Intelligent Metal Forming Simulation Technology and Its Applications

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Accuracy – Tensile test

Engineering strain (mm/mm) vs. Engineering stress (MPa)

Experiment (SCM435)
Analysis (SCM435)
Experiment (ESW95)
Analysis (ESW95)
Experiment (ESW105)
Analysis (ESW105)
Accuracy – Compression test, Extrusion test

True strain (mm/mm)
True Stress (MPa)

0 0.4 0.8 1.2 1.6

200 400 600 800 1000 1200

SCM435
ESW105

Metal Forming 2010
Accuracy – Hot forging, bearing race

Accuracy – Cold forging, automobile part
Accuracy – Hammer forging, ship engine part

KSPT Spring 2009
Accuracy – Ring rolling, hot, cold, bearing races

Hot ring rolling

Cold profile ring rolling

Accuracy – Cold forging, rotor pole

Accuracy – Enclosed die forging, bevel gear

Enclosed die forging

Sizing
Solution Delicateness – Quadrilateral elements

Solution Delicateness – Tetrahedral elements

Generated mesh

Desired mesh density

Solution Delicateness – Specially constructed mesh
Solution Delicateness – Precision simulation
Solution Delicateness – Characteristic boundary