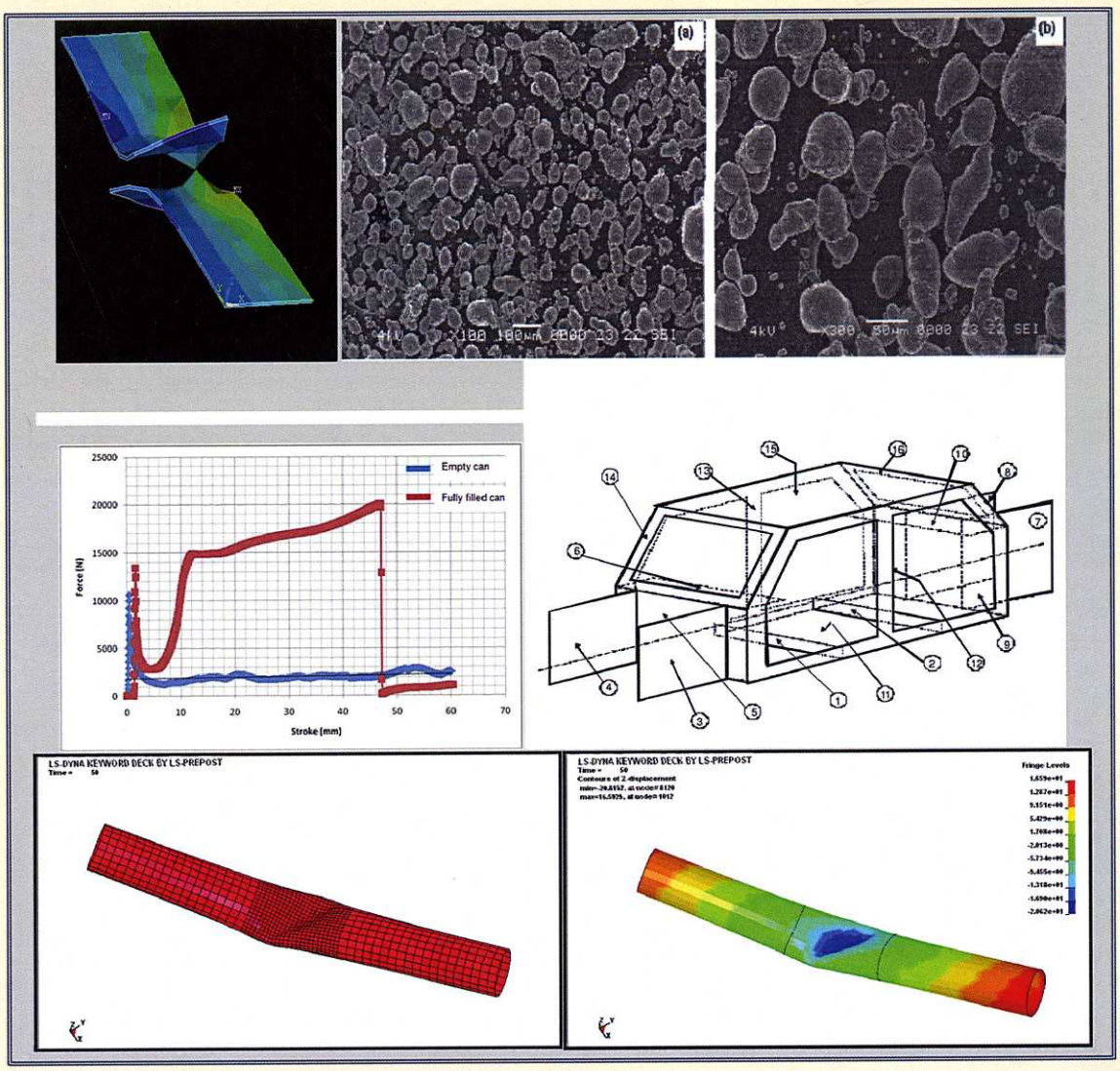
# ADVANCED TOPICS IN MECHANICAL BEHAVIOR OF MATERIALS




Edited by

## Meftah Hrairi

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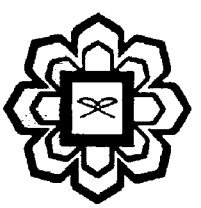

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# DESIGN AND FABRICATION OF THE TESTING MODEL OF THE VEHICLE STRUCTURE TEST SYSTEM

*Kassim A. Abdullah and Cheah Siew Loong*

## 1. INTRODUCTION

This chapter describes the procedures followed in developing the test model of vehicle structure testing and also explores a technique whereby durability aspects of the vehicle structure can be assessed by simple structural surface (SSS) method and finite element analysis (FEA) that can be carried out at an early design stage of vehicle structure.

Brown et al. described a method called Simple Structural Surfaces (SSS) that could be used in the design of a body structure to meets its service requirement [1]. Based on this SSS method, a test model of a standard saloon type vehicle structure was fabricated to capture a better understanding of SSS and to demonstrate the use of SSS method for load-path visualization during the very beginning of conceptualization design process. The test model consisted of removable panels representing the SSS. Loads for both bending and torsion cases were applied on the transverse front and rear cross beam of the test model to see how the structure performed. When building a model this way it can soon be realized if an SSS has insufficient supports or reactions and hence that the structure has a deficiency. Therefore the SSS method is useful for determining that there is continuity for load paths and hence for determining the integrity of the structure.

## 2. METHOD

The standard saloon concept as shown in Figure 1 was chosen for this study. The structure consists of a "closed box" passenger compartment, consisting of floor, roof, side frames, front and rear bulkheads and windscreen. All these surfaces are assumed to be plane surfaces. However, plane number 1, 2, 3, 4, 7 and 8 can be a stiff link/panel cantilevers. This is because suspension load for both bending