

# MADYMO and LS-DYNA; the Strength of a Combined Approach

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## Summary:

While safety legislation becomes more stringent and vehicles intended for global markets must conform to the requirements of a wider range of regulatory bodies, the cost of physically testing crash safety performance continues to rise and the vehicle safety system design is under high pressure to adopt virtual development techniques.

Structural analysis and safety system optimization have traditionally been undertaken in two totally different computational environments.

MADYMO is the worldwide standard occupant safety simulation software. It is renowned for its fast simulations, high-quality dummy models, and accurate restraint system modelling techniques. LS-DYNA is known for its accurate and robust structural FE calculations, optimizing the vehicle structure for crash integrity and deceleration levels.

This presentation describes the mechanism to couple MADYMO and LS-DYNA to take full benefit of the best of these two worlds to further enhance the performance of vehicle safety performance designs. Due to the large number of simulations required, restraint system design and optimization can be done in MADYMO, using input from FE analyses and/or tests. The MADYMO dummy + optimized restraint design can then be implemented in the LS-DYNA vehicle model to verify and fine-tune the restraint performance in the full vehicle crashworthiness analyses. The use of the same MADYMO dummy model in the total design process ensures a transparent and controlled manner of judging the restraint performance. Typical use case examples will be presented to show the benefit of the combination of MADYMO and LS-DYNA.