

MEASURING ADDITIVE MANUFACTURING RESIDUAL STRESSES USING THE CONTOUR METHOD

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Residual stresses from manufacturing can cause unfavorable deformation in parts. Due to the complex thermal gradients during the additive manufacturing processes, tensile residual stresses are common along the surface. While residual stresses can be tailored to be achieve better properties, such as the compressive stresses when shot peening a surface, understanding their role in deformation is important for proper design. The undesired tensile residual stresses near the surface can be particularly detrimental during fatigue as they will act as stress risers and lead to earlier crack initiation. One method to measure residual stresses is known as the contour method. This is a destructive method that allows a full depth analysis into the residual stress on a member using finite element analysis. This presentation focuses on the contour method process, best practices, and current results.

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