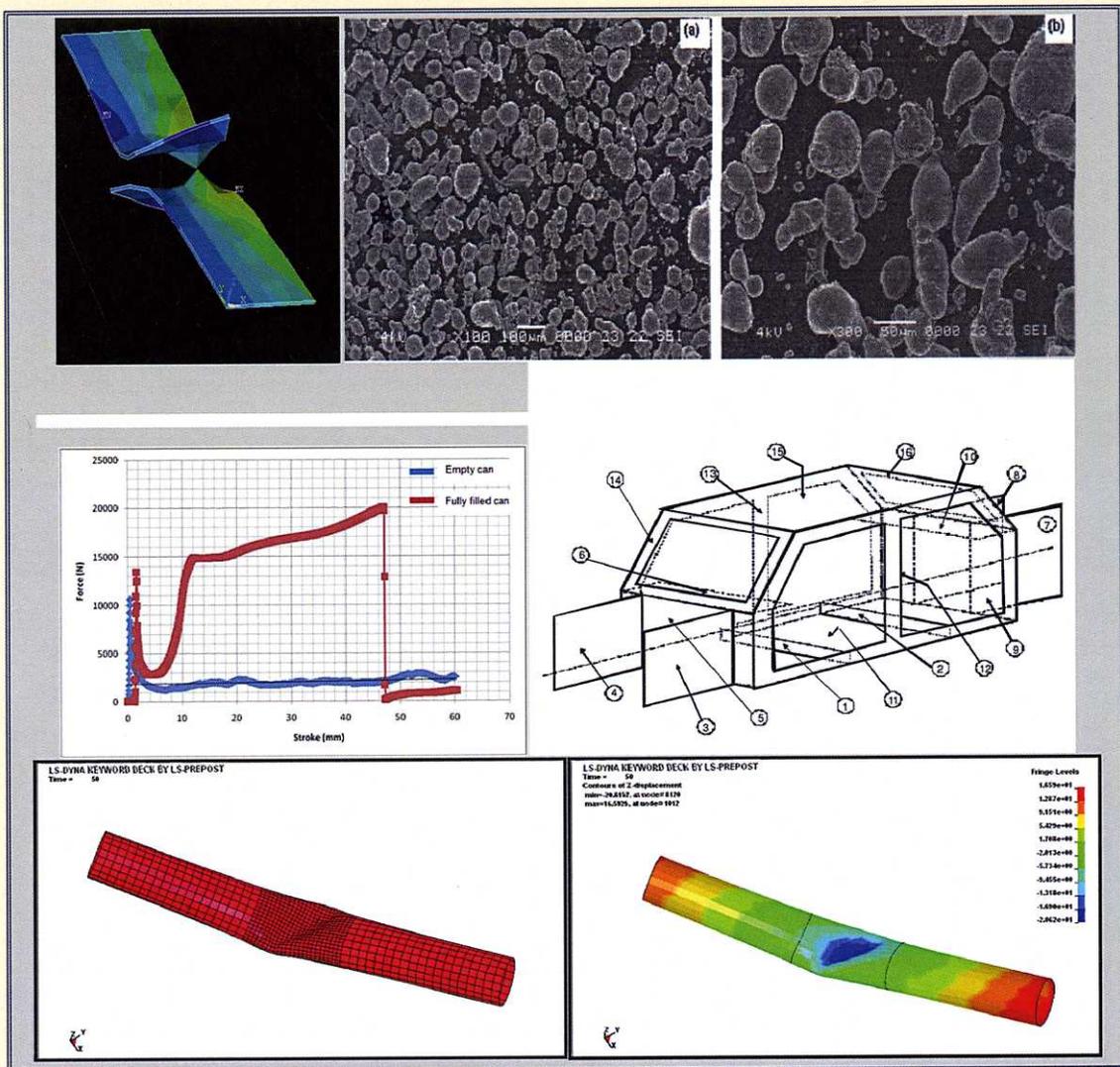


# ADVANCED TOPICS IN MECHANICAL BEHAVIOR OF MATERIALS



Edited by

**Meftah Hrairi**



IIUM PRESS

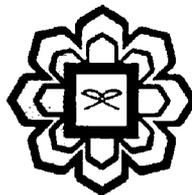
INTERNATIONAL ISLAMIC UNIVERSITY MALAYSIA

ADVANCED TOPICS IN MECHANICAL BEHAVIOR OF MATERIALS

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Edited by

Meftah Hrairi



IIUM Press

Published by:  
IIUM Press  
International Islamic University Malaysia

First Edition, 2011  
©IIUM Press, IIUM

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Perpustakaan Negara Malaysia

Cataloguing-in-Publication Data

ISBN: 978- 967-418-174-1

Member of Majlis Penerbitan Ilmiah Malaysia – MAPIM  
(Malaysian Scholarly Publishing Council)

Printed by :

**IIUM PRINTING SDN. BHD.**

No. 1, Jalan Industri Batu Caves 1/3

Taman Perindustrian Batu Caves

Batu Caves Centre Point

68100 Batu Caves

Selangor Darul Ehsan

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**NUMERICAL ANALYSIS OF MATERIALS ENERGY ABSORBING CAPABILITY  
UNDER GRAVITY LOADING IMPACT**

*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. The high energy absorbing ability can practically applied into rocket system for sending the chips or any other important materials to the space or far-distant place, thus protecting the chips from damage.

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