



SUMMARY

There have been many changes in our world last century. Environment's the tor significance is known and because of that there are some standards to save the environment such as Euro standards. These Euro standards especially control the exhausting of emission and harmful gasses and these standards are obligatory to car companies. Emission gasses are increasing with more weight. Therefore, Renault OYAK wants to lightweight the car. The aim of the project is to develop a new cockpit carrier Renault-Fluence for model design automobile. In this study Hypermesh software is used to create FE model. Frontal impact tests are simulated in LS-Dyna software and Static and Modal Analysis are simulated in HYPERWORKS software in RADIOSS module. Designed parts with different thicknesses are compared to decide the optimal model at the end of the study.



Static and modal analyses are both applied in Hyperworks/Radioss module for the baseline and new designs. For the best design the maximum displacement (0.37 mm), maximum stress (65.03 MPa), and the frequency (101.04 Hz) are observed.



PROBLEM DEFINITION

In this project, new designs of the Cockpit Crossmember are to be developed. Weight of the Crossmember will be reduced by the thicknesses of the decreasing contained. New designs components should be within the limits of following criteria;

- Minimum weight
- Maximum strength
- Decrease in overall cost





DESIGN OF AN AUTOMOBILE COCKPIT CARRIER

Department of Mechanical Engineering, Ankara, APRIL 2012 Senior Students Soner CINOGLU, Burak OLCEK, Meric EKICILER, Salih BAYRAM Supervisors : Assoc. Prof. Mehmet Ali GULER, Dr. Çiğdem Zeytin DERIN

• Compliance with existing components

The crash analyses are performed in Ls-Dyna. The crash models are chosen in accordance to the best result of modal and static analyses. The final model is specified lastly using the results of crash simulations. On the crash simulation, the maximum stress is found as 450 MPa.



Energy Balance Graph for Crash Simulation



CONCLUSION

The aim of the project was to develop a new light weighted design for Cockpit Crossmember. Therefore, the finite element model of the vehicle is created, then displacement and Von - Mises Stress Results are investigated in order to gather acknowledge about components, before the thickness values are reduced. According to these analyses and crash test results, new designs are specified. After that, the optimum design with reduced thickness from the baseline is determined.

	Base Design	Design No:1	Design No:2	Final Design
Total Mass [kg]	8.641	8.108	7.476	7.706
% Mass Change	-	6.16	13.48	10.82
Factor of Safety	5.24	4.60	3.90	4.23



