Special Issue

Residual Stresses—Prediction, Measurement, and Management

Message from the Guest Editor

Residual stresses are the locked-in stresses inevitably introduced in fabricated parts as a result of manufacturing processes. They cause distortion and can combine with operational stresses and result in premature failure of components. Alternatively, if residual stresses are engineered at the design stage, they can lead to improved performance and enhanced product lifetime. In the former case, knowledge of residual stresses is required for assessments supporting the safe operation and life extension of critical infrastructure, whereas in the latter case, detailed knowledge is required to manipulate the residual stress field through careful design, controlled manufacture processes, and lifetime management. The aim of this Special Issue is to cover the recent progress and new developments regarding all aspects of residual stress characterization and approaches to control residual stresses in engineering components. This includes advances in residual stress prediction, development of hybrid techniques for measurement of residual stresses, and novel approaches in residual stress engineering.

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Metallic materials play a vital role in the economic life of modern societies; contributions are sought on fresh developments that enhance our understanding of the fundamental aspects related to the relationships between processing, properties and microstructure – disciplines in the metallurgical field ranging from processing, mechanical behavior, phase transitions and microstructural evolution, nanostructures, as well as unique metallic properties – inspire general and scholarly interest among the scientific community.

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