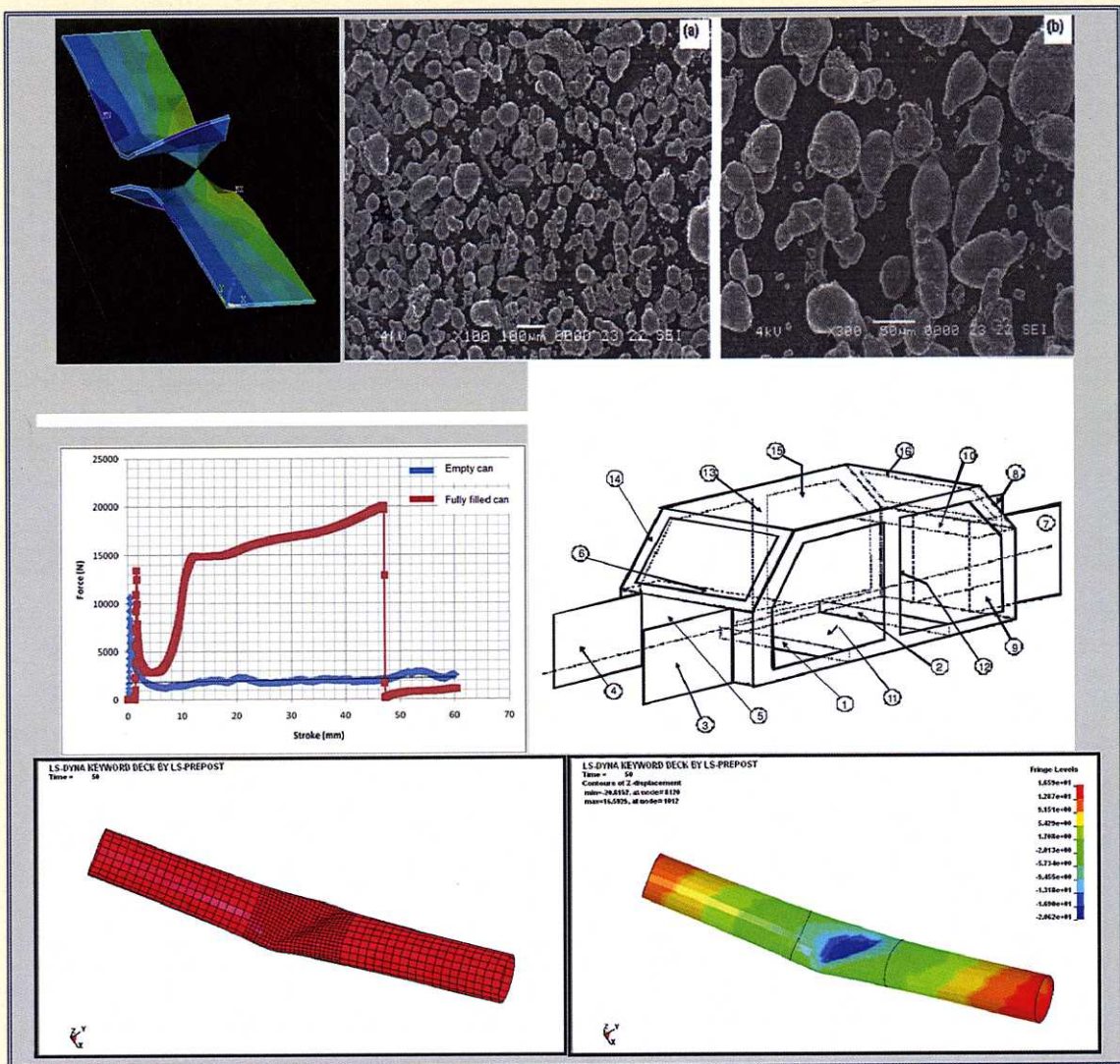


ADVANCED TOPICS IN MECHANICAL BEHAVIOR OF MATERIALS



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Meftah Hrairi



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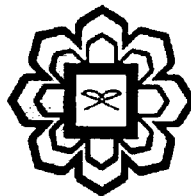
INTERNATIONAL ISLAMIC UNIVERSITY MALAYSIA

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IIUM Press

Published by:
IIUM Press
International Islamic University Malaysia

First Edition, 2011
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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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DAMAGE OF POLYCARBONATE ARMOR PLATE SUBJECTED TO IMPACT

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

1. INTRODUCTION

Due to its good impact resistance properties the polycarbonate material is used in helmets [1] and bullet proof armored vehicles. Polycarbonate (PC) is also under investigation for the development and manufacture of sandwiched panels for bullet proof vests and armored systems where alternate layers of Polymethyl Methacrylate Acrylic (PMMA) and Polycarbonate are used to mitigate the damage caused by high velocity projectiles [2, 3]. Due to their light weight, economical, and easy manufacturing processes the usage of polymers is on the rise in various industries. The response of rectangular plates subjected to blast loading was reported by [4, 5] where the authors explored the response of quadrangular stiffened steel plates. The effects of localized and uniform blast loading on various stiffener locations were studied. It was found that if the stiffeners were located at a localized blast loading position the deformation of the target plate was minimized but it resulted in tearing failure of the plate near the stiffener edges. The effect of large and close range explosions on circular armor plates have been reported very recently where the scaling of the dynamic response has been studied [6]. Numerical studies on the response of armor systems made up of PC and PMMA were reported [5] where smooth particle hydrodynamics (SPH) was used to simulate the response of PC and PMMA layers and it has been found that many existing material models can reproduce a close range results at the initial stage of simulations. Further numerical results based upon the experiments [7] have been reported by [8] where the effects of varying support configurations have been investigated on the