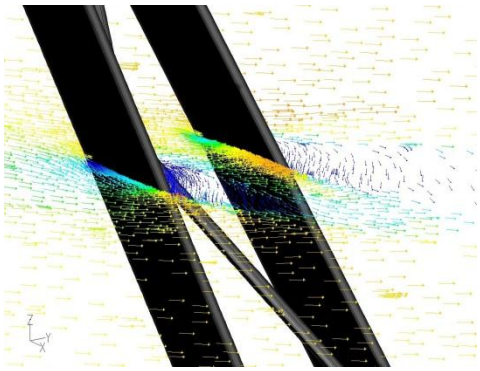
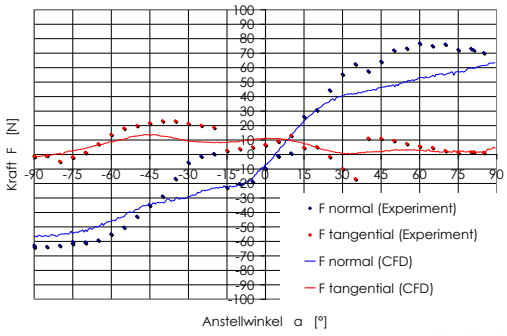
Gone with the Wind (2. part)

Years ago Vialis NMA Railway Signalling has gone an entirely new way to develop railway barriers. This innovative barriers have a decisive advantage compared to the products of other competitors in the market. Because of the aerodynamically optimized shape the barrier always falls into the traffic protecting horizontal position in case of an energy break down. In the development process of this barrier FlowMotion has performed intensive wind tunnel tests to minimize the forces, which would keep the barrier in an upright position for certain wind directions.

In these wind tunnel tests a 1m segment of the barrier has been connected to a force and moment measuring system, to determine the relation between wind speed and direction and the resulting forces.





The primary target of the current study was to determine the forces and moments for real wind conditions and all possible positions of different barrier with respect to the ground. To maximize the accuracy all fluid dynamical effects like vortices at the inner structure and the barrier tips has been taken into account.

Due to the large number of different cases (barrier geometry, wind speed, wind direction, position of the barrier) and since only vertical positions could have been investigated in a wind-tunnel, flow simulations (CFD Computational Fluid Dynamics) has been used to obtain the required data. In these numerical study the real 3D geometry of the barrier has been modelled in the computer, the flow field has been simulated and the forces have been calculated by data post processing.

The accuracy of the simulation has been determined by comparing the previous results of the wind tunnel test with an equivalent simulation of the wind tunnel flow. Within the scope of the project the comparison has shown a good agreement between the simulation and the measurements, although the geometry of the barrier is rather complex.

In the simulation even smallest rag producing geometrical details have been taken into account. The found vortices in the flow field along the framework structure of the barrier underline the necessity of this highly detailed modelling.

The calculation of the forces for each barrier and wind conditions and the visualization of the causing fluid dynamical effects helps Vialis to position their products in the rapid changing market of the future.

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