Forming and Forging

1. Introduction to Forming and Forging Processes

2. Forging Equipment and Dies
   Hammers and Presses for Forging
   Selection of Forging Equipment
   Dies and Die Materials for Hot Forging

3. Forging Processes
   Open-Die Forging
   Closed-Die Forging in Hammers and Presses
   Hot Upset Forging
   Roll Forging
   High-Energy-Rate Forging
   Ring Rolling
   Rotary Swaging of Bars and Tubes
   Radial Forging
   Isothermal and Hot-Die Forging
   Precision Forging
   Rotary Forging
   Coining
   Powder Forging

4. Forging of Carbon, Alloy, and Stainless Steels and Heat-Resistant Alloys
   Forging of Carbon and Alloy Steels
   Forging of Stainless Steel
   Forging of Heat-Resistant Alloys
   Forging of Refractory Metals

5. Forging of Nonferrous Metals
   Forging of Aluminum Alloys
   Forging of Copper and Copper Alloys
   Forging of Magnesium Alloys
Forging of Nickel-Base Alloys
Forging of Titanium Alloys

6. Cold Heading and Cold Extrusion
   Cold Heading
   Cold Extrusion

7. Other Bulk Forming Processes
   Conventional Hot Extrusion
   Hydrostatic Extrusion
   Wire, Rod, and Tube Drawing
   Flat, Bar, and Shape Rolling

8. Evaluation of Workability
   Introduction to Workability
   Workability Tests
   Workability Theory and Application in Bulk Forming Processes

   Introduction to Process Design for Bulk Forming
   Forging Process Design
   Modeling Techniques Used in Forging Process Design
   Acquisition of Data for Forging Process Design

10. Blanking and Piercing of Steel Sheet, Strip, and Plate
    Blanking of Low-Carbon Steel
    Piercing of Low-Carbon Steel
    Fine-Edge Blanking and Piercing
    Blanking and Piercing of Electrical Steel Sheet
    Selection of Material for Blanking and Piercing Dies

11. Tooling and Lubrication for Forming of Sheet, Strip, and Plate
    Presses and Auxiliary Equipment for Forming of Sheet Metal
    Selection of Material for Press-Forming Dies
    Selection of Material for Deep-Drawing Dies
    Selection and Use of Lubricants in Forming of Sheet Metal
12. Forming Processes for Sheet, Strip, and Plate
   Press Bending of Low-Carbon Steel
   Press-Brake Forming
   Press Forming of Low-Carbon Steel
   Press Forming of High-Carbon Steel
   Press Forming of Coated Steel
   Forming of Steel Strip in Multiple-Slide Machines
   Deep Drawing
   Stretch Forming
   Spinning
   Rubber-Pad Forming
   Three-Roll Forming
   Contour Roll Forming
   Explosive Forming
   Electromagnetic Forming
   Drop Hammer Forming

13. Forming of Bar, Tube, and Wire
   Bending of Bars and Bar Sections
   Bending and Forming of Tubing
   Tube Spinning
   Straightening of Bars, Shapes, and Long Parts
   Straightening of Tubing
   Forming of Wire

14. Shearing, Slitting, and Cutting
   Shearing of Plate and Flat Sheet
   Slitting and Shearing of Coiled Sheet and Strip
   Shearing of Bars and Bar Sections
   Thermal Cutting
   Laser Cutting
   Abrasive Water jet Cutting

15. Forming of Stainless Steel and Heat-Resistant Alloy Sheet Materials
   Forming of Stainless Steel
   Forming of Heat-Resistant Alloys
   Forming of Refractory Metals
16. Forming of Nonferrous Sheet Materials
   Forming of Aluminum Alloys
   Forming of Beryllium
   Forming of Copper and Copper Alloys
   Forming of Magnesium Alloys
   Forming of Nickel-Base Alloys
   Forming of Titanium and Titanium Alloys
   Working of Platinum Group Metals
   Super plastic Sheet Forming

17. Evaluation of Formability for Secondary (Sheet)
   Forming
   Formability Testing of Sheet Metals

18. Process Design for Sheet Forming
   CAD/CAM Applications in Sheet Forming
   Process Modeling and Simulation for Sheet Forming
   Statistical Analysis of Forming Processes