International Journal of Engineering and Technical Research (IJETR)
ISSN: 2321-0869, Volume-2, Issue-12, December 2014

Different Type of Crash Testing

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***Abstract*— In response to growing concerns about incompatibilities in collisions between cars and light trucks (i.e., pickups and SUVs), representatives from automobile manufacturers, the Insurance Institute for Highway Safety (IIHS), and other international vehicle safety organizations agreed in 2003 to develop collaborative recommendations to improve vehicle crash compatibility.**

***Index Terms*—SUVs, IIHS, Hiway Safety.**

I. INTRODUCTION

The Ministry of Road Transport and Highways formulated the Central Motor Vehicle Rules (CMVR) to ensure road worthiness of vehicles. Stated briefly, the rules framed are as given below:-

- Rear view mirrors, besides passing the test of durability, have to provide the driver a specified rear field of vision.
- Horns have to comply with sound level limits.
- Seats and head restraints must conform to prescribed requirements of backrest strength.
- Lighting equipment must be so placed as to satisfy the height and position requirements governing such installations.
- Windscreen equipment should meet wiping area requirements and be able to function even in very high and low temperatures. The wash pump should be able to pump water in spite of adverse throttling.

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II. EXPERIMENTAL QUASI-STATIC AND DYNAMIC TESTS

Experimental dynamic tests on cylindrical tubes .All the dynamic experimental tests reported in this paper were performed at the Picchio S.p.A. plant in Ancarano (TE) using a drop weight test machine with a 6 m free-fall height and a maximum mass of 413 kg. For the experimental tests on cylindrical tubes was used an impact mass of 294 kg and an initial velocity of about 4 m/s. During the tests every tube was supported at the bottom
edge on a metallic base with air holes. The acceleration of the mass and the velocity at impact were measured using an accelerometer with 180 g full-scale and a photocell, respectively.All the tubular specimens were manufactured with an outside chamfer so that the crushing begins in the highly stressed region at the tip of the chamfer and this develops into a stable crush zone. After the tests, the diagrams representing the variation of the acceleration with the time are analysed and filtered with a CFC60

- **Finite Element Analysis [14]**
  Finite element method is used to analyze structures by computer simulations and therefore it helps to reduce the time required for prototyping and to avoid numerous test series. The modeling and analysis will be done using Finite element Analysis software.
- **Steps for finite element analysis:**
  FEA is mainly divided into three following stages:
  - Preprocessing
    - Creating the model.
    - Defining the element type
    - Defining material properties
    - Meshing
    - Applying loads
    - Applying boundary conditions
  - Solution: Solving the pre-processed geometry using a suitable Solver
  - Post processing: Review of results such as deformation plot, stress plot, etc

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III. FULL-WRAP FRONTAL COLLISION TEST:-

Dummies are placed in both the driver's and passenger's seats and the vehicle is made to collide with a concrete barrier at a rate of 55 km/h. Actual collisions of this type tend to occur at speeds lower than that of this test. The dummies are then checked for injuries to the head, neck, chest and legs, the vehicle is checked for damage and deformation, and the results are used to evaluate the degree of passenger protection in 5 levels.

The results of this test do not apply to collisions at extremely high speeds, and other types of collisions such as when passengers are not wearing seatbelts, and collisions in which one of the vehicles is a large truck.

Consequently, the results of this test are more reliable when comparisons are made between vehicles with more or less similar body weights. In other words, when the weight of test vehicles is similar, the safety performance of vehicles with higher ratings is greater than those with lower ratings. However, just because vehicle A with a weight of 1000 kg has a higher rating than vehicle B with a weight of 1500 kg does not necessarily mean that vehicle A is safer than vehicle B.

Manuscript received December 02, 2014.

IV. OFFSET FRONTAL COLLISION TEST:-

The dummies are placed in the driver's and front passenger's seats and the test vehicle is made to collide head-on with an aluminum honeycomb, on the driver's side (at an offset of 40%). The dummies are checked for injuries to the head, neck, chest and legs, the vehicle is checked for damage and deformation, and the results are used to evaluate the degree of passenger protection in 5 levels.

As the impact is with only one part of the vehicle, the force exerted on the dummy is less than in a full wrap frontal collision. However, while the latter collision test is suited to evaluating restraining devices (such as air bags and seatbelts) used to protect passengers; the former test is more suited to evaluating injury to passengers from the deformations caused to the body of the vehicle.

Actual collisions of this type tend to occur at speeds lower than that of this test. It may be noted that the results of this test do not apply to collisions at extremely high speeds, and/or other types of collisions such as when passengers are not wearing seatbelts, and/or collisions in which one of the vehicles is a large truck.

Details of further improvement with different another process of testing with detail procedure will described in next paper

V. CONCLUSION

In this presentation the composite material model in LS-DYNA enhanced respectively implemented with in the CRASURV project has been described and their failure parameter has been discussed. Using simple test problem, the general mode of operation was shown

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