

**AP19174909 Improving the quality of contact butt welding of reinforcing rods and heterogeneous cylindrical workpieces by optimizing modes. – p.m. Yessirkepova A.B.**

***Relevance:***

development of technological capabilities of the butt-welding method of joints.

***The project purpose*** is to improve the quality of contact butt welding when connecting various metal workpieces.

***Expected and achieved results:***

A method of contact butt welding will be developed, which differs from the existing ones in versatility, productivity, high precision and welding quality, as well as wide technological capabilities. A database will be created for the selection of welding mode parameters depending on the material and diameter of the metal workpieces to be connected.

Domestic machine-building and construction enterprises are considered as potential consumers of the proposed method of contact butt welding.

**In 2023:**

- the real need for the method of contact butt welding was clarified and the relevance of the work was substantiated;
- the requirements imposed by the production on the method of contact butt welding were determined;
- the influence of welding modes on the quality of weldability was established;
- dependencies for assessing the welding quality of various metal workpieces were revealed.

The technology of contact butt welding does not always allow you to fully create defect-free welded joints. The reason for this may be the incorrect assignment of welding modes, low assembly accuracy of the connected workpieces, failure to take into account the mechanical properties of the connected workpieces when assigning modes, etc. To increase the efficiency of the use of butt welding and expand its technological capabilities, a number of experimental studies were conducted on the MCR-25 butt welding machine.

**In 2024:**

- The influence of welding modes on the quality of weldability has been established. Dependencies will be revealed to assess the welding quality of various metal workpieces.
- Optimal modes of contact butt welding of various metal workpieces have been established.

Metallographic (macro and microstructural) examination of the quality of the weld when connecting various metal workpieces is carried out. The structure and identified defects are studied: white spots, metal burnout, the presence of oxides, clogging with non-metallic inclusions, microscopic cracks, pores and some other structural defects.



**Figure 1 – The process of butt contact welding on the machine “MSR-25”**



**Figure 2 – Various metal workpieces**



**Figure 3 – Preparation of workpieces for welding**



**Figure 4 – Welded samples**

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***List of publications:***

1. Yessirkepova A.B., Sherov K.T., Akhmedov Kh.I. The problem of improving the efficiency of joint welding of fittings. International scientific and practical conference. Proceedings of the international scientific and practical conference “XV Saginov readings.

Integration of education, science and production”, Part 3. – Karaganda: Publishing House of KSTU, 2023. – pp.164-166.

<https://www.kstu.kz/wp-content/uploads/2023/06/Sbornik-2023-CHast-3.pdf>

Expected publications:

- 1 article in the first three quarters on the impact factor in the Web of Science database or in journals containing at least 50 percentiles of CiteScore in the Scopus database, in 2024;
- 1 article in the first three quarters of the impact factor in the Web of Science database or in journals with at least 50 percentiles of CiteScore in the Scopus database, in 2025;
- 1 article in journals and (or) another domestic peer-reviewed scientific publication recommended by CQAFSE in 2025.

***Information for potential consumers:***

The project studies the welding processes of various metal workpieces by butt welding.

***Scope:***

Machine-building and construction industries.

*Information update date: 05.07.2024.*