Extracts from Report on

Crashworthiness of Bajaj Three-Wheeler

by

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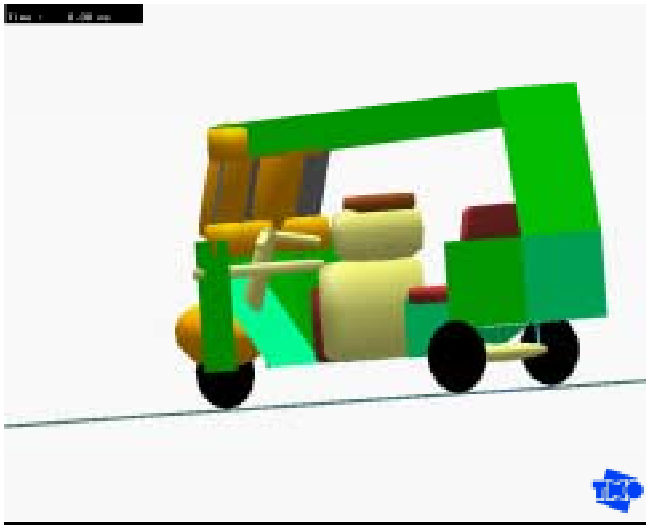
(Please see Publisher's Note at the end)

The objective of this work is to understand the injury encountered by the occupant as well as by the pedestrian during these impacts. The three-wheeler chosen is Bajaj Three Wheeler. The occupants as well as pedestrian are modelled using the standard dummies developed by TNO, Netherlands, for these impacts. The experimental data for the force deflection properties of the different parts of three-wheeler have been obtained from Bajaj Auto Limited.

While some of these models have been developed in commercial simulation packages, in some studies we have also developed the vehicle dynamic equations and implemented their solution in MATLAB. Figure below shows the model of the Bajaj three-wheeler as developed in MADYMO.

(Figure on next page)



We have developed a number of types of simulations for the TST:

1. **Impact of pedestrian with TST:** In this the impact of the TST with a stationary pedestrian has been studied.

2. **Impact of TST (with occupants) with rigid barrier:** Here the impact of the TST with a rigid wall has been studied when there is a passenger and a driver inside the TST.

3. **TST (with occupant) travelling over a Bump:** In this the TST with the occupants has been modelled when it goes over a speed breaker.

We have also studied various modifications like incorporation of seatbelts, paddings and changes in seating and have studied their effect in further improving the crashworhiness of these vehicles.

The figure below (on next page) shows the kinematics in one such case.


T = 0 ms


T = 20ms


T = 40ms


T = 60ms


T = 80ms


T = 100ms


T = 120ms


T = 140ms


T = 160ms


T = 180ms


T = 200ms


T = 220ms

T = 240ms

T = 260ms

T = 280ms

Related Publications:

1. Chawla, S. Mukherjee, D. Mohan, Jasvinder Pal Singh, Nadeem Rizvi, Crash simulations of a three wheeled scooter taxi (TST), Proceedings of ESV 2003 held in Nagoya Japan, in May 2003.

2. Chawla, S. Mukherjee, D. Mohan, Rajiv Kr, Tushar Gavade, FE Simulation studies of a three wheeled scooter taxi, Proceedings of China PAM, Beijing, Nov 17-18, 2002.

3. D Mohan, J Kaizer, KS Bawa Bhalla and A Chawla, Imact Modeling Studies for a three wheeled scooter taxi, Journal of Accident analysis and Prevention, Vol 29, No 2, 1997, PP161-170.