

## Table of contents

- **Section 1 Fabricating Processes and Equipment** (p. 3)
- **1A Press Construction and Application** (p. 3)
- **1B Mechanical and Hydraulic Presses: Advantages and Disadvantages** (p. 14)
- **1C Fundamentals of Press-Brake Operation** (p. 20)
- **1D Power Squaring Shears: Design and Application** (p. 40)
- **1E Power Bending Rolls for Metal Cylinders** (p. 48)
- **1F Rubber-Pad Forming and Hydroforming Processes** (p. 53)
- **1G Multiple-Slide Machines and Tooling** (p. 63)
- **1H Flexible Manufacturing Systems** (p. 78)
- **1I Die Sets: Applications and Functional Requirements** (p. 88)
- **1J Press Feeders for the Job Shop** (p. 96)
- **1K Metals Formed in Presses** (p. 107)
- **Section 2 Stamping and Forming Operations**
- **2A Punching and Shearing Science** (p. 119)
- **2B Die Clearances and Stripping Forces: Effects on the Dynamic Properties of Metals for Blanking Operations** (p. 132)
- **2C Blanking Operations** (p. 140)
- **2D Blanking and Shearing** (p. 153)
- **2E Piercing Operations** (p. 160)
- **2F Trimming Operations** (p. 171)
- **2G Bending of Sheet Metal** (p. 181)
- **2H Drawing Operations** (p. 191)
- **2I Drawing and Reducing** (p. 197)
- **2J Progressive Dies** (p. 208)
- **2K Forming Operations** (p. 216)
- **2L Contour Forming** (p. 226)
- **2M Coining, Sizing, and Forging** (p. 229)
- **2N Ironing** (p. 232)
- **2O Automated In-Line Forming** (p. 235)
- **2P Extrusion** (p. 241)
- **2Q Lubrication and Wear in Sheet Metalworking** (p. 248)
- **2R Lubricants for Forming Operations** (p. 267)
- **2S Steel Rule Dies for Blanking and Forming of Sheet Metal and Nonmetallic Materials** (p. 274)
- **2T Lower Hole Cost With Proper Die Design** (p. 279)
- **2U Unitized Tooling for Sheet Metal** (p. 286)
- **Section 3 Plastics for Tooling**
- **3A Plastics for Tooling** (p. 293)
- **3B Types of Plastics Tools and Methods of Fabrication** (p. 299)
- **3C Urethane Tools for Sheet-Metal Fabrication** (p. 301)
- **3D Ceramic-Filled Epoxy Tooling** (p. 312)
- **3E Plastics Molds for Thermoforming** (p. 317)
- **3F Plastics Processing With Silicones** (p. 324)

- **3G Plastics Tools for Forming of Prototype Sheet-Metal Parts** (p. 330)
- **3H Basic Principles of Mold Design Used in Casting of Plastics** (p. 335)
- **3I Evaluating Cast Urethanes for Plastics Tooling** (p. 341)
- **3J Composites**
- **Section 4 Structural Shapes**
- **4A Structural and Bar Shearing** (p. 357)
- **4B Systemized Beam Punching** (p. 369)
- **4C Tooling Techniques for Punching and Notching of Plate and Sheet Metal** (p. 376)
- **4D Uncoilers** (p. 384)
- **4E Blast Cleaning of Structural Steel** (p. 391)
- **Section 5 Nontraditional Machining**
- **5A Electrical Discharge Machining** (p. 401)
- **5B Use of Nontraditional Machining Processes in Producing Forging Dies and in Final Finish Machining of Near-Net-Shape Forgings** (p. 415)
- **Section 6 Definitions: Design Considerations**
- **6A Definitions of Terms** (p. 429)
- **6B Design Considerations for Stamping** (p. 435)
- **Index** (p. 443)