ukraine and other countries for making hulls of domestic light-armored vehicles proves their high service qualities. At the same time, the welding of these steels in real production conditions revealed a number of seri-



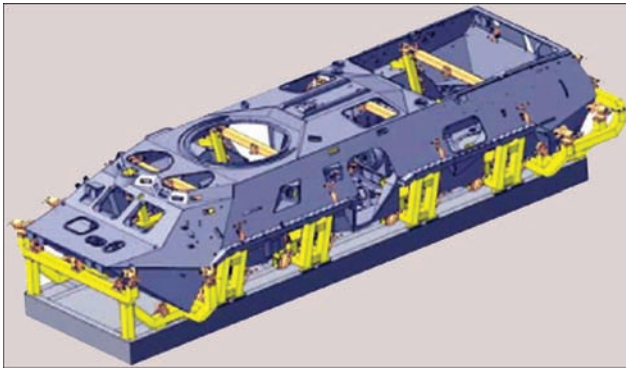
Installation for assembly and welding of suspended tanks

ous problems requiring comprehensive investigations. The main difficulties encountered in welding of such steels are associated with their tendency to formation of hot and cold cracks. In addition, the technological process of welding (welding consumables, welding modes, preheating conditions of joints and their post-weld heat treatment) should be chosen in such a way that to provide not only high technological strength of welded joints, but also the necessary complex of their subsequent service properties.

According to the existing technology the hull is welded successively, part-by-part in a stationary stand, representing a berth with a large number of auxiliary technological devices, which significantly complicate the work of welders. At the same time 80–85 % of welds have to be produced on steep, vertical and overhead planes. The making of such welds is quite labor-intensive and difficult to produce and can be qualitatively made only by highly-skilled welders. Moreover, the efficiency of one stand is approximately one hull per a month. When it is necessary to produce the hulls of other type, the stands require a complete re-equipment.

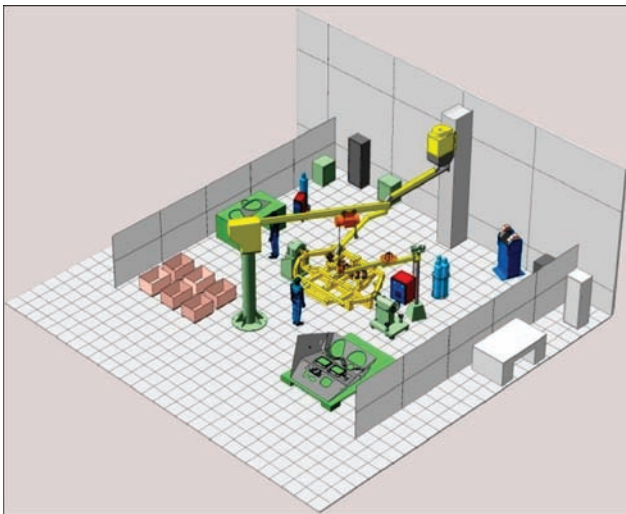


Stands for manufacturing of intermediate composite parts of light-armored wheeled machines



Berth of general assembly and welding of hull of enlarged units

The specialists of the SE «Experimental Design and Technological Bureau of the E.O. Paton Electric Welding Institute» developed a technology which allows designing a versatile, continuous positioning industrial manufacture of welded hulls of light-armed wheeled and caterpillar machines.



Example of welding site for manufacture of welded hull enlarged unit

The separation of welded hull into separate components (sections) is made taking into account the labor-intensiveness of manufacture of sections, bearing in mind the achievement of balance of this index between the separate sections. The technology of creating the welded hull of enlarged components (sections) which are manufactured at separate production sites allows a more rational use of manufacturing areas, providing a uniform loading of workplaces and operators (welders) and, accordingly, increase in labor efficiency, saving energy resources and welding consumables, as well as rhythmic work of the entire welding production of hulls. The use of this technology allows increasing the production capacity of hulls up to 20 pcs per a month (with a two-shift work), significantly reducing the requirements to qualification of welders and improving the quality of welded joints.



Installation for assembly and welding of motor compartment elements

Also, the proposed technology allows a quick (per a day) change over to the production of hulls of other modification (model). For this purpose, it is necessary to change the assembly and welding devices in special technological equipment, and all the other equipment, the cost of which amounts to 85–90 % of the total cost of production sites, remains unchanged. In addition, depending on the needs of production, the line elements can be manufactured both with the manual as well as with automated control, including the use of robots.

The SE «Experimental Design and Technological Bureau of the E.O. Paton Electric Welding Institute of the NASU» performs works under the contracts with the State Enterprise «Ukrspetsexport» on the development and manufacture of installations for creation of separate components of a light-armed wheeled vehicle using technology developed at the SE «Experimental Design and Technological Bureau of the E.O. Paton Electric Welding Institute». Within the framework of these agreements, the SE «Experimental Design and Technological Bureau of the E.O. Paton Electric Welding Institute of the NASU» jointly with the Pilot Plant of Welding Equipment of the E.O. Paton Electric Welding Institute has developed, manufactured and supplied the Customer with the elements of the continuously positioning line for welding of enlarged units of a light-armed wheeled machine. The creation of installations for these enlarged units is only a small part of capabilities of the developed technology.

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