# Optimization of the bending resistance for sheet metal parts in the automotive industry

In the automotive industry, measuring and predicting the bending resistance is a functional relevant issue. Especially for flat geometries like roofs, front hoods or trunk lids it is difficult to fulfil an adequate bending resistance because the curvature of the parts is an essential factor between suitable car package and sufficient bending resistance. Currently only basic approaches exist to predict the bending resistance and often big differences between predicted and experimental obtained values occur. This can lead to expensive modifications in the maturation phase of the product development process. Therefore it is desirable to have an accurate method for predicting the bending resistance of flat sheet metal parts in the virtual world. Therewith it should be possible to identify the most relevant parameters for an optimization without violating the hard package restrictions.

Figure : A car roof for the bending resistance test
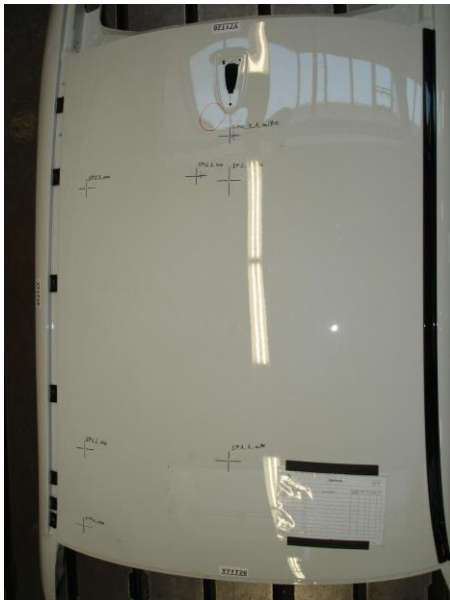
The tasks of this project are

- Collecting the data of current tests for the measurement of bending resistance
- Simulating the behaviour of the sheet metal parts under the same boundary conditions as current tests
- Systematic analysis of simulation results and the identification of the suitable geometric representation (Gaussian curvature, mean curvature, etc.)
- Parameterization of input quantities (length, width, thickness, radii, etc.)
- Optimization with suitable methods and verification of better bending resistance with numerical laboratory.

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