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AUTOMATIC WELDING IN SOVIET TANK CONSTRUCTION

Acad Ye. Paton

The Kiev Scientific Research Institute of Electric Welding imeni Ye. O. Paton, Academy of Sciences Ukrainian SSR, was founded in 1933 and has been under my direction since the inception. In the prewar period, my colleagues and I developed a new method of automatic welding, called welding under flux.

On the eve of the war, 21 June 1941, I left Moscow on a governmental mission to help several plants master the use of equipment, designed by our institute, for automatic welding under a blanket of flux. When I learned of Hitler's attack on the USSR, I immediately thought of returning to Moscow, for it seemed to me that my mission had lost its significance now that the war had started. After further deliberation, I decided to continue my trip, for it occurred to me that automatic welding could successfully be used for military purposes. I spent only a few days at the plants, but even in this short time I became convinced that automatic welding of tank armor could be organized here on a broad scale.

Early in the summer of 1942, a tank body which had been welded by hand on one side and welded by an automatic machine on the other was tested on the firing ground of one of the tank plants. The hand-welded seams did not stand up under fire, but the machine-welded seams did; they proved to be very strong.

In 1941, we designed and built several automatic universal welding machines with flexible welding heads suitable for armor work. These machines produced excellent-quality seams and increased the welder's labor productivity five to six times. I will cite some figures that give an idea of the volume of work performed by our automatic machines at one tank plant. During the war years, more than 4 million meters of seams were welded under a blanket of flux by automatic equipment, and 5 million kilowatt-hours of electricity were saved by using this equipment. Toward the end of the war, one fourth of all tank-body

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welding (according to the amount of metal going into the weld) and a little less than one third of all turret welding was performed by automatic welding machines. That was the situation at one tank plant, but automatic electric welding was used at other tank plants and had a great effect on production in all cases.

In 1943, I was awarded the title of Hero of Socialist Labor for work in the field of tank building.

Not long ago, extremely cumbersome equipment was used to guide a small welding head along the seam. This complex equipment has been replaced by the so-called welding tractor, a small, self-propelled cart with a welding head which moves along the article to be welded. We formerly used electrodes 5-6 millimeters in diameter for welding since we believed that the larger the electrode, the greater the welding productivity. Obviously, a great deal of current is needed to melt such an electrode. Now we are pursuing a different line of thought and using electrodes of smaller diameter which are fed at great speed into the welding zone from a coil. Productivity is not lowered in comparison with the 5-millimeter electrode, and much less current is required to melt the electrode. This new automatic method is called coiled-electrode welding.

Our institute is now putting out special coiled-electrode semiautomatic machines to be used for welding in places which are not accessible to welding tractors.

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