

Continental Automotive 

## Automated Evaluation of Occupant Simulations in Vehicle Safety

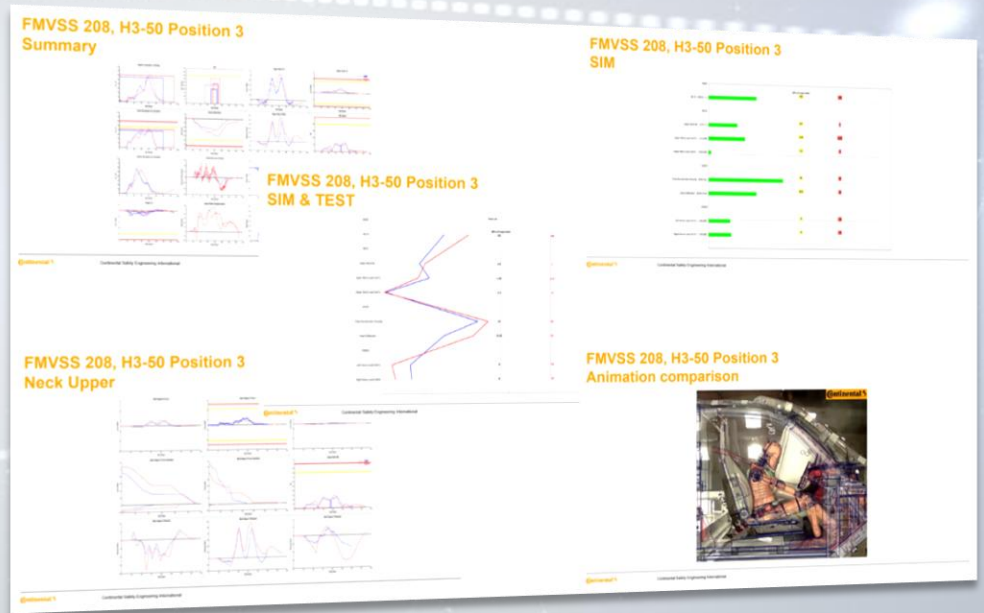
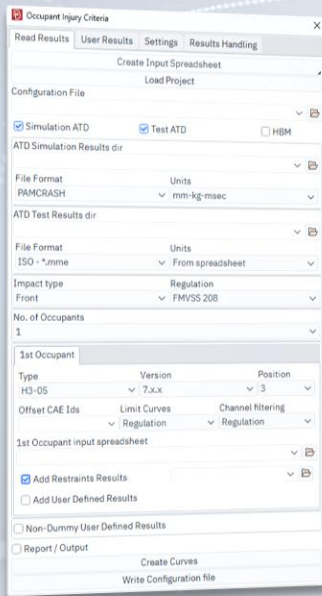
Occupant Injury Criteria Tool and META Automation

Ensuring occupant safety is a key aspect in vehicle development. As designs become more complex and regulatory standards continue to evolve, simulations based on the Finite Element Method (FEM) have become essential tools for evaluating occupant protection systems. However, the post-processing of simulation results, particularly when comparing them to physical crash and sled test data, can be time-consuming and prone to inconsistency. To address these challenges, an automated solution was deployed, leveraging the automation capabilities of META, the Post Processor of BETA CAE Systems, and in particular its Occupant Injury Criteria (OIC) tool to streamline the evaluation process, standardize reporting, and enable efficient, reliable validation of occupant safety performance.

“As technology leader in integrated safety systems, we are always looking for improvements in our processes. The ‘OIC Tool’ and associated scripts make it much easier and less time consuming to evaluate and compare simulation runs. Particularly noteworthy is the repeatability for different projects and load cases, which is guaranteed by the use of these tools.

We thank BETA CAE Systems for the detailed support.”

Tobias Daecher  
CAE Engineer  
Continental Automotive



## Challenge

The evaluation of occupant simulations often involves extensive manual effort to extract injury criteria, create visual outputs, and compile reports that align with safety regulations. This process becomes increasingly demanding when integrating data from multiple solvers and comparing it against physical test results. Without automation, the workflow is not only time-intensive but also susceptible to variability, making it difficult to maintain consistency and efficiency in safety validation activities.

## Approach

An automated workflow was developed using the Occupant Injury Criteria (OIC) tool to streamline the evaluation of occupant simulation results. This workflow leverages the tool's advanced automation capabilities to enhance efficiency and ensure consistent, standards-compliant outputs.

The solution includes:

- Automated processing of simulation data from multiple solver formats.
- Automated generation of PowerPoint reports, incorporating plots, animations, and side-by-side comparisons with physical crash test data.
- Integration of predefined regulatory thresholds within the OIC tool, en-

abling rapid validation of injury metrics against FMVSS and ECE standards.

The OIC tool serves as the central interface for injury criteria evaluation and report generation, offering a unified and efficient environment for occupant safety assessment.

## Results - Benefits

The implementation of the automated workflow delivered measurable improvements across several aspects of the occupant safety evaluation process:

- Significant reduction in post-processing and report generation time, accelerating overall project timelines.
- Standardized output formats, ensuring consistency across evaluations and alignment with FMVSS and ECE regulatory requirements.
- Integrated comparison with physical test data, enabling direct and reliable validation of simulation results.
- Streamlined workflow and intuitive tool usage, reducing training time and increasing overall operational efficiency.

For more about BETA CAE Systems, visit [www.beta-cae.com](http://www.beta-cae.com)