

CASE STUDY



HyperWorks Cuts Design and Prototyping Costs for Truck Cabin Development and Testing

Overview

Using HyperWorks, Eicher Motors was able to significantly reduce the number of physical tests during the development process of their truck cabins. The numerical simulation helped in predicting the failure mode and estimating the stress level in the individual components in elastic as well as plastic zone prior to the first physical test.

Business Profile

Eicher Motors (www.eicherworld.com) was established in 1982 to manufacture a range of reliable, fuel-efficient commercial vehicles of contemporary technology. The unit manufactures market commercial vehicles with Gross Vehicle Weight (GVW) ranging from 5 to 40 ton.

Challenge

Introduction of occupant protection norms for commercial vehicles in India in line with ECE norms (which are already in place in Europe) call for design validation of existing cabins. This requirement is also the prime criteria for new product development. During the traditional product development cycle a number of physical tests are carried out to validate design. The primary objective of a CAE based development cycle is to cut time and cost using numerical simulation methods to reduce / limit number of physical tests. HyperWorks based Validation workflow helped Eicher Motors meet these design targets.

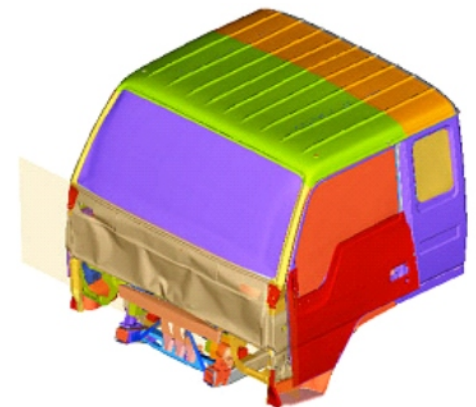


Figure 1
Numerical simulation of frontal impact test



“Virtual testing using HyperWorks has become an integral part of design and development process of our cabins.”

R. Grover
DGM – Product Development
Eicher Motors Limited, India



Solution

Physical tests were performed for the initial design and the data was collected. This data was used to correlate the performance of FE model in numerical simulation under similar loading conditions. The baseline FE model was used for further design iterations and virtual testing was performed. By performing this virtual test Eicher arrived at the final design configuration and the final physical test was carried out to verify the design performance.

Results

Numerical simulation using HyperWorks is an integral part of the current CAE driven design process. Eicher verified the existing product range under ECE- R29 norms and also developed new variants of cabins for the commercial vehicles.

Benefits

HyperWorks simulation methods helped Eicher in reducing expensive physical tests during development process. This helped in assessing the failure mode of the design iterations prior to the first physical test. As a result, Eicher is now able to evaluate their design ideas in a more cost effective and faster manner.



Figure 2
Numerical simulation of rear wall strength test

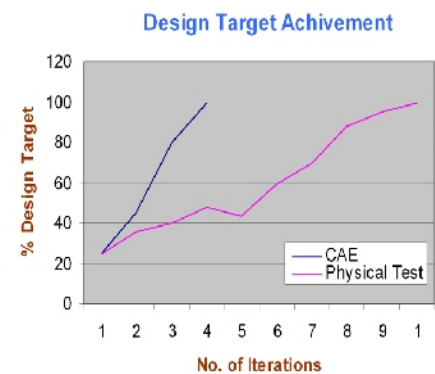


Figure 3
Reduction in no. of physical test using numerical simulation



Figure 4
Physical test setup

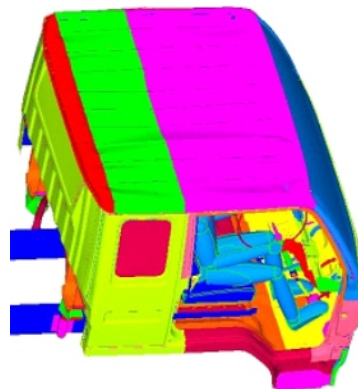


Figure 5
Numerical simulation of roof crush resistance test

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