Design Studio for Genesis

A Graphical User Interface
for the ***GENESIS***
Structural Analysis and Optimization Software

New Features and Enhancements

Version 10.0

May 2008

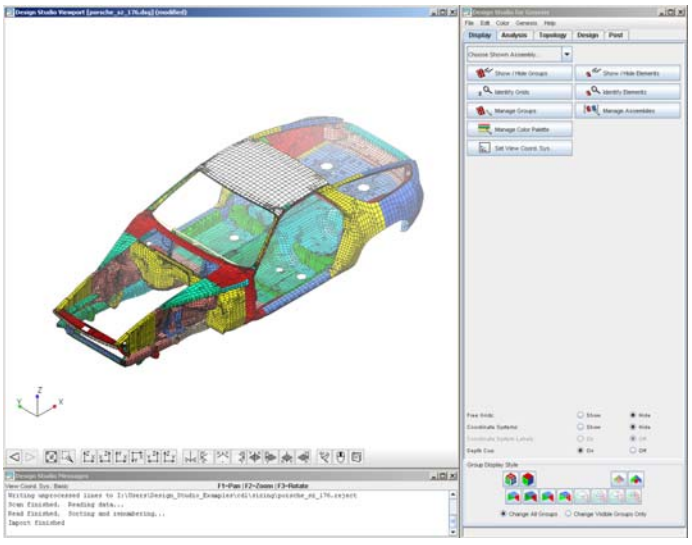
- **Introduction**
- **New Display Capabilities**
- **New Design Preprocessing**
- **New Analysis Preprocessing**
- **New Postprocessing Capabilities**
- **General Enhancements**
- **Changes in Design Studio for Genesis Version 10.0 with Respect to Design Studio for Genesis Version 9.0**

1 Introduction

This document describes the new features available in Design Studio for Genesis 10.0.

Enhancement Summary

- New Model Visualization Options
- New View Controls
- New Selection Options
- Preferences File
- New Shape Domain Creation
- Natural Perturbation Vectors
- Morphing Set Ease-of-Use
- Sizing Trail Enhancement
- Quick Sizing Additions
- Element creation
- New Modify Grid Options
- Merge Coincident Enhancement
- Morphing Set Preview
- New Post Input/Output Options
- General Post Enhancements
- Improvements in Running Genesis
- Model Checking
- Model Documentation
- Ease-of-Use Enhancements
- Support All New Genesis Features
- 3D Mouse Support



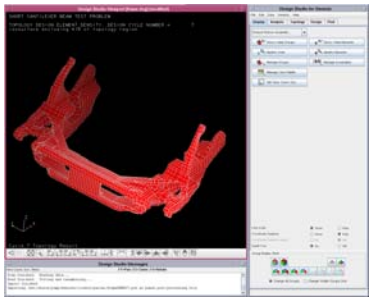
2 New Display Capabilities

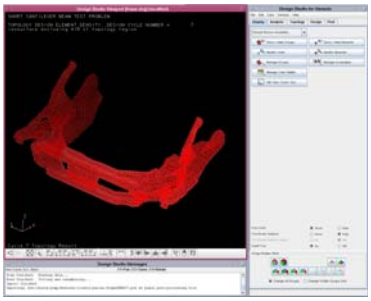
1. Two new model visualization options are available: depth cue and translucency.

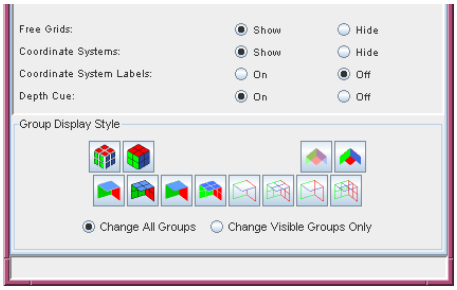
2. Icons have been added to the Group Display Style buttons in the **Display** Tab Panels to speed up finding the desired options.

3. The drag selection tool now has an option to change the anchor point from the corner to the center of the selection box. The selection shape can optionally be changed to a circle or an ellipse for grid and element selection.

4. There is now a preferences file to allow a user to preserve the display options and viewport window colors across sessions. The preferences panel also includes new options for Genesis input data export. Exported data can be divided into different included files to easily separate design data from analysis data.







3 New Design Preprocessing

1. There is a new shape domain creation method that allows dragging out new domains in the viewport window. This method allows new domains to easily be placed on top of the structure without the need to first create grids.

2. New domains can be created with translated or rotated copies of existing domains.

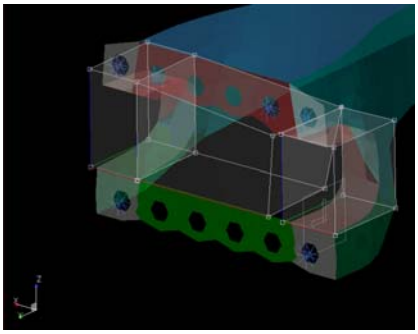
3. Natural perturbation vectors can be created in Design Studio by converting loaded displacement, eigenvector or shape change result datasets into raw shape morphing sets.

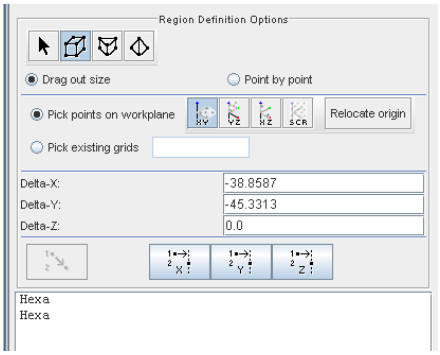
4. New design variables can now be easily created along with new shape morphing sets.

5. There is a new option to enter directions for shape morphing set vectors based on the normal of a plane defined by three grids.

6. The sizing trail now shows information about the current property value for nondesigned fields and the initial design variable value for designed fields.

7. The quick sizing trail has been enhanced to allow PBAR, PBUSH and PELAS properties to be quick-sized. The PBUSH quick trail has an option to easily set up a cubic design variable to property relationship to simulate topology of bushings with topometry.

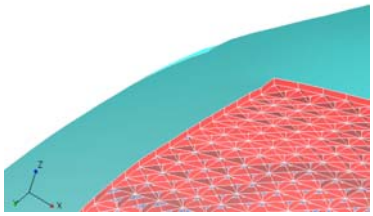




4 New Analysis Preprocessing

1. Design Studio can now create elements. There is a simple meshing tool to create regular quad or hexa meshes. Individual elements of any type can be created.

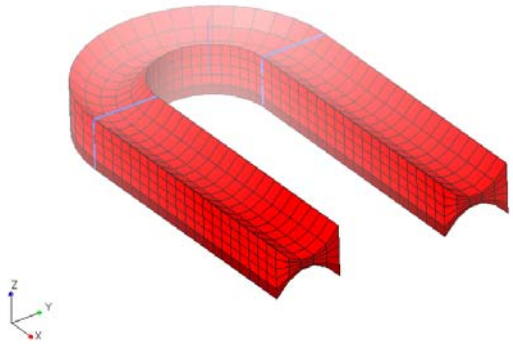
2. Autorib candidate elements can be generated.



3. Existing elements can be split into smaller elements.

4. Grid locations can be updated using displacement, eigenvector, shape change or shape morphing preview result datasets. This allows the model to be easily updated with the result of shape optimization.

5. The merge coincident grids capability has been enhanced to allow a user specified tolerance. In addition, the potential merge candidates can be listed before performing the merge.



5 New Postprocessing Capabilities

1. Morphing sets can be previewed in post processing without loading any result file. This eliminates the need to run Genesis in CHECK mode to generate a *.DVG file.

2. OUTPUT2 formated results files can now be imported into Design Studio. Note that OUTPUT2 is a system-dependent format and files produced on a different platform may not load correctly.

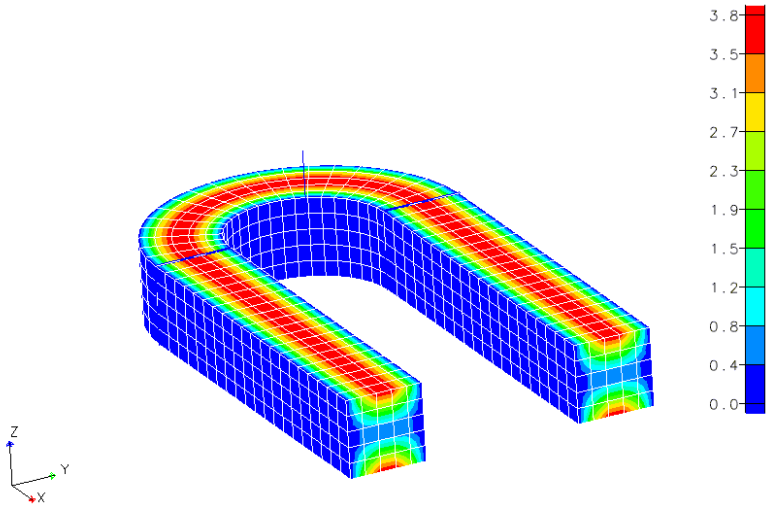
3. Animations are now exported in the animated GIF format. Animation export is now supported on all platforms.

4. The default range for the Color Mesh plot is now based on the result range for the visible elements only.

5. When creating frequency response plots, now multiple result sets can be selected to create multiple curves in one step.

6. Element strain energy results can be queried to calculate strain energy sums for selected groups, materials and/or elements sets.

7. Temperature results from heat transfer analysis can now be plotted.

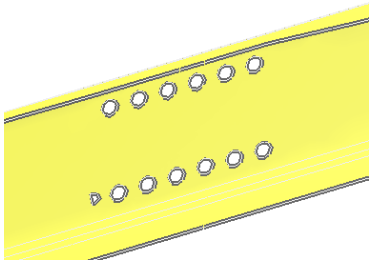


6 General Enhancements

1. New options are available for running Genesis from within Design Studio. Now optimization runs can be restarted from the final or any selected design cycle. Genesis can be run in SENSITIVITY, TSURFACE or SSOLID mode.

2. The Genesis console window now displays a color-coded message indicating why the Genesis run stopped.

3. Shell meshes can be checked for inconsistensies by displaying highlights to mark free edges.



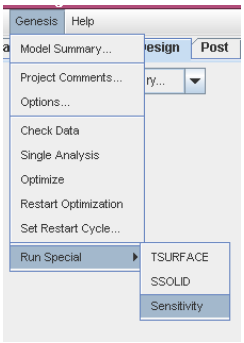
4. Comments can now be attached to projects and to individual entities in a model. These special comments can be exported to and imported from input data.

5. Element properties can be created in one step. Previously, an element group had to be created first, and then the element properties edited.

6. Entire groups can now be deleted in one step. Previously, the elements had to be deleted before the empty group could be deleted.

7. All new Genesis features are supported, including:
   a. Specifying new sheet topology fabrication constraints
   b. Linking groups into extended topometry regions
   c. Specifying symmetries in topography regions
   d. Creating composite failure index equations
   e. Setting automatic inertia relief in loadcases
   f. Controlling the number of parallel threads used

8. Now 3D mouse devices from 3DConnexion are supported to control the view in the Viewport Window.



7 Changes in Design Studio for Genesis Version 10.0 with Respect to Design Studio for Genesis Version 9.0

Design Studio database files (*.dsg) written with version 9.0 are compatible with version 10.0. However, database files written with version 10.0 are not compatible with version 9.0.