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Nota di contenuto	Cover; Failure mechanisms of advanced welding processes; Copyright; Contents; Contributor contact details; 1 Mechanics modeling of spot welds under general loading conditions and applications to fatigue life predictions; 1.1 Introduction; 1.2 Spot weld in a finite plate under general loading conditions; 1.3 Closed-form solutions for a plate with an inclusion; 1.4 Stress intensity factor solutions for a strip under various types of loading conditions; 1.5 Kinked fatigue crack model for spot welds; 1.6 Life predictions for spot welds in lap-shear specimens; 1.7 Conclusions; 1.8 Acknowledgements 1.9 References2 Resistance spot weld failure mode and weld performance for aluminum alloys; 2.1 Introduction; 2.2 Experimental study of aluminum spot welds; 2.3 Statistical data analysis for aluminum spot welds; 2.4 Analytical failure mode prediction for aluminum spot welds under cross tension loading condition; 2.5 Model validation and discussion of aluminum spot welds; 2.6 Conclusions; 2.7 References; 3 Resistance spot weld performance and weld failure modes for dual phase and TRIP steels; 3.1 Introduction; 3.2 Method of production and microstructure of steels 3.3 Resistance spot welding behavior3.4 Weld failure modes; 3.5 Future trends; 3.6 Summary; 3.7 References; 4 Fatigue behavior of spot welded joints in steel sheets; 4.1 Introduction; 4.2 Experimental study

of fatigue behavior of spot welds; 4.3 Micro-hardness measurements in spot welds; 4.4 Fracture modes and microstructure in spot welds; 4.5 Random loading fatigue test in spot welds; 4.6 Effect of residual stress on fatigue behavior of spot welded joints; 4.7 Models for fatigue life prediction of spot welded joints; 4.8 Fatigue life assessment approaches for spot welds
4.9 Current status of fatigue life prediction of welded materials or structures4.10 Conclusions; 4.11 Acknowledgements; 4.12 References; 5 Non-destructive evaluation of spot-weld quality; 5.1 Introduction; 5.2 Background; 5.3 Techniques for non-destructive evaluation of spot welds; 5.4 Single-element ultrasonic inspection; 5.5 Ultrasonic imaging; 5.6 Additional materials and welding techniques; 5.7 In-process ultrasonic monitoring; 5.8 History and future trends; 5.9 Conclusions; 5.10 References; 6 Solid state joining: fundamentals of friction stir welding; 6.1 Overview of process principles
6.2 Comparison to other welding processes6.3 Welding tools; 6.4 Parameter effects; 6.5 Materials; 6.6 Joint geometries; 6.7 References; 7 Failure mechanisms in friction stir welds; 7.1 Introduction; 7.2 Defects in linear friction stir welds; 7.3 Crack paths in tensile and fatigue fracture; 7.4 Friction taper stud welding; 7.5 Friction stir spot welds; 7.6 Residual stresses in friction stir welds; 7.7 Conclusions; 7.8 Acknowledgements; 7.9 References; 8 Microstructure characteristics and mechanical properties of the magnesium and aluminium alloy laser weld bonded joint
8.1 Introduction of laser weld bonding technique

Sommario/riassunto

Many new, or relatively new, welding processes such as friction stir welding, resistance spot welding and laser welding are being increasingly adopted to replace or improve on traditional welding techniques. Before advanced welding techniques are employed, their potential failure mechanisms should be well understood and their suitability for welding particular metals and alloys in different situations should be assessed. Failure mechanisms of advanced welding processes provides a critical analysis of advanced welding techniques and their potential failure mechanisms.The book contains chapters