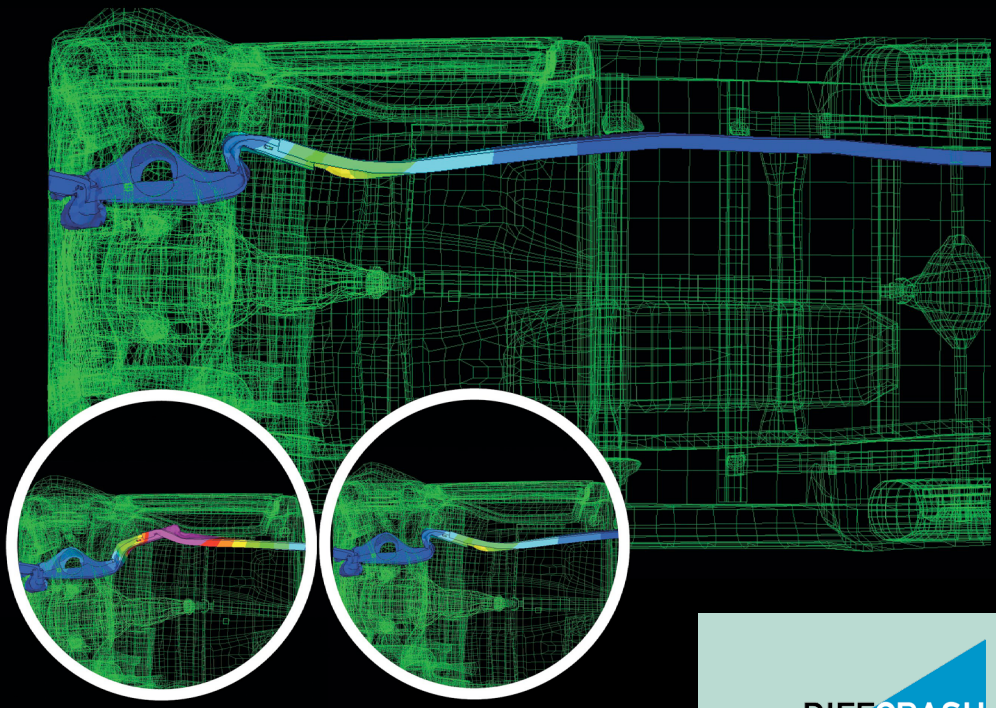
SIDACT GmbH

Simulation Data Analysis and Compression Technologies

DIFFCRASH:
IMPROVE ROBUSTNESS OF CRASH SIMULATION MODELS



DIFFCRASH

ROBUST ANALYSIS WITH DIFFCRASH

DIFFCRASH® is an advanced CAE tool supporting automotive engineers to derive design suggestions and develop robust crash models.

CHALLENGE

For the design and optimization of car models it is very helpful to deal with a simulation model, which generates similar results even if slight changes of the model are performed.

The keyword here is **predictability**. In crash simulations however, quite often there are large deviations among the calculated results. These deviations are caused by instabilities within the model. Those can be of physical nature like buckling or contact/non-contact issues as well as numerically driven.

Both physical instabilities in automobile design and numerical instabilities in simulation packages often cause extremly sensitive dependencies of simulation results.

SOLUTION

DIFFCRASH therefore was developed to encounter these problems and deliver a CAE tool which makes it possible to find the critical/sensitive regions, derive design suggestions and thus lead to a more robust model.

FOCUSSING

Analyzing a set of simulation runs DIFFCRASH with its advanced data reduction methods allows the focus on the most important crash events.

BETTER UNDERSTANDING

Highlighting structures with high variations and visualizing scatter modes the engineer gets a deeper understanding about the crash behaviour.

IMPROVE STABILITY

Finding parts which strongly determine the scatter at other parts allows to derive appropriate design adaptations. („Determine the root cause“)

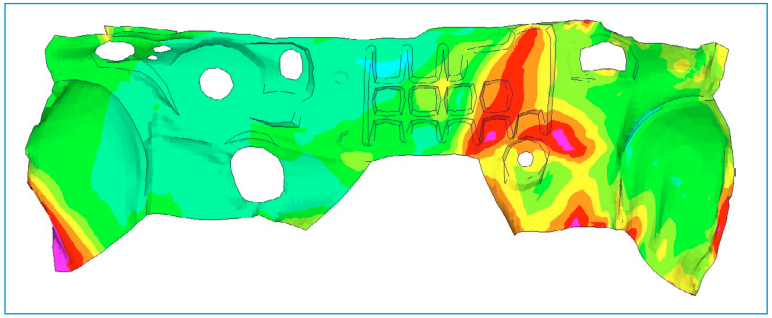
EXAMPLE WORKFLOW

Where does the scatter at the firewall come from?

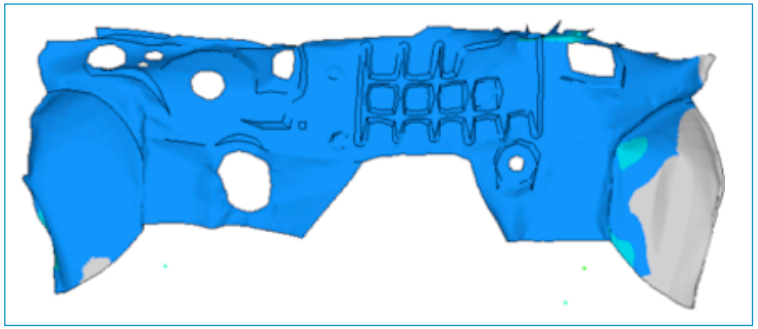
PHASE 1

Automatable

Strong scatter occurence



Compare



Significantly reduced scatter

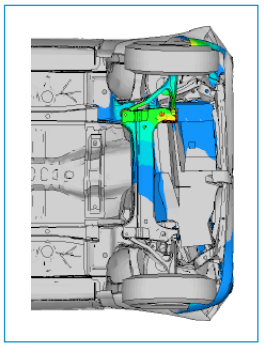
Find root cause

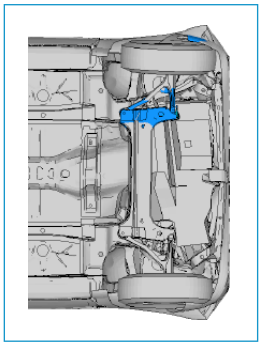
Verify changes

PHASE 2

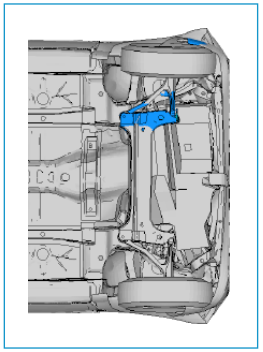
Interactive

Found bifurcation point for 2 different crash behaviours as a root source for the scatter at the firewall





prefered case



Engineer derives adaptation of the model to get get prefered crash behavior.

Derive design- changes

KEY FEATURES

IMPROVE MODEL STABILITY

Specialized to analyse a set of simulation runs, DIFFCRASH delivers a unique combination to perform robustness analysis. The statistical methods deliver several fringe plots as a result to easily be able to judge whether or not there is strong scatter occurrence among the simulation results. Combined with the powerful dimension reduction algorithm the analysis can then pushed further to track down root causes, where the scatter originates. With this knowledge the engineer is able to derive design suggestions.

KEY FEATURES

Understand scatter propagation

Understand structure of scatter

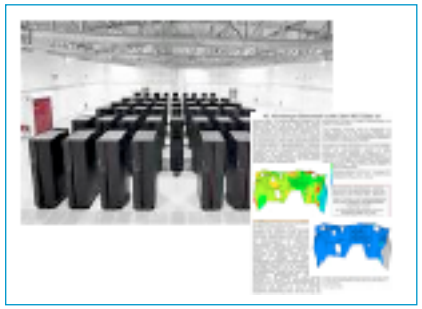
Investigate causal chains

Find root causes for scatter

Derive design refinements

SEAMLESS PROCESS INTEGRATION

HPC



Automatic analysis with DIFFCRASH

DIFFCRASH does not alter existing workflows while providing the benefits of automatic and interactive scatter investigation.

WORKSTATION

Interactive work with Post-Processor plugin of DIFFCRASH

DIFFCRASH is made to fit into the workflow used by engineers.
The support of several Post-processors (GNS Animator, Arup D3PLOT, Altair HyperWorks) with a DIFFCRASH plugin allows to interactivly perform Phase 2 and let the engineer work within his familiar environment.

FREE EVALUATION

Discover how you can benefit from Diffcrash and ask for a free evaluation license.

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Modells used for this flyer:
Chevrolet C2500 Pickup, Dodge Neon both available from the NCAC.
„The models have been developed by The National Crash Analysis Center (NCAC) of The George Washington University under a contract with the FHWA and NHTSA of the US DOT“