Dynaform®

Version 7.2

RELEASE NOTES

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5445 Corporate Drive, Suite 301
Troy, MI 48098

Phone: +1 (248) 729 3010

Support: +1 (800) 382 3362

Fax: +1 (248) 729 3020

Email: support@eta.com

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Introduction

Dynaform 7.2 provides a complete set of solutions for die system simulation. It provides a user-friendly and intuitive interface with streamlined process design. The stamping simulation process is set up fully based on the actual stamping process, which requires less CAE knowledge, and minimum geometry and mesh operations. The default template parameters and wizard interface greatly improve the efficiency of stamping simulation analysis.

Blank Size Engineering

The Blank Size Engineering (BSE) is used to generate the blank outline, estimate product trim line and nesting blank layout. It is equipped with the modified one step code, MSTEP, for rapid stamping simulation. The user may generate quick formability report for the product after conducting BSE simulation. In addition, BSE can be utilized to estimate a blank size and conduct blank development operations. The BSE enables users to quickly estimate the trim line of complicated parts. The improved blank nesting function optimizes the nesting result. For nesting of complicated parts, the result yields higher material utilization rate and more practical nesting layout.

Die Face Design

The Die Face Design (DFD) module provides a comprehensive suite of tools for rapidly creating Line Die Layouts in multistage design. These tools encompass Die Face creation, Forming Tool Design, Trimming, Flanging Tool Design, as well as the ability to modify the binder and addendum, make local feature adjustments, and conduct efficient evaluations of the multistage setup. Users have the flexibility to adjust the binder, addendum, and other tools based on the evaluation results, resulting in a significant enhancement of Die Face design optimization efficiency.

DFD guides users through the multistage design process, starting from the import of the digital product model and following the actual die design process. Once the multistage design is complete, users can perform quick evaluations using LS-Dyna or SigForm solver. In cases where the designed die face falls short of requirements, users can promptly modify the tools and resubmit for analysis. Die Face Design eliminates the need for specialized CAD software during the die quotation stage.

Formability Simulation

The Formability Simulation (FS) provides a complete set of solutions for problems existing in the sheet forming process. Various blank types provide rapid methods for the user to generate the blank. It supports the definition for laser tailor-welded blank, laminated blank and patchwork blank and provides an abundant material library. The default stamping process parameters make it easier for the user to complete the settings for the actual process. The user only needs to simply define the material and stamping process parameters for the analysis and calculation, which greatly simplifies the analysis process.

Tube Bending & Forming

The Tube Bending & Forming (TBF) provides a complete set of solutions for tube bending and hydroforming analysis. This module supports users to complete the processes from product import to results analysis, including Tube Bending, Pre-forming, Annealing, Hydroforming, Piercing and Trimming and other processes.

After importing the product, TBF can analyze product features and calculate the center line, section circumference and section strain of the product, as well as tube diameter and total tube length. It also provides the recommended bending process parameters. Bending can be analyzed quickly by using either the one-step method or analyzed accurately with the incremental method.

The Die Face function can be used to modify the product features, such as the end extension, pre-forming tool design, hydroforming separation and flange design, etc. Users can quickly process the model to generate tools for each process. The simulation settings for Tube Forming can directly reference the generated tools and set default parameters, which can be set up by the user with minimal effort.

Sheet Drop Test

The Drop Test module is used to analyze the part deformations during the drop and transmission process. The parts are picked up by the manipulator and placed on the belt pulley for transmission during the production process. When the manipulator sucker releases the parts, they will fall under the action of gravity. The panel parts with large size may be deformed due to the large height, drop angle, insufficient rigidity and other reasons, resulting in quality problems such as dimensional deviation and surface defects. The dimensional accuracy of auto panel parts is required to be high, and any dimensional deviation will have an important impact on the subsequent check at the fixture tool and the assembly of components.

Die Structural Integrity

DSI is a comprehensive CAE software for dynamic, nonlinear finite element analysis, including preprocessing, solving, and post-processing for multi-body dynamics, and static and dynamic problems in mechanical and structural engineering.

eta/DSI provides a single package for analysis of multi-body dynamics problems, linear static, nonlinear static, and dynamic nonlinear finite element analysis. DSI/ PrePost is a general-purpose, full-featured finite element software for the modelling and results display of stamping die structures under forming load. This module allows users to import CAD data, construct CAD data, import existing FE models, and construct mesh required for finite element analysis. All boundary conditions and material properties may also be created in this module. Output of the model in various finite element solver formats is available.

Result Evaluation

The Result Evaluation quickly post-processes the result of sheet metal forming simulation, including the real-time animation of stresses, strain, energy, displacements, and plotting of time history curves. Its fully dynamic allocation of memory optimizes system resources, allowing streamlined and smooth processing of very large stamping simulation models.

ETA Report

The ETA Report is employed to automatically generate formability simulation reports using a pre-defined report template in both Microsoft Office's PowerPoint and Excel format. It is a plug-in in PowerPoint and Excel environment, which is used to automatically update the simulation report. Results of localized zone can also be manually included in the report. The plug-in is available for PowerPoint and Excel version 2007 to 2019.

New Features

The following features are newly added to Dynaform 7.2.

Die Face Design

1. Trim Segment feature allows users to perform trimming planning directly within the line die layout page and allocate trim segments to various cutting operations.
2. Auto CAM feature allows users to automatically detect CAM angles for piercing and flanging using the Auto CAM option on the Line Die Layout page.
3. In-place Edit functionality now offers users several geometry editing features, including Delete Surface, Split Surface, Extend Surface and Fill Holes. These features will be available on the Line Die Layout page, Binder page, Addendum page, and Flange Tool page.
4. End curve tangency added a new option for tangency in the Profile Binder for segments will help users to maintain tangent continuity of profile binders.
5. Addendum Master Templates includes six standard templates for generating addendums, making it easier for users to create addendums using ready-made templates or default options.
6. Extend Flange tool geometry is automatically generated along the boundary of the faces assigned to the Form region, adjacent to the Radius or Part regions.
7. Variable Entry feature in the Sweep Flange tool allows users to modify the bottom surface by making it variable using control points and their heights.
8. Un-flange (morph of flange) function enables the user to change the shape of flanges, which has various practical uses.
9. Trim Angle Check feature helps users to evaluate part trimming and piercing conditions. Trim angle analysis for trimming and piercing is conducted based on the assigned cutting directions and trim limit settings.
10. **Under-cut check in tool page** helps users to evaluate the part wall angle and check for undercuts on the Addendum outer page and Flange tool page in DFD module. This feature enables users to assess undercuts and part wall angles before generating the tool.

Formability Simulation

1. Clamping springback option enables measurement of springback using rest pads, pilot pins, and clamps. It begins by sequentially closing the clamps either simultaneously or in a specified sequence to measure the springback.
2. Laminate Blank: The Blank Source now includes an option for laminated blanks, allowing users to use laminated blanks for simulation.
3. Center of Gravity: A new feature on the Analysis page helps users update the press coordinate system based on the COG of the selected tools.
4. Hot Forming: With the wide application of high strength steel, the technology of hot is becoming popular for improved formability under reduced press force. eta/DYNAFORM provides a user-friendly interface to perform complex hot forming setup. Three stages are included in the hot forming setting by default: Gravity, Forming and Hardening/Cooling. It allows the user to delete Gravity and hardening stages to simulate only the Forming stage. The user is enabled to define the tool only in the Forming stage, and the other stages will cite the tools defined by the Forming stage.
5. Trim Angle Check this feature helps users evaluate part trimming and piercing conditions. Trim angle analysis for trimming and piercing is conducted based on the assigned cutting directions and trim limit settings.

Sheet Drop Test

1. In Define by function added options of define by elements & results file.
2. Tipping: With this feature Part can be rotated/translated about/along the U, V, or W axis to perform the tipping operation.
3. Symmetry: Allows the user to select from various symmetry options, including Half Input Symmetry, Double-Attached Symmetry, and Double-Attached with Two Asymmetrical Parts.
4. Springback: Allows user to run the free springback in Sheet drop test.

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eta/DSI provides a single package for analysis of multi-body dynamics problems, linear static, nonlinear static, and dynamic nonlinear finite element analysis. DSI/ PrePost is a general-purpose, full-featured finite element software for the modelling and results display of stamping die structures under forming load. This module allows users to import CAD data, construct CAD data, import existing FE models, and construct mesh required for finite element analysis. All boundary conditions and material properties may also be created in this module. Output of the model in various finite element solver formats is available.

Geometry Manager

1. Fillet option allows user to create a rounded corner between two shared edges or surfaces.
2. Geometry Cleanup: The Geometry Cleanup function facilitates the user to perform the geometry cleanup operation like removal of hard points, creation of hard points.
3. Offset Curve function enables user to create offset of 3D curves by a specified distance on the selected surface.

Enhancements

The following functions are improved and enhanced in Dynaform 7.2.

Blank Size Engineering

1. Added five new currency options—Indian Rupee, Chinese Yuan, Brazilian Real, Euro and Mexican to the nesting report.
2. Added two new options vertical and Horizontal for bridge connection.
3. Added a Force Scale factor to allow users to include a safety factor in the theoretically calculated Blanking and Stamping forces as per internal standards.
4. Added Tipping and Boundary functions in Wizard mode.
5. User can Drag and drop. dynain files in Dynaform canvas to open.
6. Improved accuracy of nesting.

Die Face Design

1. Added an "Extend" option to the Copy Flange tool, allowing users to extend tools within the Copy Flange feature.
2. Enhanced the Butterfly feature to support adding multiple butterflies to an existing one.
3. Improved synchronization between the DFD and FS modules to enhance the workflow experience.
4. Added binder edit functionality, allowing users to modify the binder size after it has been created
5. Mesh quality has been improved for the surface generated from Flange tool extend option.
6. When a user removes a defined operation from the line die layout, the associated tools for that operation are automatically deleted.

Formability Simulation

1. Spring back compensation export surface quality has been improved.
2. Part mesh logic improved to improve the overall quality and performance.

3. Added an option to define Variable thickness as a blank type in Blank source page.
4. Tool control method has been improved for Single action with Draw operations.
5. Nodal Springback option is merged into Clamping springback for ease of use.
6. Support material type "*MAT_HILL_3R".
7. Add several new materials to the Material library.

Tube Bending & Forming

1. Improved bending table function to support bending with 180 degrees.
2. Update tube length and radius after user define the tube in Forming Simulation automatically.
3. Adjust the plunger size according to the tube size automatically.
4. Improved the centre line generation for the small size tube.

Sigform

Sigform is a high performance and accurate finite element solver for sheet metal forming simulation. The forming solution is based on explicit time integration. The implicit solver is integrated for solving gravity loading, springback, and springback compensation. The parallel framework supports both concurrent multi-threading and multi-processing as a hybrid approach.

Sigform offers support for the following features within FS modules:

Adaptive mesh

Gravity loading

Multi-stage stamping

Draw bead

Press tonnage prediction

Springback and compensation

Utilities

1. **Label Dimension:** Users can measure the 2D bounding box dimensions of the displayed part on the canvas by selecting the reference plane from the menu.
2. **Trim Angle Check** this feature helps users evaluate part trimming and piercing conditions. Trim angle analysis for trimming and piercing is conducted based on the assigned cutting directions and trim limit settings.

Fixed Issues

The following bugs are fixed in Dynaform 7.2.

Blank Size Engineering

1. Fixed a bug related to positioning of 3D geometry image in the nesting report.
2. Fixed a bug to restrict bridge connection placement in progressive nesting outside of the Sheet area.
3. Resolved issues in the Formability report with JPEG format.
4. Fill holes issue after remeshing part has been fixed.
5. Issue related to results of maximum utilization in multi-nesting has been fixed.
6. Visualization of Plate in nesting canvas and nesting report has been fixed.
7. GUI drop down issue in Coil page has been fixed.
8. Fixed Scrap value issue error during calculations.

Die Face Design

1. Fixed several bugs related to Section cut issues.
2. Fixed a bug to resolve material synchronization between DFD and FS.
3. Fixed several bugs on Sidestep function.
4. Corrected an issue with Flange tool creation with the include fillet option.

Formability Simulation

1. Fixed a bug related to multi-step spring back support.
2. Addressed several issues in the Data Manager.
3. Resolved a crash occurring on the FLC curve edit page.
4. Fixed an issue with exporting compensated geometry.

Tube Bending & Forming

1. The issue with plunger positioning is fixed.
2. Tube bending Separating line and separate tools issue is fixed.

Utility Batch

1. Fixed the bug where part of adaptive information was lost in some cases.
2. Fixed bug in Utility Batch where it failed to trim some elements.

Upgraded CAD Translator to Version 2024

Platform and version supported

Microsoft Windows 10/11 64-bit operating system

Files supported--reader

CATIA V4 reader --- CATIA 4.1.9 - 4.2.4 (*.model)

CATIA V5 reader --- CATIA V5 R8 - V5-6 R2024 (*.CATPart,*.CATProduct)

STEP reader --- STEP AP203, AP214, AP242 (Geometry only) (*.stp,*.step)

IGES reader --- IGES version up to 5.3 (*.igs,*.iges)

Parasolid reader --- Parasolid version 9.0 - 36.0.169 (*.x_t,*.xmt_txt,*.x_b,*.xmt_bin)

VDA-FS reader --- VDA-FS version 1.0 - 2.0 (*.vda)

Inventor reader --- Inventor version 6 - 2023 (*.ipt) Inventor Version 11-2020 (*.iam)

Pro/E reader --- Pro/E version 16 - Creo 10.0 (*.prt,*.asm)

NX reader --- Unigraphics version 11 to NX2312 (*.prt)

Solidworks reader --- SolidWorks version 2003 - 2024 (*.sldprt,*.sldasm)

Files supported--writer

CATIA V4 writer --- CATIA 4.1.9 - 4.2.4 (*.model)

CATIA V5 writer --- CATIA V5R15 - V5-6 R2024 (*.CATPart,*.CATProduct)

STEP writer --- STEP AP203, AP214, AP242 (Geometry only) (*.stp,*.step)

IGES writer --- IGES version 5.3 (*.igs,*.iges)

VDA-FS writer --- VDA-FS version 2.0 (*.vda)