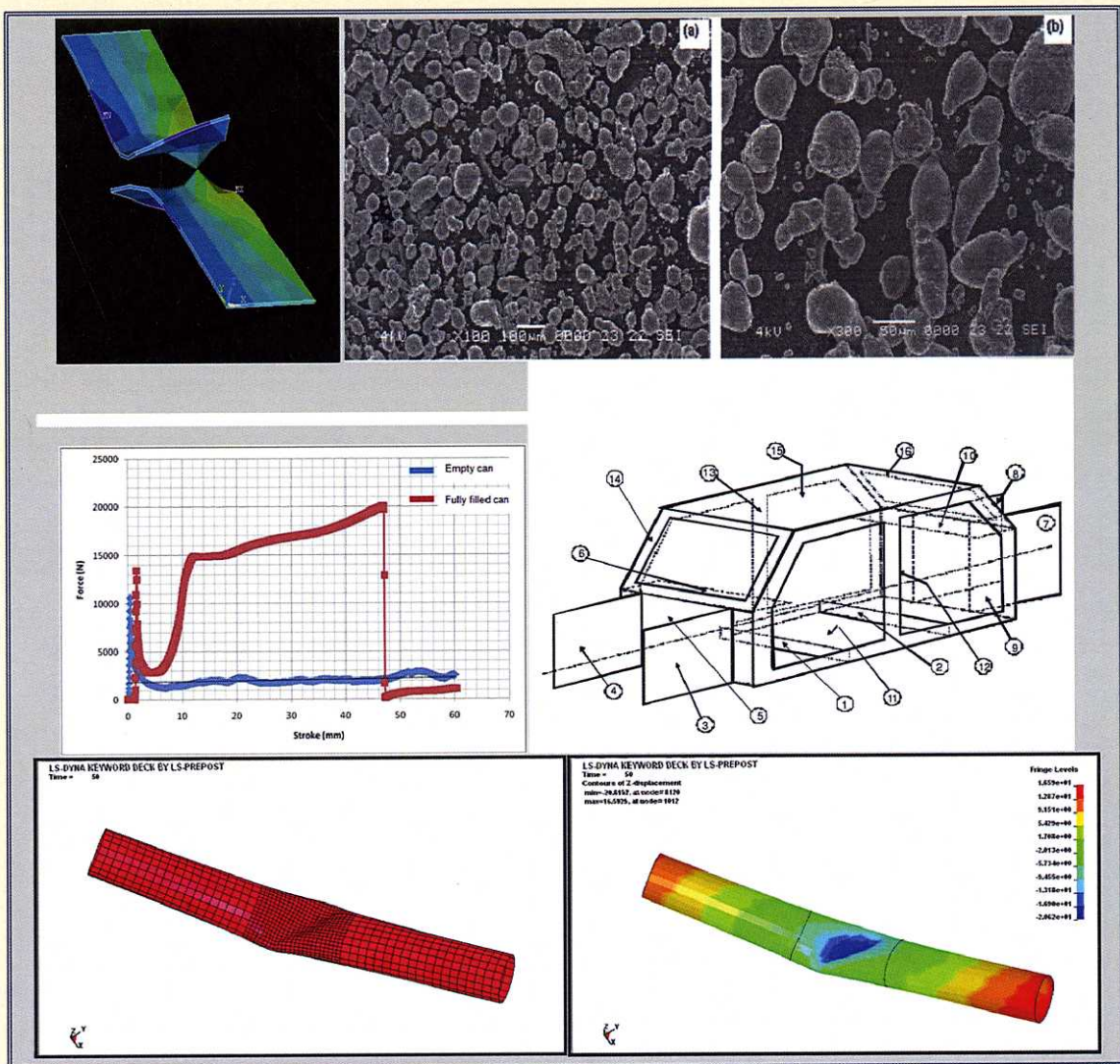


ADVANCED TOPICS IN MECHANICAL BEHAVIOR OF MATERIALS



Edited by

Meftah Hrairi



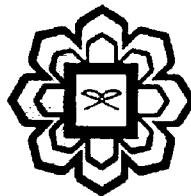
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Meftah Hrairi



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DESIGN ANALYSIS OF LAMINATED COMPOSITE LADDER CHASSIS FRAME OF LIGHT TRUCK

Kassim A. Abdullah and Mohd Zaimi bin Rosli

1. INTRODUCTION

The truck chassis is a major component in a vehicle system. In the design process of the vehicle, the chassis frame is often subjected to refinement in order to develop vehicles with reduced cost and weight [1]. The application of FEA is used to reduce component complexity, weight and subsequently cost.

Chassis frame stiffness values are important from a vehicle dynamics point of view. Bending and torsion stiffness of the chassis frame has to be decided at initial stage of vehicle program [2]. Various iterations of side member cross-sections and cross member arrangements have to be carried out to achieve target stiffness values.

This chapter is focused on the method for development of the light truck chassis that can be fabricated from laminated composite. The design layout was adopted from the measurements taken from an existing steel pick truck chassis. Then the chassis was analyzed to determine its maximum deflections under normal operating loads. Chassis was modified to use the carbon fibre/epoxy laminated composite with these specific objectives:

1. To perform design analysis for the chassis that can have the same or higher strength and stiffness as the original steel chassis.
2. To obtain the suitable composite materials that can provide more stiffness and strength to the chassis.
3. To determine whether the design will provide less weight than the current one