EfoS

Surface change in car body part manufacturing

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Abstract

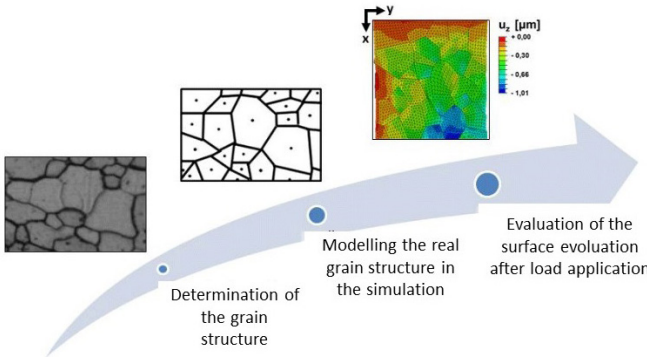
The aim of this project is to develop a universal qualification methodology for sheet metal forming of car body, considering the strain influence on subsequent processes (bondability, corrosion protection, paint appearance).

Project description

The experimental basis of the project is the development of a laboratory test methodology for generating different strain states on large, flat sheet metal samples. This testing methodology is used to investigate material behaviour, in particular strain-induced surface changes caused by biaxial strains. Moreover, the correlation between surface changes and the quality of subsequent processes such as paint appearance, is analysed. In addition, a numerical model considering the grain structure of the sheet metal is developed for the forming-induced surface analysis. Based on this, a software for the qualification of forming sheets is being developed. This is designed to predict the surface changes of sheet metal in relation to the strain states and to enable qualified predictions to be made about its post-processing properties.

Results

In close collaboration with the project partners Filzek TRIBOtech and Opel Automobile GmbH, an application-oriented, experimental implementation path is being pursued. Filzek TRIBOtech is developing a tool for generating defined biaxial strains on flat sheet metal samples.
The focus of the research centre (PtU) is primarily on the scientific aspect. Thus, with the development of a numerical model, a tool is created that enables the prediction of the strain-induced surface transformation. A high degree of precision is to be achieved by transferring real grain structures and orientations. The modelling procedure is shown in Figure 1.



[1] Modelling of real grain structure

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