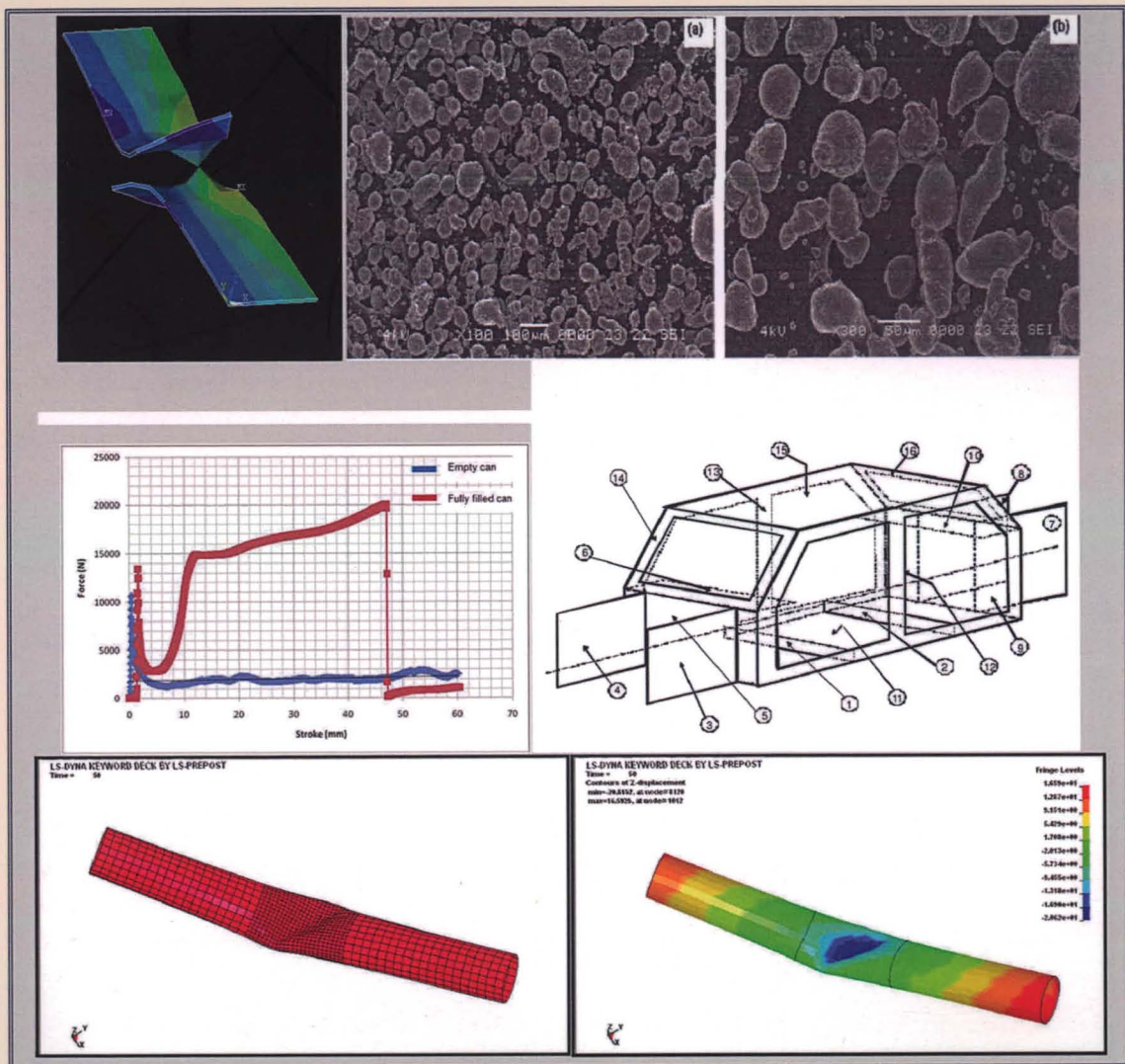


ADVANCED TOPICS IN MECHANICAL BEHAVIOR OF MATERIALS



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Meftah Hrairi



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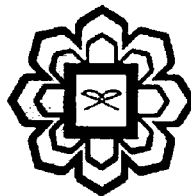
INTERNATIONAL ISLAMIC UNIVERSITY MALAYSIA

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PIPE WHIP IMPACT

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

1. INTRODUCTION

Pipe whip is a safety related issue for nuclear power and chemical plants, where pipes are often used to transport fluids at high pressure and high temperature. When a pressurized pipeline is severed, the fluid escaping from the open end exerts a thrust on the pipe. This thrust is also known as the blow down force. The relevant literatures related to this research project are reviewed in this chapter. There are some characteristics that are needed in the analysis such as the nature of the pipe, which leads to deformation and bending characteristics of the centreline of the pipe. Generally, observations focus on all the characteristics of pipe whip plus the interaction between the rigid and deformable bodies (missile and target pipes) during the impact event.

2. OVERVIEW

In engineering mechanics, bending (also known as flexure) characterizes the behavior of a slender structural element subjected to an external load applied perpendicularly to an axis of the element. The structural element is assumed to be such that at least one of its dimensions is a small fraction, typically 1/10 or less, of the other two [1]. For our project, it is expected that the target pipe will bend at the point of impact. In general, the deformation of a structure will not be uniform throughout its volume, and so the change in geometry of any line segment within the body may vary along its length. For example, one portion of the line may elongate, whereas another portion may contract. In pipe whip analysis as mentioned earlier in the introduction