

## **INFLUENCE OF TOOL SHAPE ON THE ABILITY OF ALLOYS TO BE WELDED BY FRICTION STIR WELDING AND HARDENING**

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The shape of the tool used for friction welding or hardening processes is an important factor in the development of a technological process for a particular type of machining. This is due to the purpose of the frictional impact in each specific technological case. This takes into account the physical, technological and other properties of the materials, as well as the nature of their interaction with each other and with the tool to be used during machining.

Plastic materials, such as copper, aluminum and alloys based on them, can change during friction stir welding (FSW). The work hardening effect can also occur in iron, which also has a fairly high ductility, but the technological aspects for each material may differ. The structural changes that can occur during processing [1] determine the behavior of materials when they are joined or strengthened and depend on the processing modes. Under certain technological conditions, the formation of nanostructures in the processed materials is possible [2]. Obtaining reliable welds with high strength during friction stir welding (FSW) has limitations in the thickness of the joints. Accordingly, one of the technological tasks is to increase the thickness of permanent joints that can be obtained by friction stir welding (FSW) while maintaining the quality and mechanical characteristics of such joints compared to similar but thin ones. This issue can be solved by using a tool whose material and working part shape are designed with consideration of plasticity, toughness, thermal conductivity, adhesion and a number of other characteristics that affect the ability to join and strengthen materials.

### **Reference:**

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2. Volkov O.A., Study of heat deformation influence in surface strain hardening of steel by thermofriction processing, Eastern-European journal of enterprise technologies. 25 (80) (2016) 38–44.