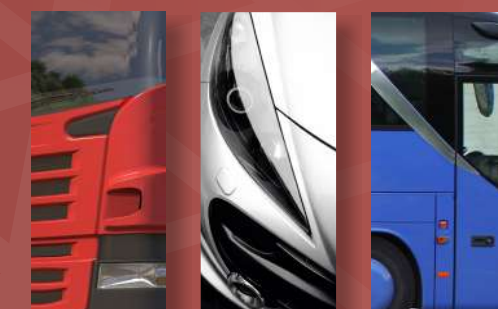
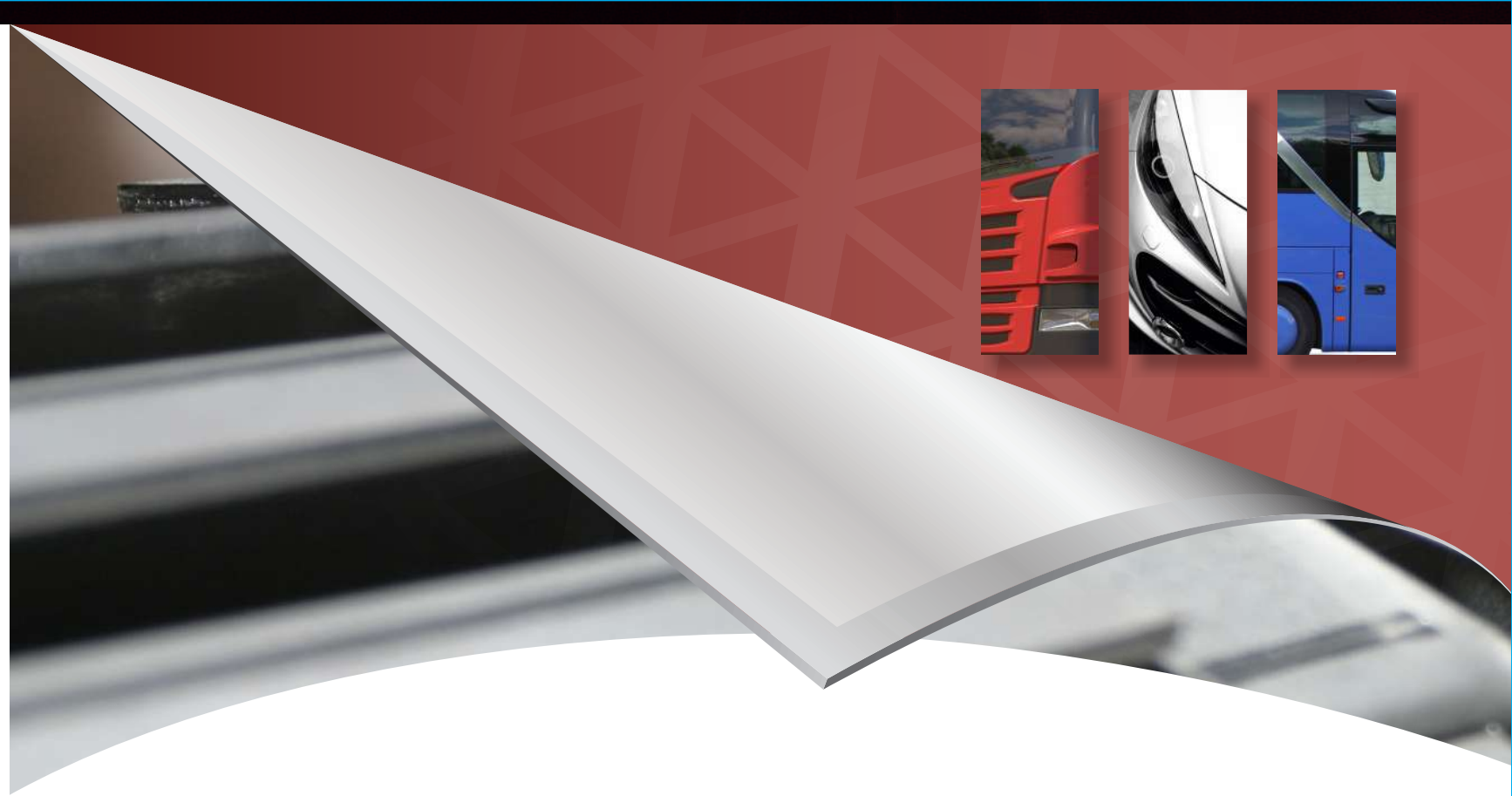




Reveal Design Flaws

Developed by Engineering Technology Associates (ETA), eta/DYNAFORM® is a simulation software tool, which allows organizations to entirely bypass soft tooling, reducing tryout time, lowers costs, and improves cycle times and productivity. It features 3D capabilities and is designed to improve efficiency by streamlining all phases of the die development process. For more information and for a free eta/DYNAFORM® trial please visit: www.eta.com/dynaform.com.



eta/ DYNAFORM®

Uncover Design Flaws with
Forming Simulation

eta

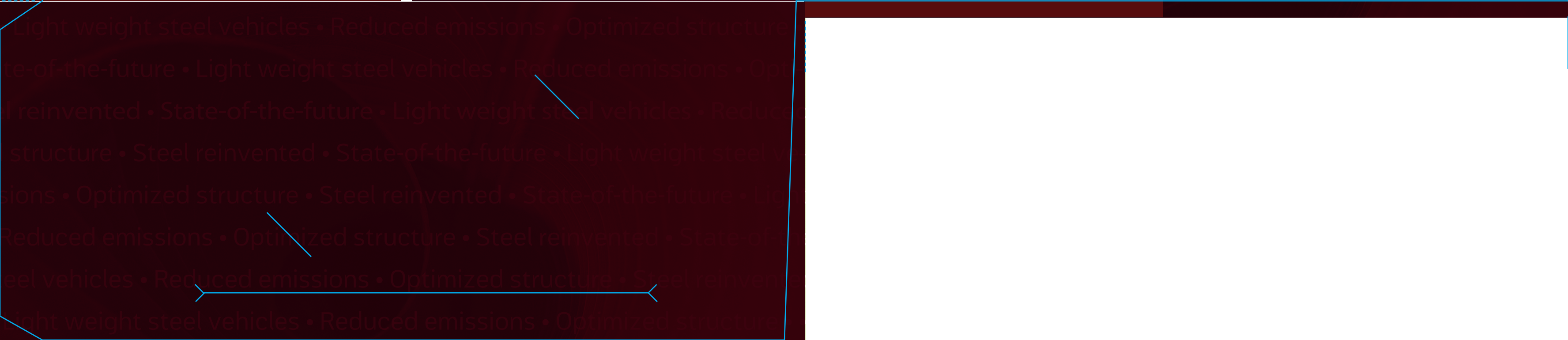
1133 E. Maple Road | Suite 200 | Troy, MI 48083
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Die System Simulation Solution

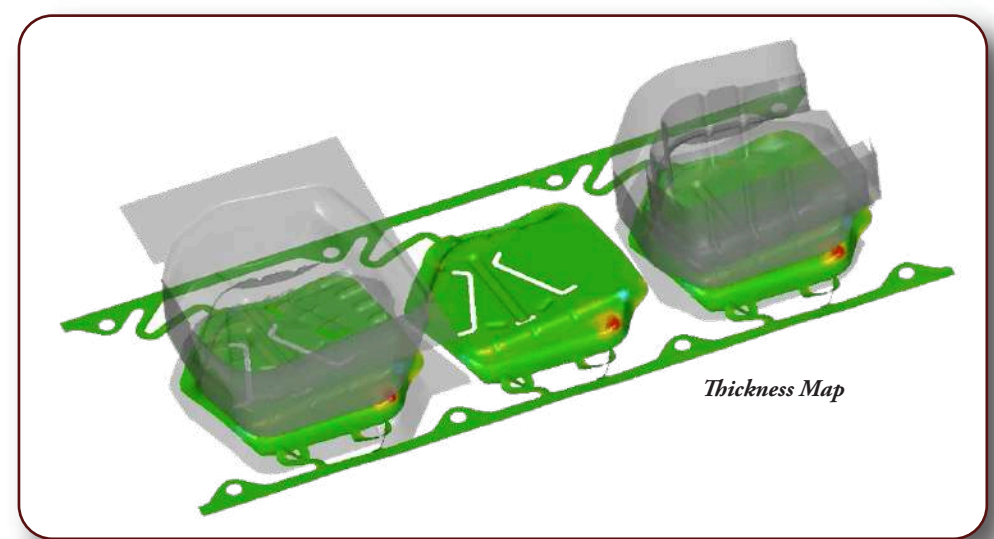
Bypass soft tooling, reduce tryout time and product development costs

eta/DYNAFORM® allows an organization to entirely bypass soft tooling, reducing overall tryout time, lowering costs, increasing productivity and providing complete confidence in die system design. It also allows for the evaluation of alternative and unconventional designs and materials to find the best design solution.

eta/DYNAFORM® encompasses the entire die system process in one simple interface. By simulating every detail during the design stage, eta/DYNAFORM® ensures the highest quality formed part and best manufacturing process. The system guides the engineer through cost estimation, quoting, die evaluation and formability. Then in a virtual environment, moves the part through stamping—station-by-station.

Modules:

- Blank Size Engineering {BSE};
Blank, Nest & Generate Quotes
- Formability Simulation {FS};
Complete Virtual Tool Shop
- Die Evaluation {D-Eval};
Analyze CAD Based Tooling
- Die System Analysis {DSA};
Analyze Die System Operations
- Optimization Platform {OP};
Metal Forming Optimization



ETA Worldwide



Die System Analysis

Analyze Die System Operations

Develop & design a formable part quickly & efficiently

The finite element approach to die system design is an efficient way to predict and resolve many stamping related concerns within the die production line. DSA simulations can help streamline die system design, from the analysis of scrap shedding and removal, to die structural integrity and sheet metal transferring and handling.

Die Structural Integrity

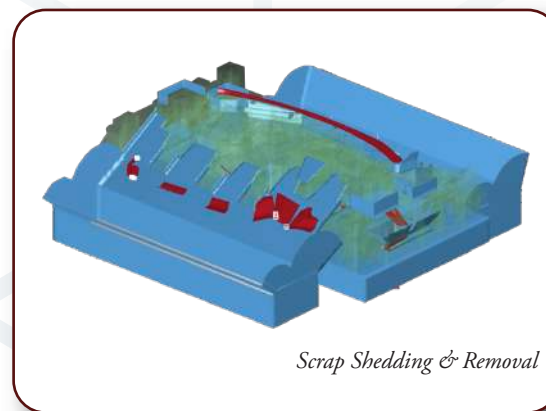
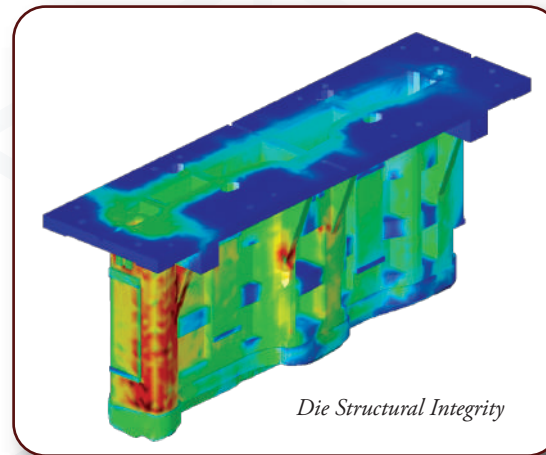
- Simulate operational loads
- Generate FEA models of the die structure
- Define operational & stamping loads
- Evaluate die structure strength & durability
- Implicit & explicit solutions

Scrap Shedding & Removal

- Streamline modeling for scrap, trim dies, chutes & trim steel
- Create trimming operations & shedding simulations

Sheet Metal Transferring & Handling

- Simulate metal transfer during manufacturing
- Simulate transfer to die station, between stations & placement of finished piece on shipping rack
- Predict interference between work-piece & tools
- Use stress/strain results to prevent damage during transportation, & during loading & unloading operations



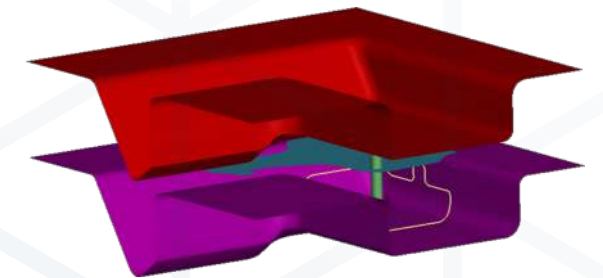
Blank Size Engineering

Blank, Nest & Generate Quotes Quickly

Quick & easy processes to check formability results & estimate manufacturing costs.

BSE is a complete solution for accurately estimating blank size along and blank nesting for maximum material utilization, minimum scrap and piece costs. Using streamlined processes, this powerful module allows the user to predict thinning, thickening, thickness strain, major prin. strain, min. prin. strain, strain tensor & generate a forming limit diagram (FLD).

BSE is now enhanced with nesting optimization to review all nesting possibilities and to maximize material utilization. BSE also offers enhanced FLD & thickness/thinning contour reporting capabilities.



Part Preparation

- Separates top & bottom surfaces of solid-model parts
- Automatically generates middle surfaces
- Fixes & fills surface gaps & holes
- Automatically meshes
- Tips double-attached parts
- Fills holes & gaps between double-attached parts

Blank Development

- Blank size estimates (accurately predicts flat blank profiles)
- Supports tailor welded blanks & double attached parts
- Outputs press direction automatically after running MSTEP
- Unfolds flanges
- 3D Trim line calculations
- Produces the most accurate blank, accounting for linear bends and material stretch during the forming process
- Supports constraint conditions in the accurate method

Forming Analysis

- Generates a forming limit diagram (FLD)
- Predicts thickness, thinning, thickening, stress & strain

Nesting

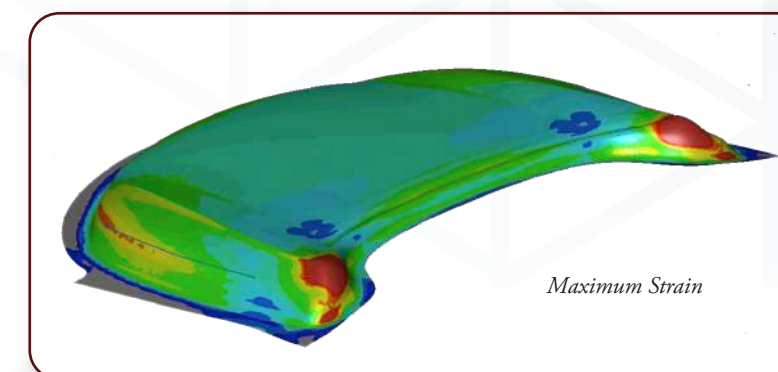
- Allows nesting with imported, created or MSTEP generated outline
- Supports outline development, editing & deletion
- Optimal 1-up, 2-up, 2-pair, mirror & multiple blank nesting
- Fitted geometry shape nesting: rectangle, parallel, trapezoid, isosceles trapezoid & arc
- Supports nesting with fixed angle, pitch or width
- Supports nesting with the range of angle, pitch & width
- Allows nesting in plate to align the outlines in plate position
- Calculates material utilization, fall-off & piece cost
- Supports carrier nesting
- Best utilization for multiple outlines

Report Generation

- Cost estimation reports (maximum material utilization & product piece cost)
- Formability reports (thickness, thinning & FLD)
- Supports different output units for nesting reports
- Offers a combined report for tailor welded blanks

For NX Users: BSE-in-NX

Generate a blank outline, obtain nesting results and maximize material utilization all within the **native NX environment**.



Importable File Types:

IGES, VDA, DXF, STL, ACIS, LINE DATA, CATIA, NX, PRO-E, STEP, NASTRAN, DYNA, DYNAIN, ABAQUS

Additional ETA Software Tools



Mechanical System Simulation



Advanced FE Modeling



FEA Toolset and Solver



Optimal Design Gateway*

*a collaboration of:
eta BETA

Formability Simulation

Uncover Design Flaws & Optimize Product Designs

Generate formability results & prevent costly manufacturing issues

This powerful module facilitates the rapid development & validation of both single-station and progressive die designs. FS helps to uncover hidden problem areas and enables designers to optimize designs based on accurate LS-DYNA® based forming results.

FS is now enhanced with optimization. Engineers now can go beyond identifying problem areas by incorporating design optimization within simulation to improve performance & quality—reducing wrinkling, thinning & tearing. FS also now offers improved trim line development.

Features

- Quick & easy set-up
- Multiple tools & multi-station progressive die simulations
- User-friendly guided user interface

Material Library

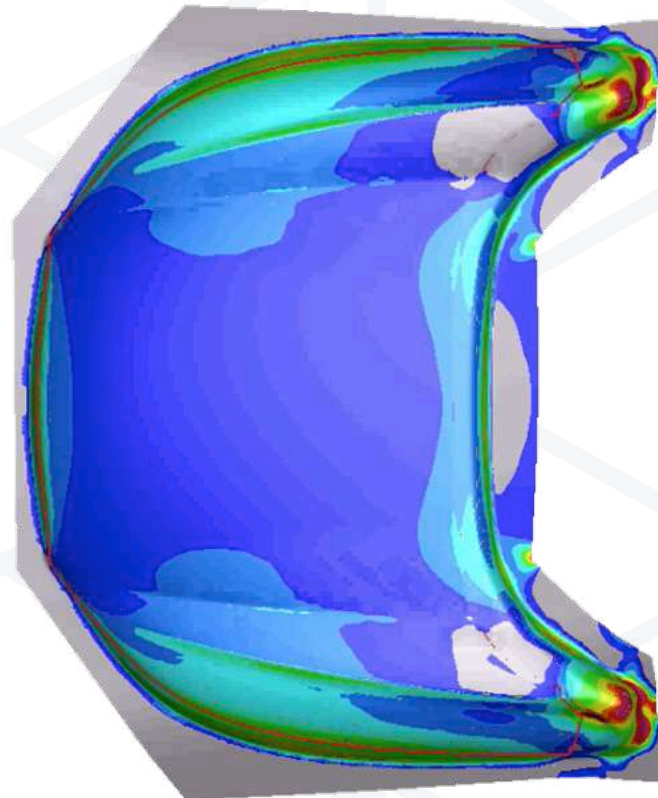
- Standard material types
- Mild, high strength & stainless steel materials
- New dual phase steel, aluminum & metallic alloys

Functions

- Superplastic forming, Hot Forming, Hydroforming & Roller Hemming capabilities
- Springback Analysis
- Auto Springback Compensation (SCP)
- Tube Bending for multi-stage rotary draw bending simulations
- Trim Line Development
- Rotary Tube Bending
- Die Structure Cooling
- 2D Simulation
- Spinning forming
- Stretch forming

Usable Feedback Results

- Forming Limit Diagram (FLD) indicates problem areas
- Predict splitting, thinning & wrinkling
- Major Strain



Major Strain



Roller Hemming

Die Evaluation

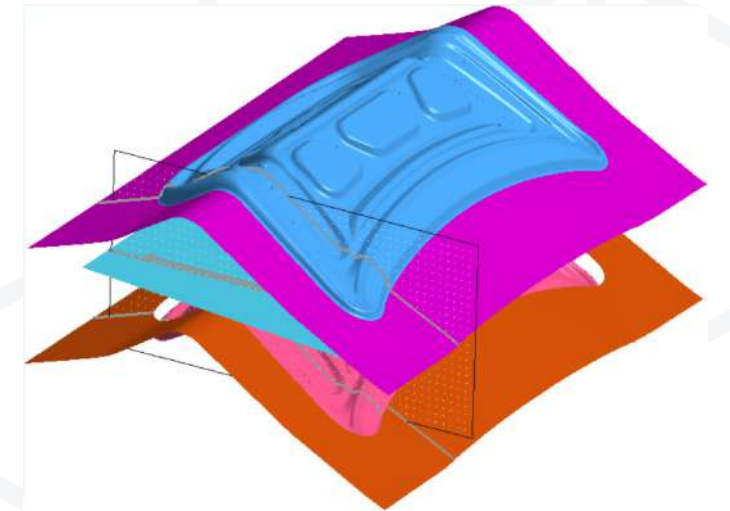
Analyze CAD Based Tooling

Consider formability & manufacturability early in the design cycle with CAE

Since most tooling designs are done in a CAD environment, the D-Eval Module was specially created to support and analyze CAD based tooling and engineering designs.

A CAE solution, D-Eval is tailored to support engineers in the early stages of the product design cycle. It allows engineers to take manufacturability into consideration early in the design process, ahead of the tooling stage.

D-Eval includes the INCSolver, which allows engineers to generate reliable formability results in a short response time.



CAE Tools for:

- Tipping Adjustments
- Binder Generation & Modifications
- Morphing
- Drawbead Layout
- Line & Geometry Bead Conversion
- CAM Trim Evaluation
- Trim Line Checks

INCSolver

The D-Eval Module Includes the INCSolver, which is a nonlinear transient dynamic finite element program. It was developed solely for the purpose of simulating sheet metal forming processes.

Using Shared Memory Processing (SMP), users can take advantage of the multiple-CPU's, Multiple-Cores and Multiple-Threads of the latest Windows computing platform. This allows for quick and reliable results. For most cases with a 4-core CPU, results can be generated in just minutes.

The INC Solver works well with non-connected mesh generated from non-conforming CAD surfaces. This solution is most suitable for CAD engineers and directly interfaces with all major CAD systems. In addition, the INCSolver's features and functions are excellent for early stage tooling evaluation are very simple to learn and use.

For NX Users: D-Eval-in-NX

Analyze CAD-based die designs, using CAE, to consider formability early in the design cycle within the **native NX environment**. Since most tooling designs are done in a CAD environment, DYNAFORM's D-Eval-in-NX Module was specially created to support and analyze CAD-based tooling and engineering designs.