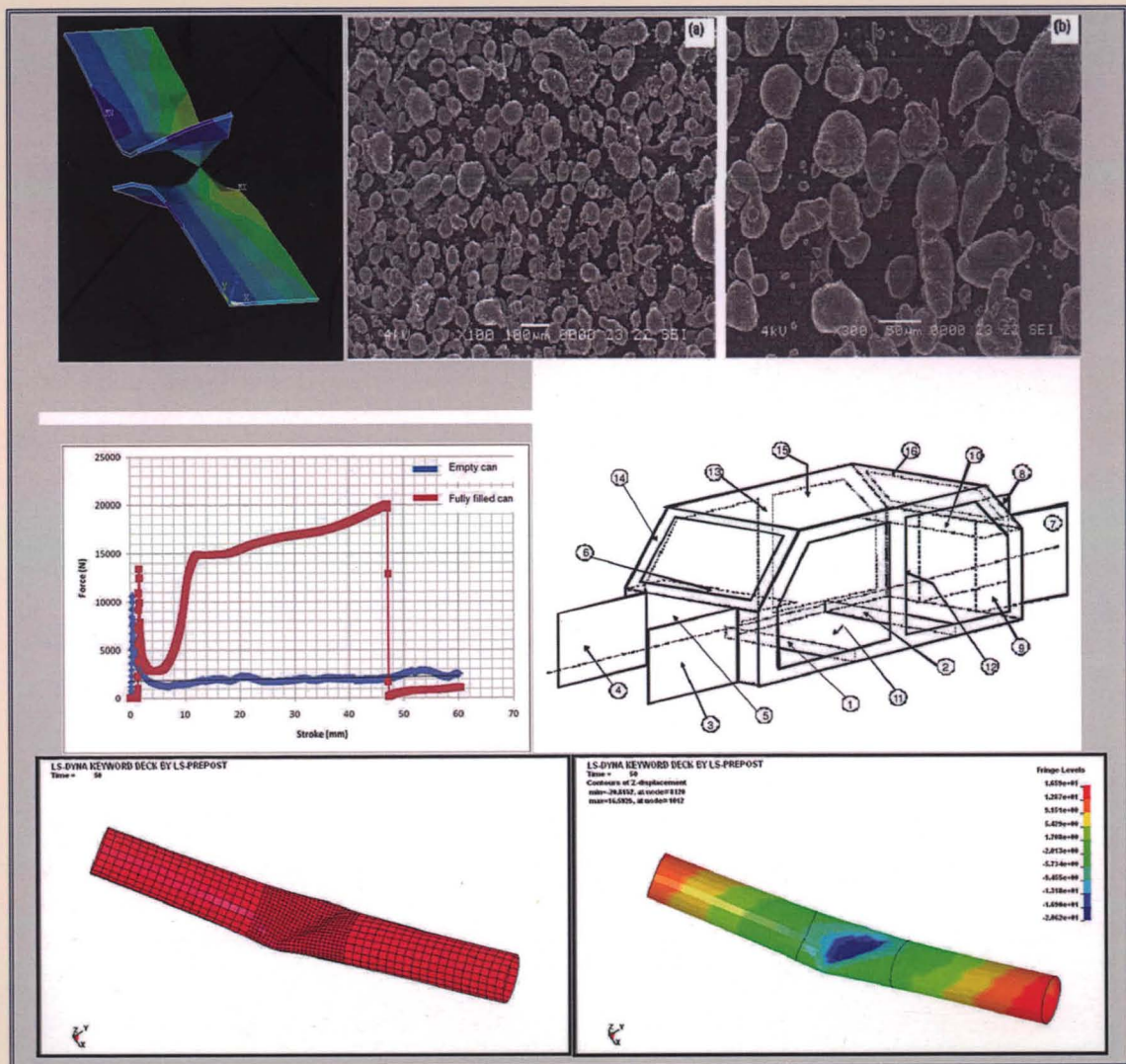


ADVANCED TOPICS IN MECHANICAL BEHAVIOR OF MATERIALS



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Meftah Hrairi



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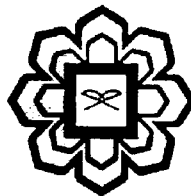
INTERNATIONAL ISLAMIC UNIVERSITY MALAYSIA

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EXPERIMENTAL RESULTS OF EMPTY AND WATER FILLED CYLINDRICAL SHELL BUCKLING

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

1. INTRODUCTION

The objective of this experiment is to find out the types and properties of the material used in this study. This can be known by measuring the mechanical properties and observing the characteristics of the material. The most fundamental strengths of a material are the yield strength and ultimate tensile strength. Therefore, the relation between stress and strain becomes an important characteristic of the material. A tensile test can determine a stress-strain diagram of the material. Then the experimental results will be compared with numerical simulation results.

An aluminum alloy can was placed at the middle of a Universal Testing Machine. The upper part will move downward and compress the can with constant speed until a desired stroke. This machine is connected to a computer to run the INSTRON program. Then, the deformation of the cans due to the axial compression applied is observed. The test was divided into three parts which used empty, half-, and fully-filled containers. Also, the compression rate for every test was varied from 10mm/min to 500mm/min to see the different deformations according to the changes. In the experiment, empty and water filled circular cylindrical cans have been loaded under axial compression using a Universal Testing Machine. The graph of load and stroke was obtained from collected data. The presence of water which is an incompressible fluid in the water filled cans gave greater resistance to the cans before complete collapse when compared to the