



Design Studio for Genesis

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

New Features and Enhancements

Version 13.0

January 2014

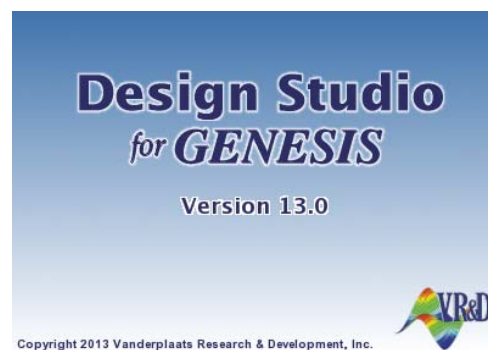
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1 Introduction

This document describes the enhancements and new features available in Design Studio for Genesis 13.0.

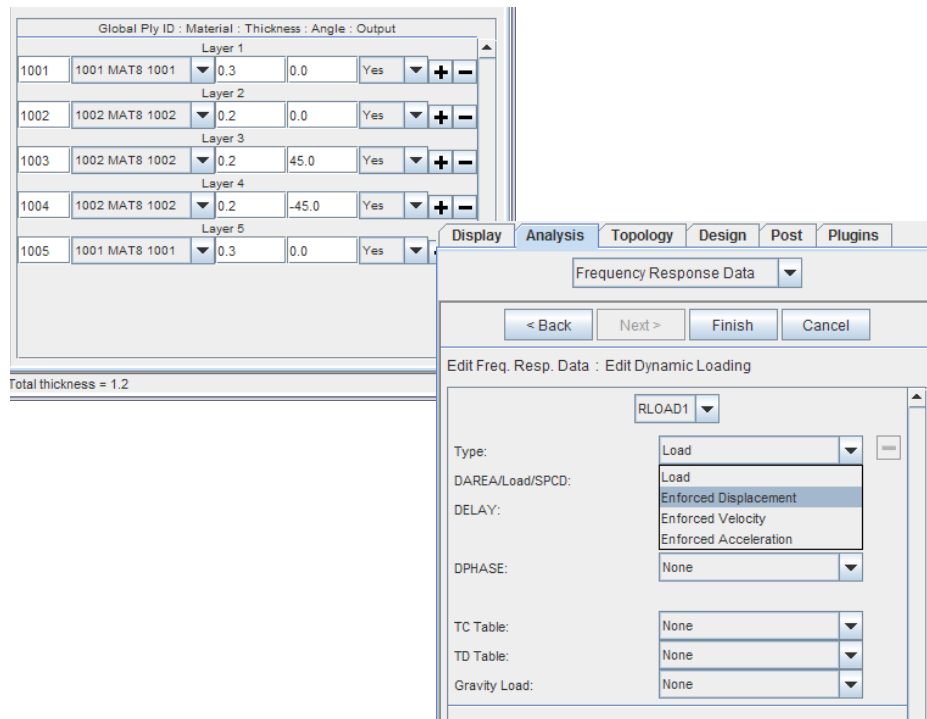
Enhancement Summary

- *GENESIS* 13.0 Compatibility
- Current Trail Description
- Active Trail Warning
- New Examples
- New Domain Drawing Style
- New Element Identification Option
- New CBUSH Drawing Style
- Solid Element Pressure Loads
- Composites Quick Sizing Trail
- Design Variable/Group Selection
- New Color Mesh Option
- Composite Layer Selection
- New Grid Stress Options



2 General Enhancements

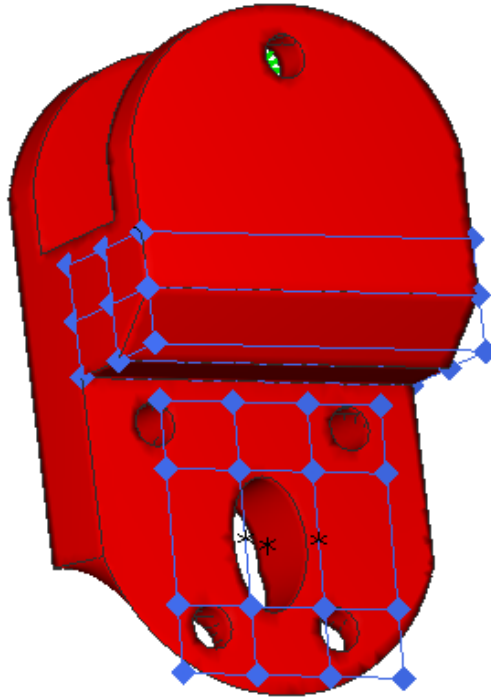
1. *GENESIS* 13.0 Compatibility. Design Studio has been enhanced to handle all of the new capabilities of *GENESIS* 13.0. New features in *GENESIS* 13.0 include: nonlinear contact using BCONTACT/BCPAIR/BCPADD; contact clearance and contact pressure calculation request with CDISP/CPRESSURE; mixed topology and shape/sizing/topography/topometry optimization; enforced dynamic displacement/velocity/acceleration on RLOAD1/RLOAD2; global ply IDs for composites; frequency-dependent CBUSH element properties; new coarsening method for topometry; and extended topology regions.



2. Current Trail Description. The status area now identifies the item being edited in the current trail.
3. Active Trail Warning. Now a warning dialog will pop up if the user tries to export data or run Genesis while there is an unfinished trail. This change will help users avoid making runs without intended changes to the data.
4. New Examples. There are 7 new step-by-step example problems in the Design Studio Examples manual that illustrate new capabilities of Genesis. The examples are: TPDSG024, TPDSG025, TPDSG026, MXDSG001, MXDSG002, MXDSG003 and MXDSG004.

3 Display Enhancements

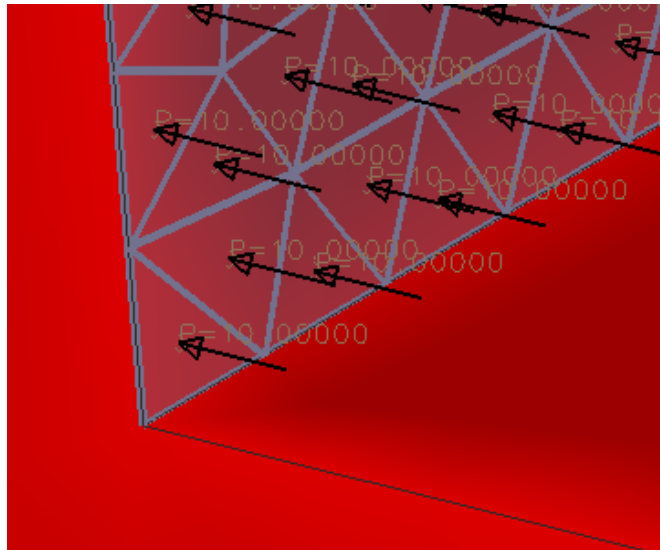
1. New Domain Drawing Style. Domains are drawn with a new style that emphasizes the control corner grids. This style also help distinguish domains from the structural model.



2. New Element Identification Option. Now the user has the option to label or not to label an element's grids which using the Identify Element function. This can reduce clutter in the viewport when the user does not need to know the grid IDs.
3. New CBUSH Drawing Style. Now CBUSH elements that connect noncoincident grids are drawn with a line instead of two point markers. This will enable users to easily see which grids are connected.

4 Analysis Preprocessing Enhancements

1. Solid Element Pressure Loads. Now the user can create/delete pressure loads on solid element faces.



5 Design Preprocessing Enhancements

1. Composites Quick Sizing Trail. Now design variables and sizing data can be quickly generated to design many composite layer thicknesses and/or angles using the quick sizing trail. Layers can be selected by layer number or by global ply ID.

Quick Sizing Setup : Choose Composite Property Parameters

Layer	Thickness	Angle
Layer 1	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Layer 2	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Layer 3	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Layer 4	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Design Z0 = - T / 2

Initial Value = C1 + M1 * Current

	Thickness	Angle
C1:	<input type="text" value="0.0"/>	<input type="text" value="0.0"/>
M1:	<input type="text" value="1.0"/>	<input type="text" value="1.0"/>

Lower Bound = Max(C2 + M2 * Current, MinLB)

	Thickness	Angle
C2:	<input type="text" value="0.0"/>	<input type="text" value="-180.0"/>
M2:	<input type="text" value="0.1"/>	<input type="text" value="0.0"/>
MinLB:	<input type="text" value="0.001"/>	<input type="text" value="-180.0"/>

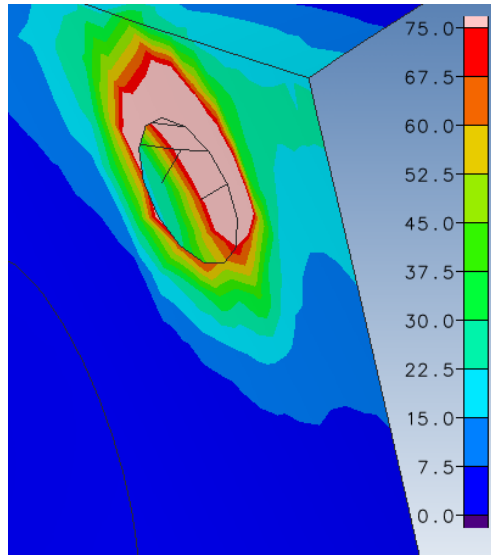
Upper Bound = Min(C3 + M3 * Current, MaxUB)

	Thickness	Angle
C3:	<input type="text" value="0.0"/>	<input type="text" value="180.0"/>
M3:	<input type="text" value="10.0"/>	<input type="text" value="0.0"/>
MaxUB:	<input type="text" value="100.0"/>	<input type="text" value="180.0"/>

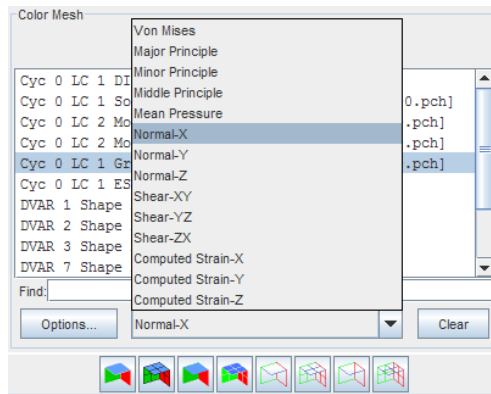
2. Design Variable/Group Selection. The user now has the option to easily select the groups designed by a given design variable as well as select the design variables designing a given group using the “Select by group...” checkbox on the Design Variables category main page.

6 Postprocessing Enhancements

1. New Color Mesh Option. Now out-of-bound values can optionally be given special colors on a color mesh plot.



2. Composite Layer Selection. Now when plotting composite layer results (failure index, stress or strain), layers can be selected by global ply ID.
3. New Grid Stress Options. Now the user can choose to plot stress tensor components or computed grid strain components from grid stress results. Grid strain is calculated using the Young's modulus and Poisson's ratio of the solid elements. This can be useful for comparing finite element results with experimental strain gauge data.



7 Compatibility with Previous Versions

1. Design Studio database files (*.dsg) written with version 12.2 or earlier are compatible with version 13.0. However, database files written with version 13.0 are not compatible with previous versions.
2. Grid stress results in punch or output2 files written by *GENESIS* 12.2 or earlier are not compatible with Design Studio 13.0.