Forming Technology

Product Development

Process Technology

Fundamental & Applied Technology

The Forming Technology Research Department is providing advanced value added support to automotive customers through the development of forming and application technology of our advanced steel sheets and EVI (Early Vendor Involvement) activities.

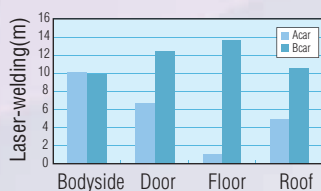## Automotive Body Structure and Functional Analysis

The database of automobile body structures and materials has been developed by disassembly investigation. Material development and EVI activities are strongly supported by this database. Many proposals have been made to our customers such as weight and cost reduction, performance improvement and structural optimization including the forming process.


Half body exhibition after disassembly investigation

≧780MPa 7%
590MPa 20%
270MPa 52%
440MPa 15%
340MPa 6%
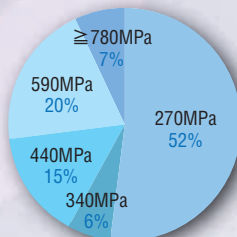
Example of weight ratio by steel strength level used for an automobile body

Laser-welding(m)
Bodyside Door Floor Roof
Acar Bcar

Investigation results of laser-welding application (Comparison with each portion)

## Analysis of Automobile Body/ Part Rigidity and Life

The strength, rigidity and durability of automotive bodies and parts are evaluated by numerical analyses and experiments. Based on the data, we propose suitable materials, shapes and joining conditions for development of bodies and parts to customers.

Side sill
Cross member
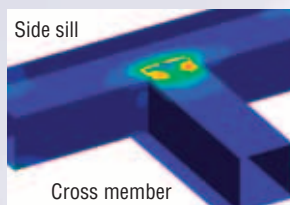
Fatigue life prediction of spot welded structures
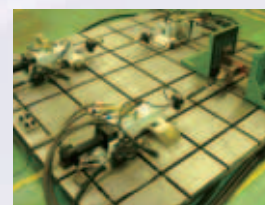
Tri-axial fatigue testing machine
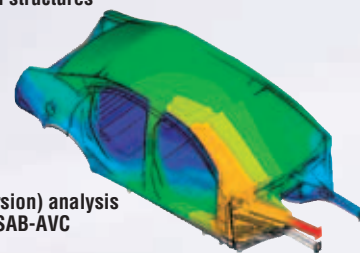
Body rigidity (torsion) analysis Model: ULSAB-AVC

New Forming Technology/ Evaluation Technology

New forming technologies are developed for improving formability of steel sheets. JIM-Form® is one of our original forming technologies, which improve deep-drawability by press motion control with a servo press machine.
Formability of JFE's new sheet products are evaluated by press forming tests. Automotive prototype parts are produced using the products.
We propose new forming technologies and effective application of new products to our customers.


3000kN servo press machine

OK
JIM-Form®

Breakage
Normal press

The effect of JIM-Form® on improvement of formability (590MPa HITEN)

Evaluation of new product by press forming

CAE Analysis Technology

High accuracy is required in numerical analysis of press forming especially in multi-stage forming: draw forming, trimming, and restriking. We support our customers in parts development by predicting the risk of defects such as wrinkles, surface distortions, fractures, stretch-flange cracks and springbacks. We are making continuous effort to improve the accuracy of CAE analysis by applying advanced models such as the YU model which can incorporate the Baushinger effect.
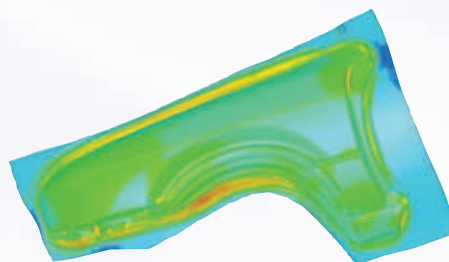
Press forming analysis of fender panel

Springback analysis of center pillar

σ

ε
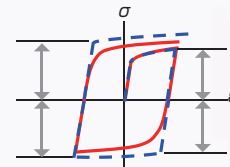
Baushinger effect of steel when the direction of strain changes