CRASH SIMULATIONS OF THREE WHEELED SCOOTER TAXI (TST)

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ABSTRACT

This paper reports the rigid body based simulations for frontal impact of Three Wheeled Scooter Taxi (TST) with a rigid barrier and those of a TST with a pedestrian in different spatial configurations. The simulations have been carried out in MADYMO™. The paper describes the development of the TST model, assesses the scale of injuries to the driver, occupant and pedestrian during the occurrence of these impacts and analyses the crashworthiness of TST. It is observed that even with small changes in the TST there is significant improvement in the injury indices. We thus believe that there is a considerable scope of improvement of the crashwothiness of the TST.

INTRODUCTION

TST's plays a major role as para-transit modes in most Indian cities. However, the increasing concern of the general public and official agencies with road traffic crashes has focused attention on the safety characteristics of TSTs also. Most scientific studies on road traffic crashes and possible countermeasures originate mainly from a handful of nations in Western Europe, North America and Japan. As a result, a major proportion of the safety research effort has focused on the problems of the car occupant. Much less is known about the vulnerable road users (VRUs), who are not protected by a vehicle shell designed for crash worthiness according to international standards. This category of road users includes not only pedestrians and cyclists, but also motorized two-wheeler riders, occupants of three-wheeled scooter taxi's (TST), and cycle rickshaws, which are common in India. According to data available with us the total number of road traffic deaths in Delhi was 1,768 in 2001, of which TSTs were involved in 2-3 percent of the cases and approximately 2% of the fatalities were occupants of these vehicles [1]. TSTs comprised two percent of the vehicle population in Delhi in 2001 and they were involved in approximately 12 pedestrian (total 907) and 8 bicycle (total 171) fatalities. The data on fatalities are not detailed enough to draw conclusions about safer designs for each type of vehicle. However, some trends can be observed. While the TSTs do not account for a high number of fatalities, these numbers are significant keeping in mind the fact that the number of TSTs is only about 2% of all the vehicles. Though buses, cars and trucks account for a major portion of the fatalities the popularity of the TST can be further enhanced if it is perceived to be a safer vehicle by the users.