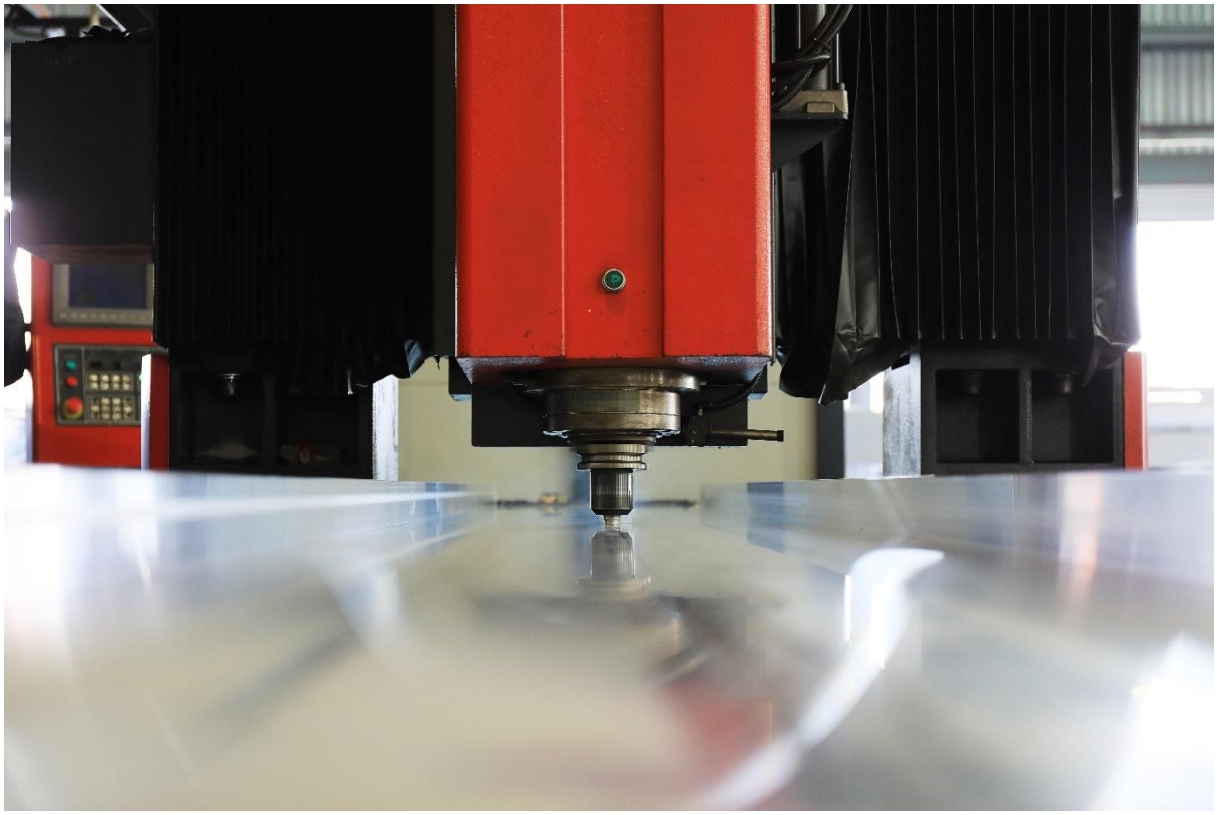
Case Study

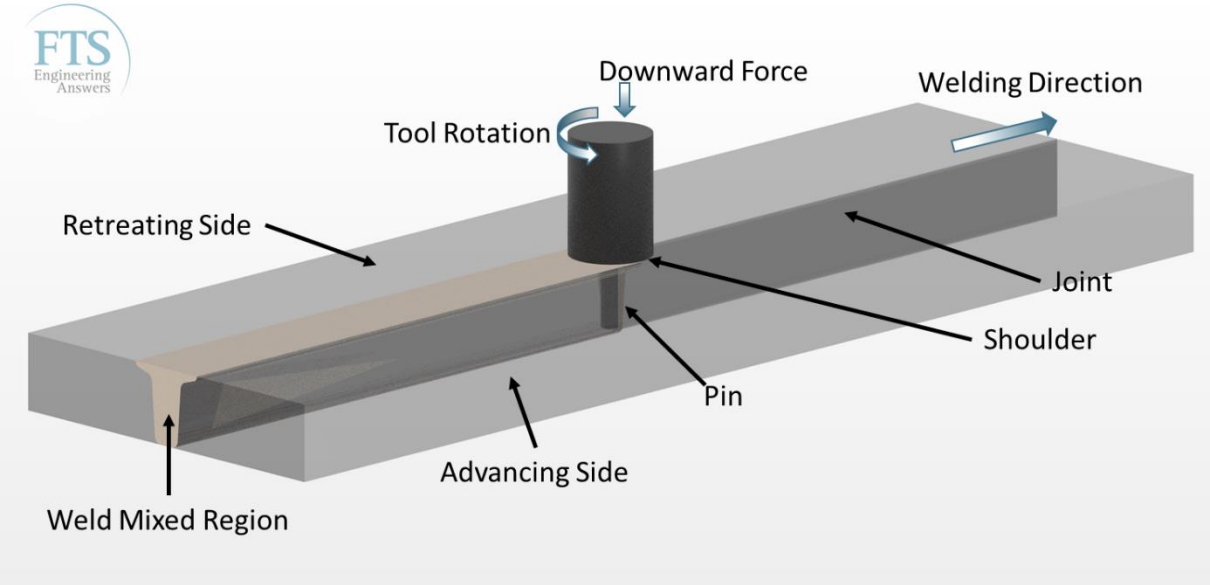
Friction Stir Welding

Straight Forward CFD Model Implementation without Empirical Fudge Factors

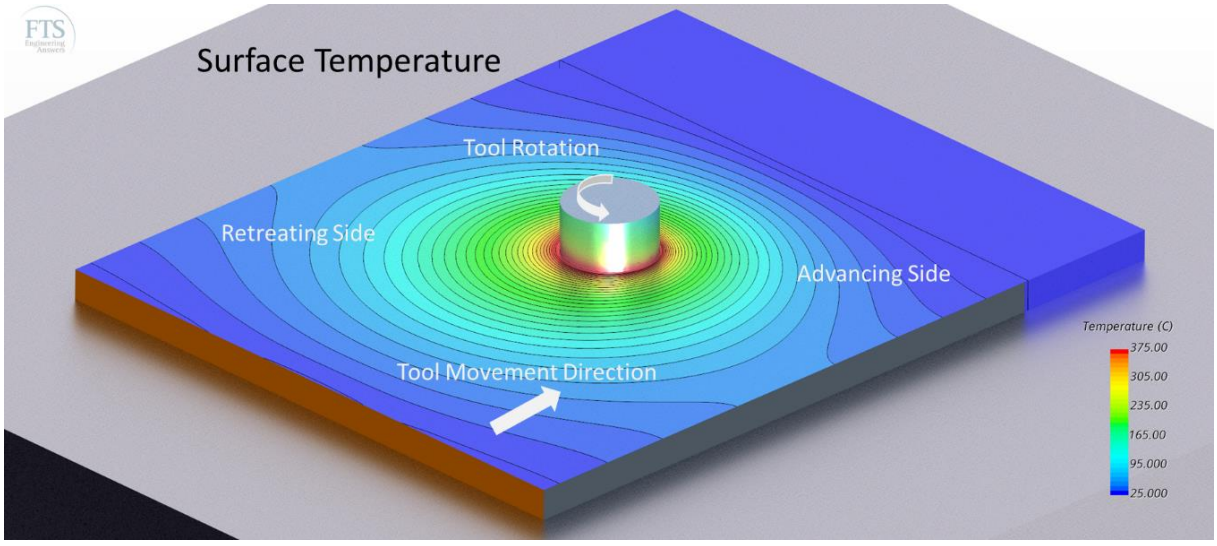


FTS Engineering Answers and Transforming Stress have developed an easily implemented CFD based modelling approach for Friction Site Welding which can be applied to a wide range of applications

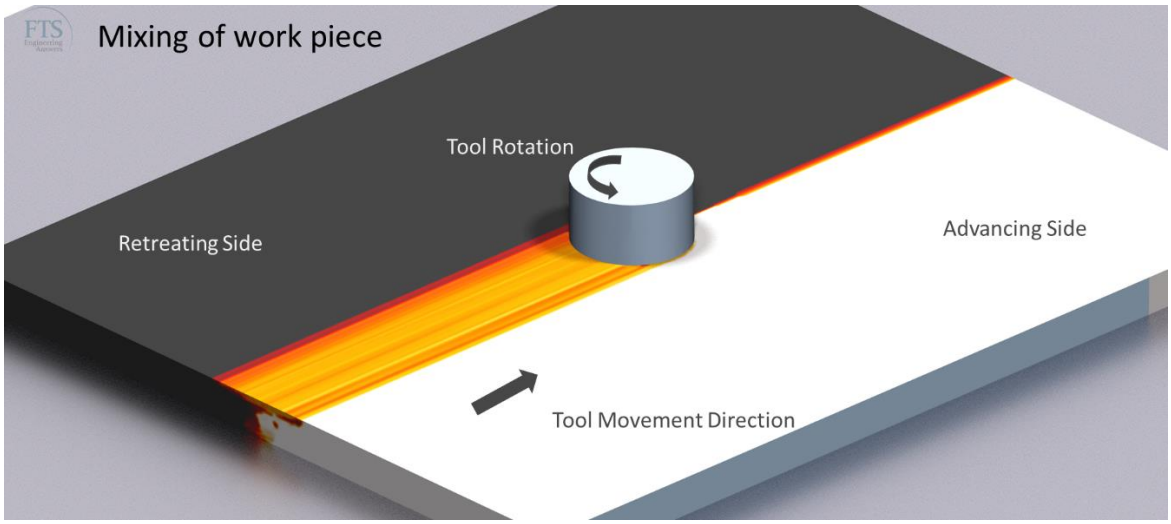
Friction welding processes use the heat generated between contacting surfaces that are in relative motion and pressed together to generate hot and clean surfaces to produce a joint. Rotary Friction Welding (RFW) joins two cylindrical cross sections using a relative rotational motion followed by compression of the cylinders. The most recent friction welding process uses a non-consumable rotating pin to produce heat between adjacent flat surfaces. This is called Friction Stir Welding (FSW).



FTS Engineering Answers Ltd. And Transforming Stress Ltd. (Members of OxCam Engineering Arc) have been developing CFD based methods to model FSW such that it can be easily implemented for a wide range of applications. This approach does not require fudge factors from test welds or extensive data sets for material behaviour and has been validated over a wide range of welding conditions.



It is important that original joint line is mixed and compressed by the FSW tool during welding, whilst keeping workpiece temperature controlled to avoid the generation of flash at the edge of the workpiece shoulder. Optimised welding procedures can be developed by welding trials, but there are significant advantages associated with the use of an accurate computer model to develop robust welding procedures.



A computer model of FSW can be used to make sensitivity studies of tool shapes before welding trials and to investigate the effect of variations in workpiece properties that may not be possible in a small welding trial. The methods developed by Oxcam Engineering Arc can be used in a straightforward manner to reduce the costs associated with the implementation of FSW within the requirements of new industrial applications.

Contact FTS Engineering Answers to discuss your manufacturing challenges.

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