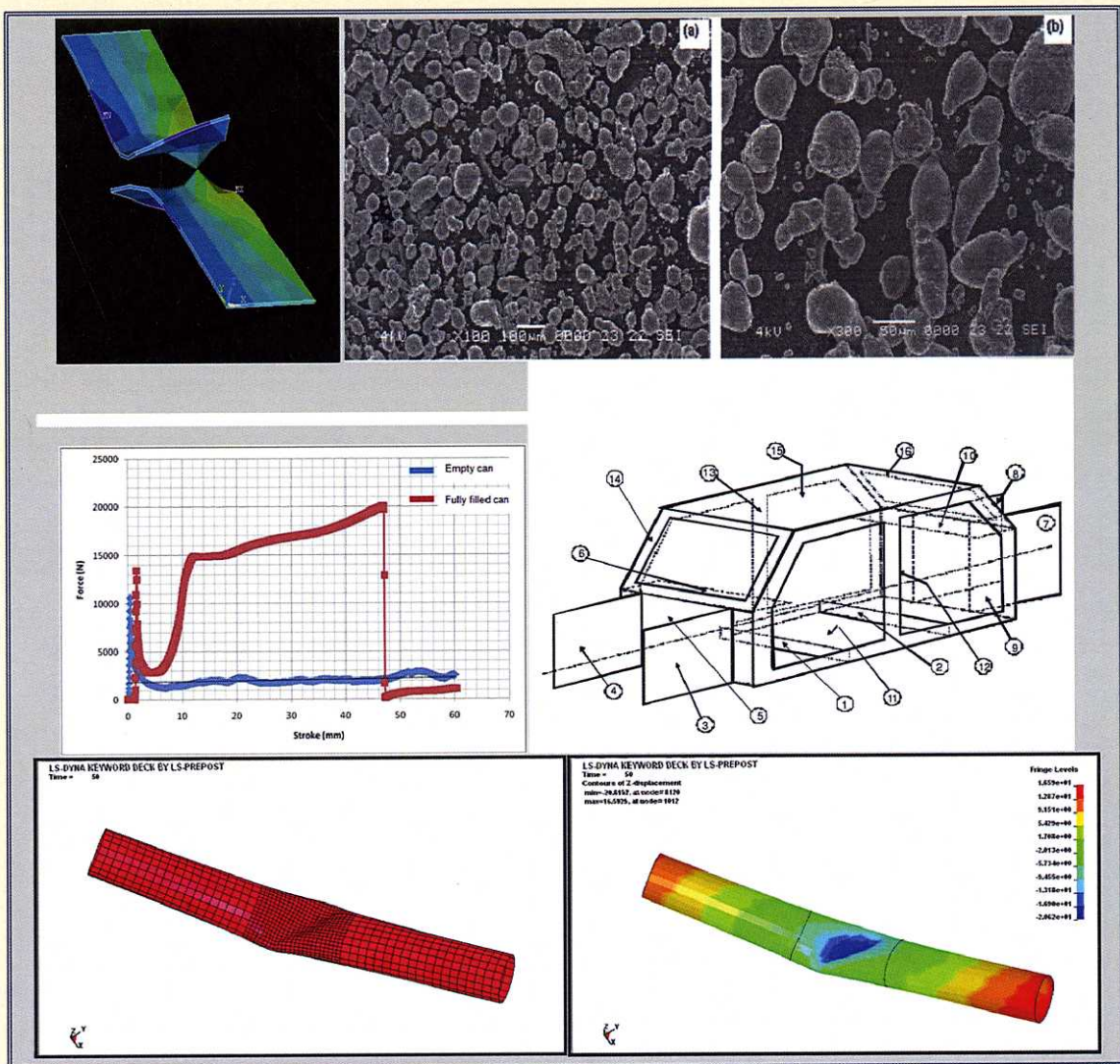


# ADVANCED TOPICS IN MECHANICAL BEHAVIOR OF MATERIALS



Edited by

**Meftah Hrairi**



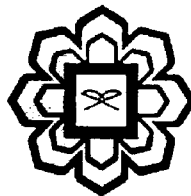
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# ADVANCED TOPICS IN MECHANICAL BEHAVIOR OF MATERIALS

Edited by

Meftah Hrairi



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## ENERGY ABSORBING CAPABILITY OF MATERIALS SUBJECTED TO IMPACT UNDER GRAVITY LOADING

*Qasim H. Shah, Hasan M. Abid, Adib B. Rosli*

### 1. INTRODUCTION

Energy absorbers are systems that convert kinetic energy into other forms of energy, such as pressure energy in compressible fluids, elastic strain energy in solids, and plastic deformation energy in deformable solids. The process of conversion for plastic deformation depends, among other factors, on the magnitude and method of application of loads, transmission rates, deformation displacement patterns, and material properties. The applications of deformable energy absorbers have been paid serious attention for several decades, for the means of safety. The aim is to minimize the impact by controlling the deceleration pulse during impact, i.e. extending the period of dissipation of kinetic energy. Cushioning devices on vehicle bumpers, crash retarders in emergency systems of lifts, and some crash barriers used as road blocks are everyday examples. The vital application of this work is reliability of energy to absorb massive landing force, for instance the missile safeguards when landing on the ground. This high energy absorption ability can be practically applied to rocket systems for sending the chips or any other important materials into space or far-distant places, thus protecting the chips from damage.

The project design focuses on a missile with a nose constructed from energy absorption material carrying a load and a deformable material impacting on the two layers of steel plate.