

## Heat Effects of Welding



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***(Cade Nolan)***

## HEAT EFFECTS OF WELDING



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Book Condition: New. Publisher/Verlag: Springer, Berlin | Temperature Field, Residual Stress, Distortion | Almost all welding technology depends upon the use of concentrated energy sources to fuse or soften the material locally at the joint, before such energy can be diffused or dispersed elsewhere. Although comprehensive treatments of transient heat flow as a controlling influence have been developed progressively and published over the past forty years, the task of uniting the results compactly within a textbook has become increasingly formidable. With the comparative scarcity of such works, welding engineers have been denied the full use of powerful design analysis tools. During the past decade Dr Radaj has prepared to fulfil this need, working from a rich experience as pioneer researcher and teacher, co-operator with Professor Argyris at Stuttgart University in developing the finite element method for stress analysis of aircraft and power plant structures, and more recently as expert consultant on these and automotive structures at Daimler Benz. His book appeared in 1988 in the German language, and this updated English language edition will significantly increase the availability of the work. | 1 Introduction.- 1.1 Scope and structuring of contents.- 1.2 Weldability analysis.- 1.3 Residual stresses.- 1.4 Welding residual stresses.- 1.5 Welding residual stress fields.- 1.6 Type examples.- 1.7 Welding deformations.- 1.8 References to related books.- 1.9 Presentation aspects.- 2 Welding temperature fields.- 2.1 Fundamentals.- 2.1.1 Welding heat sources.- 2.1.1.1 Significance of welding temperature fields.- 2.1.1.2 Types of welding heat sources.- 2.1.1.3 Output of welding heat sources.- 2.1.2 Heat propagation laws.- 2.1.2.1 Law of heat conduction.- 2.1.2.2 Law of heat transfer by convection.- 2.1.2.3 Law of heat transfer by radiation.- 2.1.2.4 Field equation of heat conduction.- 2.1.2.5 Initial and boundary conditions.- 2.1.2.6 Thermal material characteristic values.- 2.1.3 Model simplifications relating to geometry and heat input.- 2.1.3.1 Necessity for simplifications.- 2.1.3.2...



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