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Nota di contenuto	THE AUTOMOTIVE BODY MANUFACTURING SYSTEMS AND PROCESSES; Contents; Preface; Foreword; Acknowledgments; Abbreviations; 1: Introduction; 1.1 Anatomy of a Vehicle, Vehicle Functionality and Components; 1.2 Vehicle Manufacturing: An Overview; 1.2.1 Basics of the Assembly Processes; 1.2.2 Basics of the Power-train Processes; 1.3 Conclusion; Exercises; 2: Stamping and Metal Forming Processes; 2.1 Formability Science of Automotive Sheet Panels: An Overview; 2.1.1 Stamping Modes and Metal Flow; 2.1.2 Material Properties and their Formability; 2.1.3 Formability Measures 2.1.4 Circle Grid Analysis (CGA) and the Forming Limit Diagram (FLD) 2.2 Automotive Materials; 2.2.1 Automotive Steel Grades; Traditional Steel Grades; 2.2.2 Automotive Steel Grades: High Strength and Advanced (Ultra); 2.2.3 Stamping Aluminum Sheet Panels; 2.3 Automotive Stamping Presses and Dies; 2.3.1 Automotive Dies; 2.3.2 Die Operation and Tooling; 2.3.2.1 The Blank Holder; 2.3.2.2 Draw Beads; 2.3.2.3 Blanking and Shearing Dies; 2.3.2.4 Bending; 2.3.2.5 Deep Drawing; 2.3.2.6 Coatings and Lubrications; 2.4 Tailor Welded Blanks and their Stamping; 2.5 Advances in Metal Forming

2.5.1 Hydro-forming and Extrusions; 2.5.2 Industrial Origami: Metal Folding-Based Forming; 2.5.3 Super-plastic Forming; 2.5.4 Flexible Stamping Procedures; 2.6 Stampings Dimensional Approval Process; 2.7 Stamping Process Costing; 2.7.1 Case I: The Stamping Process; 2.7.1.1 Detailed Cost Analysis; 2.7.2 Case II : Tailor-Welded Door Inner Cost; Exercises; 3: Automotive Joining; 3.1 Introduction; 3.2 Fusion Welding Operations; 3.2.1 Basics of Arc Fusion Welding and its Types; 3.2.2 Metal Inert Gas MIG Welding Processes; 3.2.3 Automotive TIG Welding Processes; 3.2.4 Automotive Resistance Welding Processes; 3.2.4.1 Surface Conditions and Their Effect on Resistance Welding; 3.2.4.2 Basics of Spot Welding, Lobes and Resistance Curves; 3.3 Robotic Fusion-Welding Operations; 3.3.1 Robotic Spot Welders; 3.4 Adhesive Bonding; 3.4.1 Basics of Adhesive Material Selection; 3.4.2 Basics of the Adhesion Theory and Adhesives Testing; 3.5 Welding and Dimensional Conformance; 3.6 Advances in Automotive Welding; 3.6.1 Friction Stir Welding (FSW); 3.6.2 Laser Welding; 3.6.3 Weld Bonding; 3.7 The Automotive Joining Costing; 3.7.1 Joining an Automotive Frame; 3.7.2 Sub-assembling Automotive Doors; Exercises; 4: Automotive Painting; 4.1 Introduction; 4.2 Immersion Coating Processes; 4.2.1 Cleaning; 4.2.2 Rinsing; 4.2.3 Conversion and Phosphate Baths; 4.2.3.1 Phosphating Aluminum; 4.2.4 E-Coating Baths and their Operations; 4.3 Paint Curing Processes, and Balancing; 4.4 Under-Body Sealant, PVC and Wax Applications; 4.5 Painting Spray Booths Operations; 4.5.1 Spray Paint Applicators; 4.5.2 Painting Booth Conditioning, Waterborne, Solvent-borne and Powder-coating Systems; 4.5.2.1 Waterborne Paint; 4.5.2.2 Powder Coating; 4.5.3 Paint Calculations; 4.6 Material Handling Systems Inside the Painting Area

Sommario/riassunto

A comprehensive and dedicated guide to automotive production lines, The Automotive Body Manufacturing Systems and Processes addresses automotive body processes from the stamping operations through the final assembly activities. To begin, it discusses current metal forming practices, including stamping engineering, die development, and dimensional validation, and new innovations in metal forming, such as folding based forming, super-plastic, and hydro forming technologies. The first section also explains details of automotive spot welding (welding lobes), arc welding, and adhesive bonding.
