EnginSoft is a premier consulting firm in the field of Simulation Based Engineering Science (SBES) with a global presence. It was founded in 1984, but its founder and initial employees had been working in SBES since the mid '70s. Throughout its long history it has been at the forefront of technological innovation and remains a catalyst for change in the way SBES and CAE technologies in general are applied to solve even the most complex industrial problems with a high degree of reliability.

Today, EnginSoft is comprised of groups of highly qualified engineers, with expertise in a variety of engineering simulation technologies including FEM Analysis and CFD, working in synergic companies across the globe. We are present in Italy, France, Germany, the UK, Sweden, Turkey and the U.S.A. and have a close partnership with synergetic companies located in Greece, Spain, Israel, Portugal, Brazil, Japan and the U.S.A.

EnginSoft works across a broad range of industries that include the automotive, aerospace, defense, energy, civil engineering, consumer goods and biomechanics industries to help them get the most out of existing engineering simulation technologies.





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DATA SHEET

FEMFAT Software **Spot Welds and Self Piercing Rivets** Stress- and Force-based assessment

Stress- and Force-based assessment

Method

FEM models form the basis for FEMFAT spot analyses. Spot-welded joints are directly included or can easily be determined using information from an additional file. Two different concepts have been implemented, enabling an assessment of spot welds with the focus on either precision or speed:

Stress-based Assessment

For a stress-based assessment, the spot-welded joints are represented by a stiffness-optimized, detailed FEM model, generated automatically from the integrated remesher in the SPOT module or designated pre prozessors. This remesher identifies spotwelded joints defined in the model - either directly represented by beam, solid, CWELD elements, or specified in an external control file - and replaces them with detailed nuggets (see picture below). The next step is the stress analysis of the refined model, producing the basis for fatigue prediction.

Force-based Assessment

the well known Rupp method.

Your Benefits

- ✓ Open database structure



Both the rigidity and the strength of thin sheet-metal car body components are significantly influenced by their spot-welded joints. The joining technique used, and the number and position of the spot-welded joints, are extremely important, both technically and economically.

In addition, new joining techniques such as self-piercing rivets play a significant role in current designs.

FEM models used in body development contain detailed information on the number and positions of joints, where the individual jointing points are represented (e.g. CWELD).

Several modeling methods facilitate satisfactory simulation of the stiffness behavior of bodies in white for static and dynamic analyses. The FEMFAT spot software module is a simulation method focusing on stiffness and fatigue simulation of spot-welded and self-piercing riveted components.

> FEMFAT Spot is a product **MAGNA**

Spot-welded joints are represented by simple connections (beam, solid, CWELD). Fatigue analysis is based on analytical stresses computed from the connector forces and moments according to the JSAE-method, which is an improved version of

For both, the stress- and the force-based method, fatigue prediction is strongly related to test results stored in an open database. Customers can modify or even extend this open database by parameters gained from specific test data.

Choice of 2 complementing assessment methods ✓ Different spot weld models can be used simultaneously ✓ Interfaces to all common FEM tools

Includes generation of several spot-welded joint types

Results can be shown as color plots in the FEMFAT visualizer and in common FEM post processors