

## **MULTI MATERIAL MODELING WITH ANSA: AN APPLICATION IN THE AUTOMATED ASSEMBLY PROCESS AT FORD**

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**ABSTRACT**

The simulations of virtual models hold a key role during the design process of a vehicle. The numerous different components in a CAE model make its assembly one of the most demanding tasks during the model buildup.

Over the last years, the effort to achieve higher accuracy in crash test simulations has resulted in more detailed models. As a result, the FE representations used to connect the different parts vary a lot and get complex sometimes. To support effectively such time-consuming and error-prone modeling processes, the available tools should offer increased automation and standardization levels.

A commonly used method is to simulate the area of these connections by using different material properties representing effectively not only the material of the connecting flanges but also the heat affected zones in each flange. Ford-Werke GmbH in cooperation with BETA CAE Systems has come up with a fully automated process within ANSA pre-processor that reads the CAE and its connection file, assigning the proper connectivity to each connection. Additionally, with the use of external files assigns the needed materials in the area of each spotweld using the respective LS-DYNA keywords. Finally reports to the user the results of the assembly procedure and the final status of each connection.

The current paper explains the basic terms of the automated process mentioned above. Moreover, it presents the techniques used within ANSA to assemble a full analysis model in a fast and robust way combining different FE-representations and multi material assignment in the area of a connection