IMPROVEMENT OF WAGON TANK WELDING PRODUCTION TECHNOLOGY

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Abstract: *The article covers the technology and modern equipment for welding wagon tanks. The design features of the tanks, welding methods, and quality control processes are analyzed. Information will also be provided on advanced technologies, automated welding systems, and material selection criteria used to ensure high-quality and durable welds. The article is useful for engineers, technologists, and researchers working in the field of wagon tank production.*

Keywords: *Tank cars, welding technology, metal structure, automated welding, quality control, material selection, durability, industrial equipment.*

In serial production of containers, serial production methods are used. The tank liner consists of five sheets, arranged along the generatrix. The two soles are joined by a butt joint with a connecting rod.

The tank boiler is manufactured on two flow lines. In the first, the production of shells was organized, in the second - the assembly and welding of shells with the bottom, as well as the testing of tanks. The thickness of the upper and middle sheets is 8 mm. The lower sheet 3 is made thicker (11 mm). Obechaic sheets, after straightening on multi-shaft shafts, are assembled into packets up to 150 mm thick and processed on edge planing and end milling machines.

The assembly of processed sheets is carried out according to the line we recommend. In this case, the sheets are unfolded on the assembly stand 1, and the butt joints of the fabric are assembled on clamps with input and output technological plates. The assembled sheet is fed to stand 3 for automatic welding using lifting rollers 2 and pulling carts moving along the monorail 5, the diagram of which is shown separately in Fig. 1.

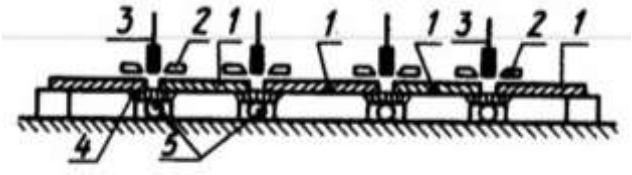

Figure 1. Diagram of a stand for automatic welding of edge sheets.

The edges of the sheets 1 are clamped against the stand by clamps 2, and the flux cushions 4 with pneumatic hoses 5 ensure tight compression of the flux against the back of the sheets. Four welding heads 3 simultaneously weld all longitudinal joints. After the completion of welding, the lifting rollers 2 (Fig. 2) lift the welded fabric from the surface of the stand and transfer it to the cassette-type counter 6, which rotates the fabric by 180°. Then the sheet moves to stand 7 for welding the seams from the reverse side. In terms of construction, this stand is similar to the one shown in Figure 1, but it does not have pneumatic clamps and flux cushions, since welding is carried out along the main weld from the other side.

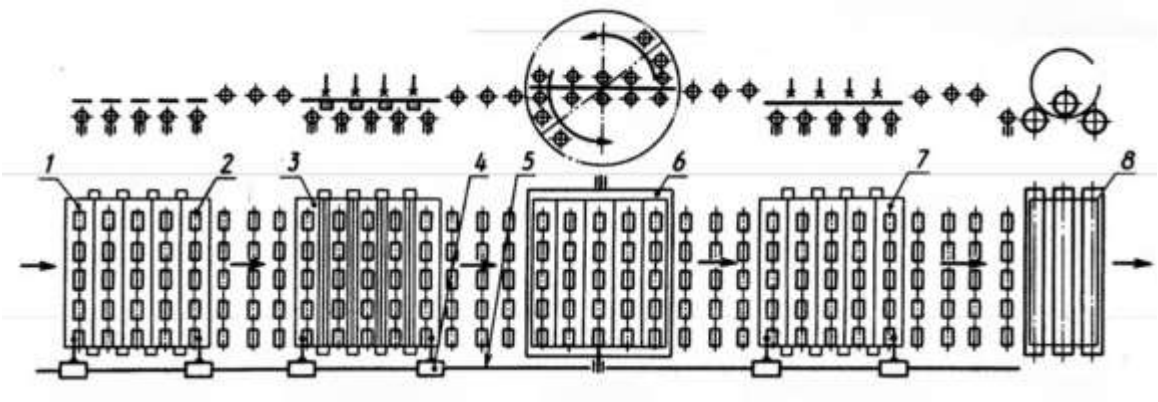

Figure 2. Recommended welding line for tank assembly.

The last-welded sheet is fed through a roller conveyor to three-shaft bending shafts 8, where it is rolled onto a 2800 mm diameter liner without pre-bent edges.

The rolled sleeve is transferred by a bridge crane to the assembly staple, on which the edges of the longitudinal seam are smoothed, tightened, and secured with technological plates for removing the beginning and end of the seam. The straight cylindrical shape of the body is ensured by subsequent calibration on the bending shafts of the assembled and welded body.

With a longitudinal roller conveyor, the shell is fed to an installation with two centrators 1, connected by a longitudinal beam 4. The bottom is brought vertically to the washer and initially secured with screw-type end clamps 3. Then, by sectional connection of radially positioned pneumatic cylinders 2, the edges are smoothed as shown in Figure 13. After the clamps are installed, the assembled tank cauldron is sent for welding the annular seams of the bottom with a sink, where the seams are welded first from the inside, and then from the outside.

Conclusion

The technology of welded production of wagon tanks is of great importance in modern transport systems, and this process requires ensuring the strength, safety, and economic efficiency of the materials. The use of modern technologies expands the possibilities of automating the welding process and improving quality control. This contributes not only to increasing the reliability of the product, but also to reducing

production costs. In the future, it is possible to further increase the efficiency of transport systems by using new materials and innovative welding methods in the production of wagon tanks.

The technology of wagon tank welding is a complex and multifaceted process, requiring advanced technical solutions and highly qualified specialists. Research and development in this area make an important contribution to the development of the transport industry.

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