
Contents

Preface	ix
Chapter 1. Dynamics from Electromagnetic Effects	1
1.1. Electromagnetic shocks and applications	1
1.1.1. Introduction	1
1.1.2. Electromagnetic shocks	2
1.1.3. Magnetic field and induced current in metals	9
1.1.4. Current and magnetic field measurement.	18
1.1.5. Skin thickness	19
1.1.6. Electromagnetic pressure	20
1.1.7. Orders of magnitude of the magnetic field and the electromagnetic energy density to obtain a deformation.	21
1.2. Deformation by electromagnetic pulses	23
1.2.1. Displacement, kinetic energy and deformation rate.	23
1.2.2. Pulse of the electromagnetic stress.	31
1.2.3. Publications	43
Chapter 2. Dynamics from Electrohydraulic Effects	59
2.1. Introduction	59
2.2. Forming tanks	60
2.3. The electrohydraulic effect.	62
2.3.1. Primary shock wave and secondary pressure waves	65

2.4. Actions of the wave pressures in the fluid: fluid–plate acoustic effect	69
2.4.1. Fluid–plate interaction	69
2.5. Electrohydraulic forming.	73
 Chapter 3. Elastic Limit Deflection, Plastic Hinge, Dynamics of Movement	77
3.1. Plastic bending	77
3.1.1. Case: doubly symmetrical shaped section beam	77
3.1.2. Any potential section with double symmetry	78
3.2. Plastic hinges	82
3.2.1. The case of rectangular beams or sheets	83
3.2.2. Dynamic in distributed loading of rectangular beams or sheets	91
3.2.3. Bending of circular plates: bending of symmetrically uniformly loaded circular plates	102
3.2.4. Electrodynamics and hydrodynamics of plates	117
 Chapter 4. Dynamic Actions, Technologies and Applications	125
4.1. Mechanical shocks	125
4.1.1. Structural memory	125
4.1.2. Dynamic powder compacting, sintering	138
4.2. Electromagnetic shocks and applications	169
4.2.1. Shock inductors	169
4.2.2. Dynamic assemblies	192
4.3. Dynamic plating solders	208
4.3.1. Introduction	208
4.3.2. Magnetic welding	211
4.3.3. Plate dynamics	216
4.3.4. Micrographs of the solders obtained by the electromagnetic impact and an analysis of the connection	219
4.3.5. Electrohydraulic soldering	221
 Appendices	227
 Appendix A: Electromagnetism	229

Appendix B : Joining, Dynamic Hooping: Transmissible Force and Torque	257
Appendix C: Tables of Characteristics of Metals	273
Appendix D: Publications	281
References	303
Index	305