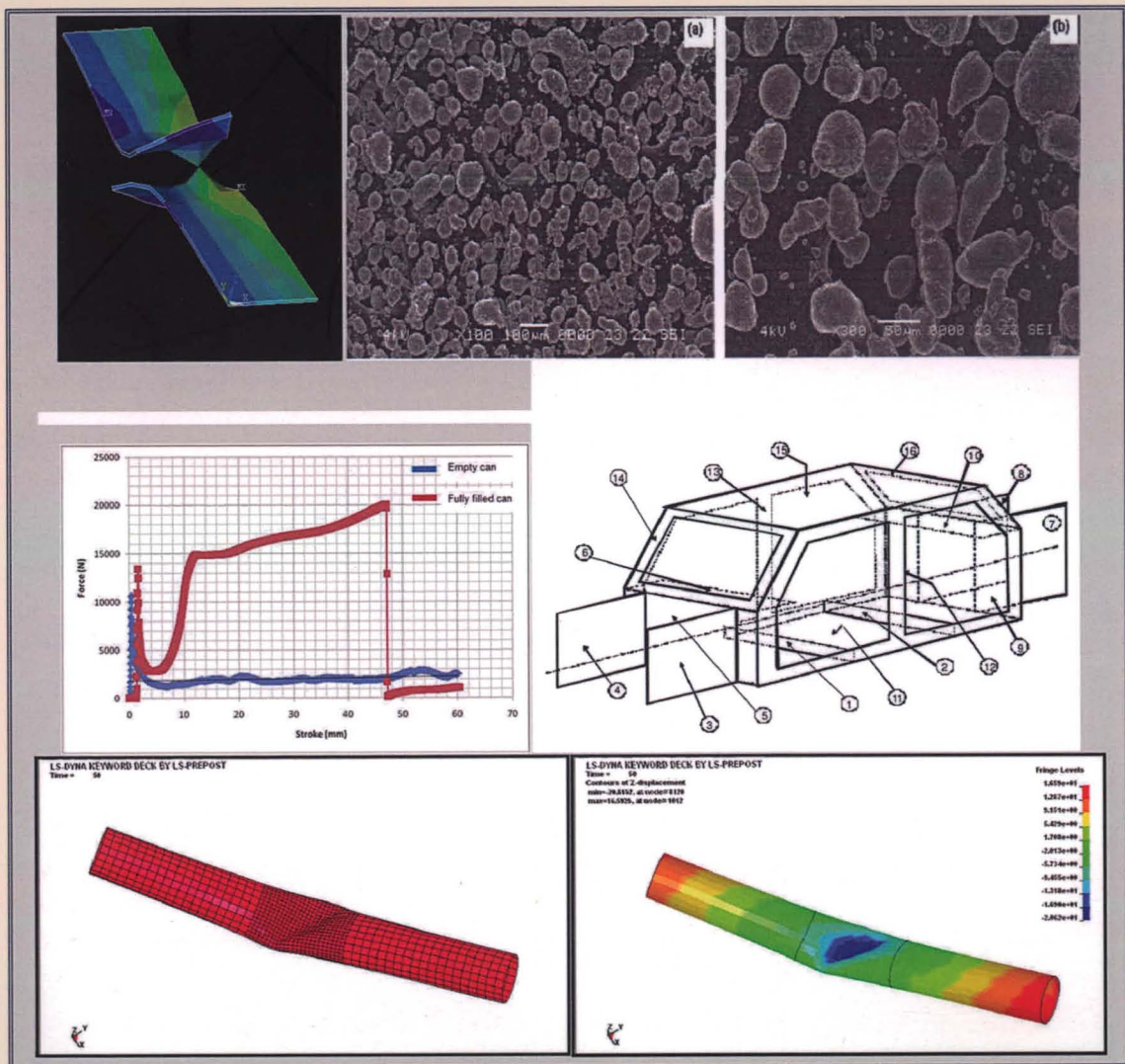


ADVANCED TOPICS IN MECHANICAL BEHAVIOR OF MATERIALS



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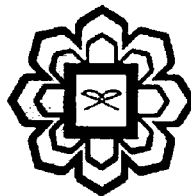
INTERNATIONAL ISLAMIC UNIVERSITY MALAYSIA

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STUDY OF SPOT WELDING PROCESS

Meftah Hrairi, Fatimah Jamil

1. INTRODUCTION

Spot welding is a process in which contacting metal surfaces are joined by the heat obtained from resistance to electric current flow. Work-pieces are held together under pressure exerted by electrodes. Typically the sheets are in the 0.5-3.0 mm thickness range. The process uses two shaped copper alloy electrodes to concentrate welding current into a small "spot" and to simultaneously clamp the sheets together. Forcing a large current through the spot will melt the metal and form the weld. The attractive feature of spot welding is a lot of energy can be delivered to the spot in a very short time (ten to one hundred milliseconds). That permits the welding to occur without excessive heating to the rest of the sheet.

Some work has already been carried out on the modeling and simulation of a spot welding process. Wei and Ho [1] had created an unsteady, axisymmetric heat conduction model to investigate 3-dimensional nugget growth for different welding current. Khan et al. [2] has used ABAQUS software to develop an axisymmetric finite element model employing coupled thermal-electrical-mechanical analysis. Tsai et al. [3] has created a 2-dimensional axisymmetric model using ANSYS to do some parametric studies on the spot welding process.

2. PREPARATION OF SPECIMENS

As shown in Figure 1, two types of specimen have been prepared. The first specimen is done with one spot weld while the other is done with two spot welds on the specimen. Thickness of the specimen is 1mm. Length is 100 mm and width is 40 mm. We used 7-9 kA weld current and 50 HZ for weld frequency.