

Welding Complex Structures with Clear Understanding of Options

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The welding of complex structures so as to minimize adverse effects such as distortion is a difficult task that has historically relied on the past experience of the welding team (welders, supervisors & engineers). When presented with a difference of opinion on how to proceed it is difficult for a project manager to know what to do. Each scenario may have its own pros & cons, with decisions based on who the manager trusts more. In the modern age, computational modeling offers a scientific method to compare different welding scenarios. In this paper, the authors present some real-world examples, where computation models have been used to optimize the welding of complex structures using commercially available software. An example will be presented for the welding design of a large structure for optimal fixture, tack weld, strong back, and sequence design where extremely tight dimensional tolerances were required. Another example shows how the capability of modeling and simulation helped weld engineers for assessing and selecting the best scenario for heat straightening of a structure that was distorted from an initial poor welding design. A third example will be on the assessment of retrofit options, for a welded structure containing cracks that developed after initial welding. These cases will present how weld engineers can be enabled to develop creative options when developing a solution to welding problems using computational welding models.