

“With the simulation solution veDYNA a valid statement concerning the trailer stability can already be made in the run-up to the first road trial.”

Josef Strasser
Design
Trailer connecting parts

Knott accelerates the validation of the control system by determining accurate stability limits

The companies within the KNOTT Group develop, design, manufacture and distribute chassis components for trailers and braking systems for commercial and off-highway vehicles according to the highest standards of quality. Knott employs the vehicle dynamics software veDYNA of TESIS DYNAware for the validation and pre-calibration of their electronic trailer stabilization (ETS).

The Challenge

- Development of electronic controlled systems for the stabilization of the trailer in vehicle-trailer combinations
- Reaction time between detecting the sway motion and intervention of ETS is minimized
- Simulation of trailer brake systems for optimized brake response, especially at the driving limits
- Optimized control of the hydraulic brake system depending on precise consideration of blocking propensity of the trailer wheels during braking, especially at the driving limits

Decision for TESIS DYNAware

veDYNA is a vehicle dynamics software for the fast simulation on PC platforms and the development of vehicle control systems in real-time environments. It combines high-precision models for the vehicle dynamics with efficient numerical solvers in order to guarantee high performance on all simulation platforms.

The Solution

- Creation of a simulation environment in order to simulate vehicle-trailer combinations
- The vehicle models are implemented as fully modular systems in Matlab/Simulink
- For the validation of the ETS system, the controller code was implemented as a Matlab/Simulink s-function and directly integrated into the veDYNA model for the vehicle-trailer combination
- Encapsulation of the control system in a separate s-function in order to reuse the simulation model in all development stages
- Vehicle states required for the detection of the swaying motion (e.g. trailer yaw rate, friction torque and trailer brake pressures issued by the controller) are exchanged via connecting lines in Simulink

The Benefit

- **Stability limits can be determined accurately**
 - ▶ Layout of the controller parameters
 - ▶ Function validation
- **Support during the entire development process**
 - ▶ Reusability of the simulation model in all development stages
 - ▶ Software emulation of the controller can easily be exchanged by the physical control device in a hardware-in-the-loop setup
- **Validation of the control system is accelerated**
 - ▶ High performance and system stability of veDYNA
 - ▶ Large number of simulations can be carried out in a short time
- **Risk minimization for driver and vehicle due to reduction of physical tests**

Contact

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