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The Plastic Flow Field in the Vicinity of the Pin-Tool During Friction Stir Welding

By -

BiblioGov. Paperback. Book Condition: New. This item is printed on demand. Paperback. 22 pages. Dimensions: 9.7in. x 7.4in. x 0.1in. The plastic flow field in the vicinity of the pin-tool during Friction Stir Welding (FSW) needs to be understood if a theoretical understanding of the process is to be attained. The structure of welds does not exhibit the flow field itself, but consists in a residue of displacements left by the plastic flow field. The residue requires analysis to extract from it the instantaneous flow field around the pin-tool. A simplified merry-go-round model makes sense of some tracer experiments reported in the literature. A quantitative comparison is made of the displacements of copper wire markers with displacements computed from a hypothetical plastic flow field. The hypothetical plastic flow field consists in a circular rotation field about a translating pin tool with angular velocity varying with radius from the pin centerline. A sharply localized rotational field comprising slip on a surface around the tool agreed better with observations than a distributed slip field occupying a substantial volume around the tool. Both the tracer and the wire displacements support the rotating plug model, originally invoked or thermal reasons, of the FSW process. This...



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