Your Benefits

- Two complementing assessment methods
- Different spot weld models can be used simultaneously
- Interfaces to all common FEM tools
- Open database structure
- 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
- Super element technique in Nastran

FEMFAT Interfaces

- Abaqus • ADAMS • ADVC • ANSYS • COSMOS • CREO
- DIADEM • DIGIMAT • HYPERMESH • I-DEAS • LS-DYNA
- MARC • MEDINA • MoldFlow • MotionSolve • NASTRAN
- nCode • Optistruct • PATRAN • PERMAS • Pro/MECHANICA
- Radioss • RPC • SIMPACK • TECMAT • TOSCA

FEMFAT spot is an optional module for the fatigue analyses in combination with FEMFAT basic, FEMFAT max or FEMFAT spectral.

FEMFAT spot

FINITE ELEMENT METHOD FATIGUE

Head Office:

Austria
Magna Powertrain
Engineering Center Steyr GmbH & Co KG
Steyrer Strasse 32, 4300 St.Valentin
Helmut Dannbauer
Senior Manager Simulation / Testing

FEMFAT Support and Sales
Phone: +43 7435 501 5300
femfat.support.mpt@magna.com

Sales Offices:

Japan
Magna International, Tokyo
Noriyuki Muramatsu
Phone: +81 3 3548 0310
noriyuki.muramatsu@magna.com

China
Magna Powertrain, Shanghai
Aisheng Tang
Phone: +86 21 6165 1662
aisheng.tang@magna.com

Sales Partners:

Brazil
Virtual CAE
Sao Caetano
Phone: +55 1142 2913 49
femfat.support.brazil@virtualcae.com.br

France, Belgium & Luxemburg
CIMES France
Valenciennes
Phone: +33 3274 1737 4
support@cimesfrance.com

India
Finite to Infinite
Pune
Phone: +91 86 6846 0087
femfat.support.india@finitetoinfinite.com

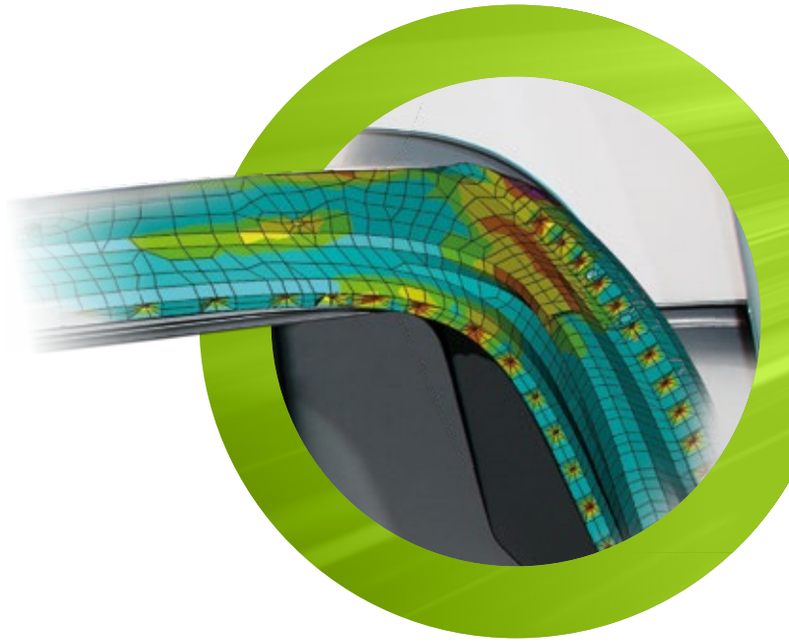
Italy
EnginSoft
Padova
Phone: +39 4977 0531 1
femfat.support.italy@enginsoft.it

Rep. of Korea
CAE-Cube
Anyang
Phone: +82 3134 43061 2
tjkim@cae-cube.co.kr

USA
Computer Aided Technology (CATI)
Ann Arbor, MI
Phone: +1 734 7863 721 101
rober.baack@cati.com

FEMFAT spot

BY MAGNA POWERTRAIN



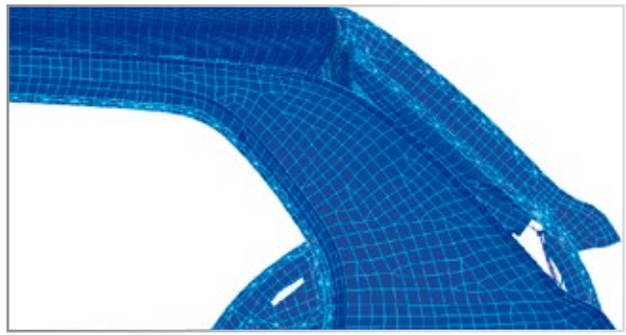
Spot Welds and Self Piercing Rivets

- Flexible Database
- Stress- and Force-based assessment
- Super element option

femfat.magna.com

Spot Welds and Self Piercing Rivets

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.



Body in white (rear area)

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.

Method

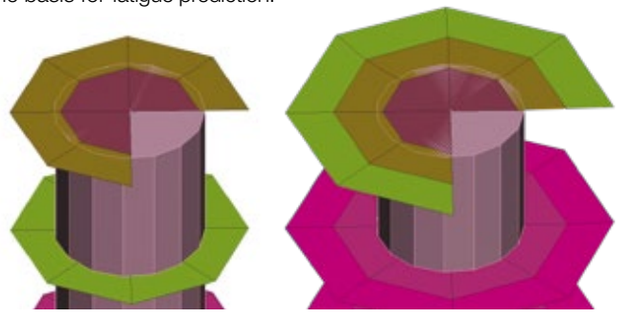
FEM models form the basis for FEMFAT spot analyses. Spot-welded joints are directly included or can easily be determined using information from an additional file.

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 spot-welded 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).

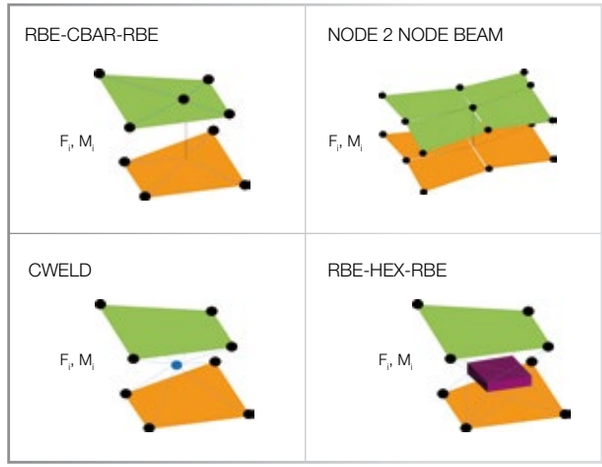
The next step is the stress analysis of the refined model, producing the basis for fatigue prediction.



FEMFAT spot nugget definition (stress concept)

Force-based Assessment

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 the well known Rupp method.



FEMFAT spot force based definition

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.