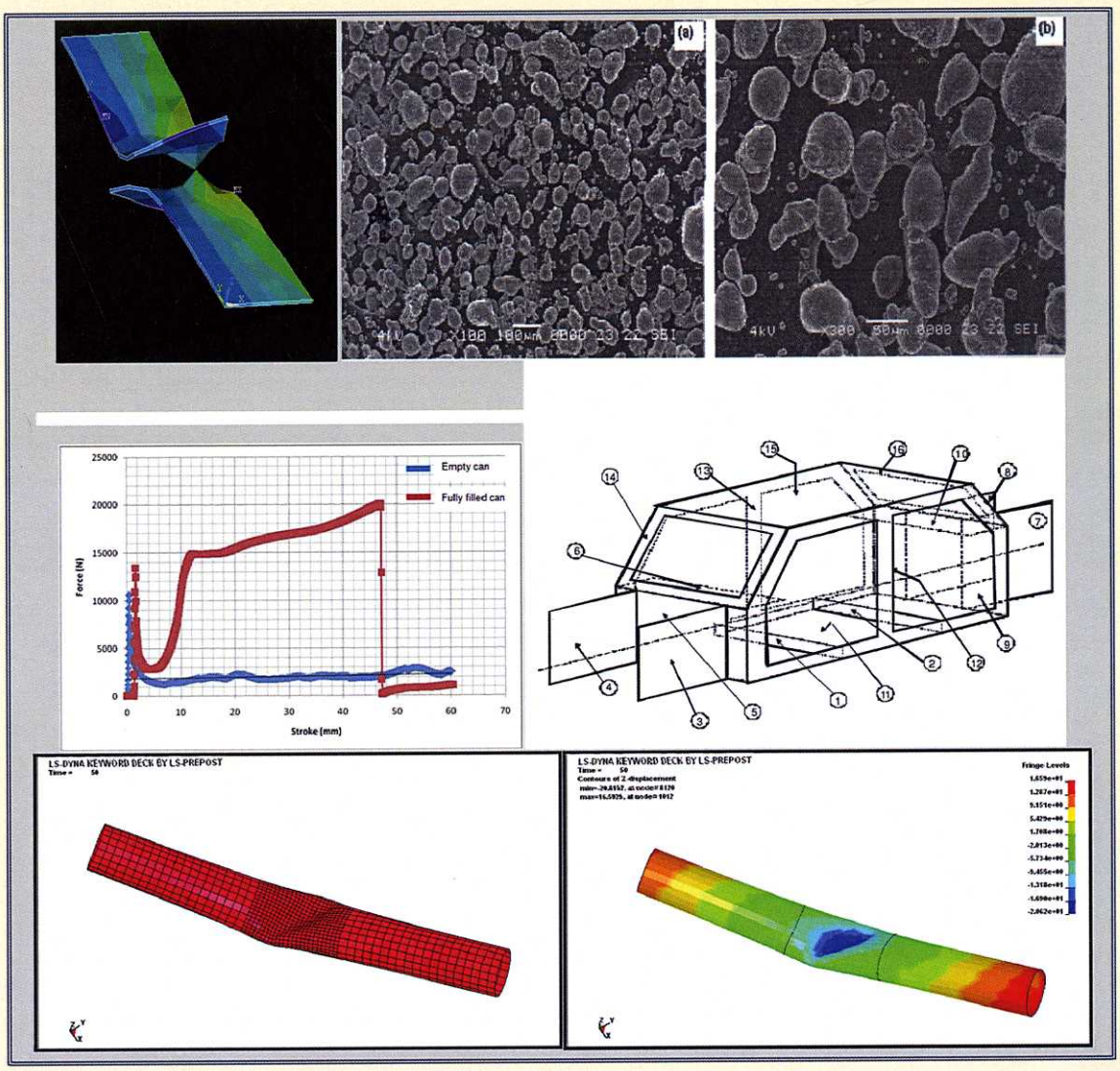
ADVANCED TOPICS IN MECHANICAL BEHAVIOR OF MATERIALS



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Meftah Hrairi

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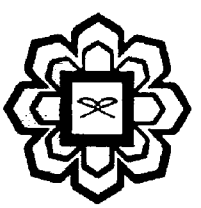

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SIMULATION RESULTS OF LIQUID SLOSH IN A PARTAILLY FILLED CYLINDRICAL TANK

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

1. INTRODUCTION

A 3D model of liquid slosh inside a partially filled tank is done by using Smoothed Particle Hydrodynamics (SPH) method of LS-DYNA software package. The validation of the simulation model was performed against the experimental results for various filled of water volume in tank. Majority of the previous slosh analyses have thus been made in the scope of laminar flows. The results of the strain are discussed in the following sections of liquid fill levels of 50 % and 70%. Moreover the discussion will focus also on the liquid slosh behaviors of the simulation model of SPH which represents the water inside the cylindrical tank, and the figure shows the liquid slosh at different time histories of 0, 10, 20, 30, 40, 50, 60, 70 ms.

2. RESULTS

A three-dimensional finite element slosh model is developed on the basis of SPH technique and validated against the experiments for certain conditions. The model validity was analyzed for tank configurations with three fill volumes (50% and 75%). The analyses comprise the evaluation of the model's applicability in the transient and steady-state fluid slosh, which were conducted under the single-cycle sinusoidal and idealized ram-step, and constant linear excitations, respectively. It is assumed that the entire motion of the fluid has a free surface and is unsteady and incompressible. During the first part of the tank motion the fluid behaves as a rigid body, but after impact the sloshing motion is violent. Nevertheless the flow regime is assumed to be laminar throughout. This is a reasonable assumption s in this type of flow the phenomena at play are largely in-viscid and has the advantage of reducing th execution time and represents a good compromise between the accuracies. The finite-volume meth