SayField International brochure, 1996

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In this leaflet, the professional activities of the one-man consultancy company SayField International will be illustrated. The key activity of SayField can be described as:

Virtual Prototyping of mechanical products, making use of commercially available and in-house developed mathematical simulation tools

The founder of SayField, Chris Verheul has had 10 years of experience working with simulation codes at the Delft University of Technology and at the TNO Road-Vehicles Research Institute in Delft. A few of the examples mentioned here are projects initiated or performed in this period.

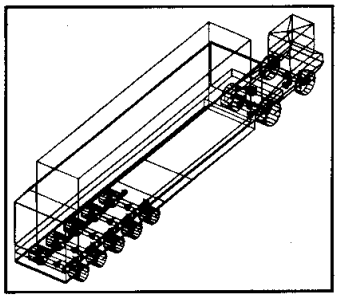
Mathematical simulations are a cost effective means for analysis, evaluation and visualisation in the design phase of new products. In former days, people used to make *Prototypes*, hand-made first products only made to test the new product. Making a mathematical simulation model (in other words *a Virtual Prototype*) can be done for a fraction of the cost and with comparable or better output of tests and evaluations.

Examples of simulation models

A number of simulation projects in which SayField is involved will be explained to illustrate the scope of the work field.

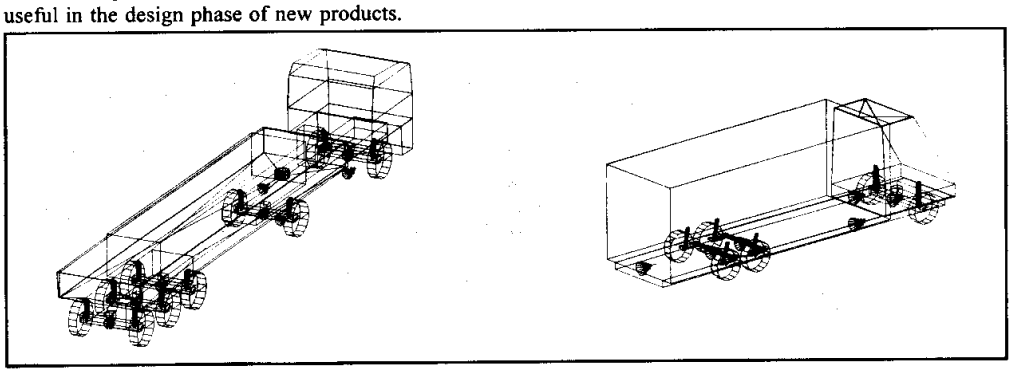
Double Stack Trailer

For BUISCAR, a project is performed in cooperation with the Delft University of Technology for the design of a new Double Stack Trailer. Simulation models are made and used to analyze vehicle roll-over stability and for the design of a steering algorithm required for minimised tyre wear and optimised vehicle handling. The final product design is based on a self bearing space frame of the gooseneck type to ensure roll-over stability. Five air spring suspended axles are applied to reduce axle loads on the terminal premises.



PARADYME

In cooperation with Dutch manufacturers of commercial vehicles and vehicle components, a project is completed to evaluate a simulation tool useful in the design phase of new products.



Parallel to the market study, the simulation program PARADYME was developed. Specific features of this program are a strong support of modular model components and a database oriented component library. PARADYME is now commercially available at TNO. SayField has a sales licence of the product and strongly contributes in the design and development of the program code.

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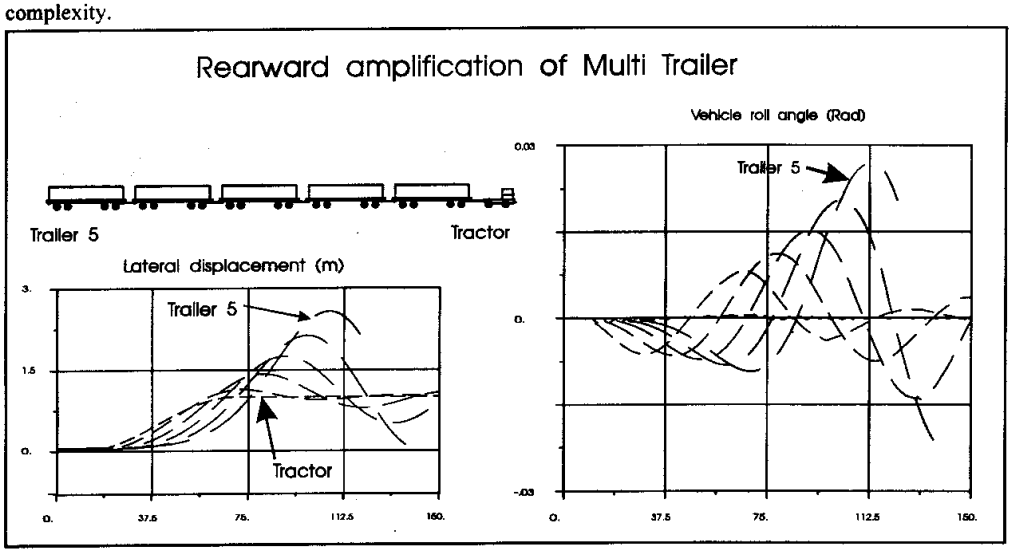
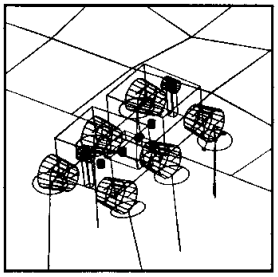
Analyses of long commercial vehicles

The continuous search for more economical means of road-transport has lead to an increased interest in Road Trains. Actually, the first version of PARADYME was made for dynamic analysis of Road Trains in Australia. The knowledge gained in Australia with the program will be invested in improving the program, thus making it more useful for the Dutch market also. One application where PARADYME is used currently is the development of a Road Multi Trailer system based on the Multi Trailer system which BUISCAR currently builds for the ECT. The dynamic problems in making a vehicle system that has both good path following properties at low speed and is still stable at higher speed are analyzed using different simulation models with increasing complexity.



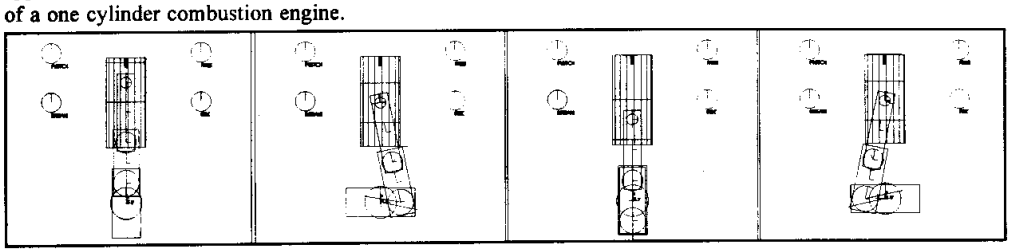
Real time simulation models

Real time simulation models have the special quality that calculations can be performed with the same speed as the modelled system itself. In recent days, real time models with reasonable complexity can be run on a low cost (i.e. PC) hardware platform. Practical use of these simulation models is more realistic than people often realise. The education of commercial drivers becomes more economical and practical situations can be exercised better with a real time simulation model in a virtual environment. Also for the normal driving licence, quality of the education could gain from using real time simulation models. Another example is a model used to predict the position of a vehicle driving on Mars. Use of the real time model in this situation, drastically speeds up the control loop of telematically driving the vehicle.



Other simulation applications

The above examples of simulation models mainly concern vehicle systems. The application field of simulation models is much wider. The example is shown of a one cylinder combustion engine.



With the model, problems and possibilities were analysed of a design modification in the piston rod that allows a multi-piston engine to run with some of the pistons fixed to the cylinders. The simulation model showed the forces on the different parts of the system. Close examination of the simulations resulted in a feasible algorithm for parking and releasing the rotating and translating parts of the crack-slider mechanism.

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