

ALTAIR

ONLY FORWARD

Altair SimSolid® 2024.1

Release Notes

Updated: 09/04/2024

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Technical Support

Altair provides comprehensive software support via web FAQs, tutorials, training classes, telephone, and e-mail.

Altair One

Altair One (<https://altairone.com/>) is Altair's customer portal giving you access to the Marketplace, the Community, Managed Licenses, Altair Drive, My Apps, and the Learning Center. We recommend that all users create an Altair One account and use it as their primary portal for everything Altair.

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Visit the Altair Community (<https://community.altair.com/community>) where you can participate in forums, share insights, access knowledge base articles, and contact Support. Once you login to the Altair Community, subscribe to the forums and user groups to get up-to-date information about release updates, upcoming events, and questions asked by your fellow members.

These valuable resources help you discover, learn and grow, all while having the opportunity to network with fellow explorers like yourself.

Once your Altair One account is set up, use this link to access the Altair support page: www.altair.com/customer-support/

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For more information visit: <https://learn.altair.com/>

If you are interested in training at your facility, contact your account manager or technical specialist for more details.

Telephone and E-mail

If you are unable to contact Altair support via the customer portal, you may reach out to technical support via phone or e-mail. Use the following table as a reference to locate the support office for your region.

Altair support portals are available 24x7 and our global support engineers are available during normal Altair business hours in your region.

When contacting Altair support, specify the product and version number you are using along with a detailed description of the problem. It is beneficial for the support engineer to know what type of workstation, operating system, RAM, and graphics board you have, so include that in your communication.

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Altair SimSolid 2024.1 Release Notes

1

Highlights

- Response spectrum analysis
- Collisions of deformed shapes
- Neuber stresses
- Clamping contact condition
- Trapezoidal seam welds

New Features

Response spectrum analysis

Response spectrum analysis is a technique used to estimate the maximum response of a structure for a transient event. The time-history of the responses are not available. RSA is a simple and computationally inexpensive method to provide a peak response approximation, compared to conventional transient analysis.

The solution is supported using four modal combination methods namely Absolute sum (ABS), Square root of sum of squares (SRSS), Navy research Laboratory's SRSS (NRL) and Complete quadratic combination (CQC). The solution requires linking to a modal analysis, which requires and uses most of the computational effort to obtain enough modes to represent the entire frequency range of input excitation and resulting response.

Collisions of deformed shape

A new post processing capability is available for both structural and multi-loadcase analysis that finds possible collisions on all deformed parts in the assembly. The collisions can be found within a user-specified gap tolerance. The tool displays and lists all the possible collisions between all the deformed parts in the assembly.

Neuber stress

Neuber stresses/strains can be obtained by running linear structural analysis and Neuber correction can be used to evaluate approximate local plasticity. This method is computationally inexpensive as Neuber stresses/strains are output without running a full-fledged nonlinear analysis. To successfully output Neuber results, material stress-strain curves are required to be input.

The Neuber method corrects elastic results to capture any local plasticity. It is used to convert elastic stress/strain into real stress/strain when plastic deformation occurs. To apply Neuber's rule, compute stress (KtS) at a notch with elastic assumptions and when the stress exceeds the strength of the material, the real stress will show somewhere on the materials stress-strain curve at a point σ .

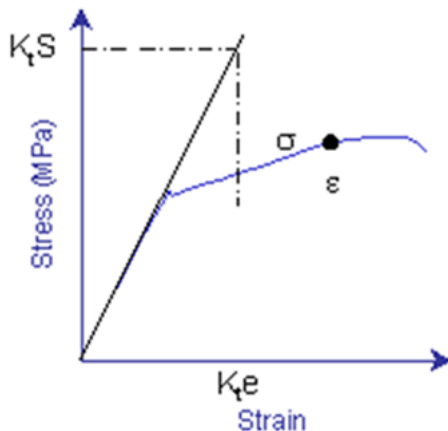


Figure 1: Neuber correction

Neuber's rule states that the stress-strain product of the elastic solution is equal to the stress-strain product of the real elastic-plastic solution. Mathematically, this is expressed as:

$$K_t S \cdot K_t \epsilon = \sigma \cdot \epsilon \quad (1)$$

Clamping contact condition

A new contact condition called Clamping is now supported for structural analysis. The clamping contact condition allows parts to align in normal direction only, while allowing sliding between parts. Loads are applied internally to clamp the parts together. Graphics icon for clamping is a purple point cloud. The clamping condition is available only as a custom contact condition for structural analysis.

Trapezoidal seam welds

The implicit seam welds created can now have a trapezoidal shape in addition to the existing prismatic shapes. This capability is available for both weld by lines/edges and weld from solids. These new welds can help in instances where creating prismatic shaped welds was difficult.

Enhancements

Multi-loadcases

- Several new boundary conditions are now supported under multi-loadcases including gravity, hydrostatic pressure, translational and rotational inertia, thermal loads, distributed mass and volumetric expansion/shrinkage.
- Result graph is supported.
- Export of deformed shape is supported.

Fatigue safety factor

A new safety factor output is now available for fatigue analysis. Safety factor is available for fatigue via back-calculation to calculate scaling factor for a particular target life. It can be activated using fatigue solution settings.

Imported loads

Imported loads are now supported. Several loads can be imported from a CSV file including pressure for structural analysis and temperature, flux, convection for steady-state thermal analysis.

Composites (Beta)

- Orthotropic materials can be applied to plies within the laminates.
- Orthotropic material orientation can also be applied but it is limited to flat shapes.

Separating/closing and Separating contact

The contact conditions are now enhanced and made robust. The closing contact will work with gaps within the small-sliding zone. Any penetrations are automatically resolved when separating/closing contact is used.

Others

- Part info is available for several parts in the assembly.
- ECAD files reader has been updated.
- Spot weld visualization has been improved where 2T, 3T, and 4T spot welds can be visualized in different colors. The 2T spot welds are highlighted in red, 3T in cyan, and 4T in pink.
- The adaptation for sheets has been improved which should resolve several numerical instabilities that yield error ID 18.
- Data imported from CSV files can now read more decimal places.

Known Issues

The following known issues will be addressed in a future release as we continuously improve performance of the software.

- Issues with linear guide joint under virtual connectors.

Resolved Issues

- Laminate creation and editing have been re-factored to improve the workflow.
- Issues related to updating the units appropriately.
- Issues related to result plots have been resolved.
- Issues with importing fatigue material properties from a CSV file to material database.
- Issues related to re-using adaptation from previous steps leading to performance issues.
- Remote loads are updated appropriately when edited.
- Improved display issues with selection of parts.
- Improved creation of connections.
- Improved creation of seam welds.
- Status bar is updated appropriately when solution is being prepared before solving.
- Improved approximation of spots, when thermal loads are applied on spots.
- Result quantity labels are fixed when running dynamic analysis with displacement base excitation.
- Fixed issues and inconsistencies related to creation of virtual connectors.
- Issues related to dynamic reactions along bushing coordinate system.

- Improved error messages.
- Inconsistencies with plotting and saving results.
- Fixed issues related to boundary condition visualization.
- Boundary conditions can be applied to the face where distribution mass is applied.
- Issues related to handling boundary conditions appropriately in local studies.
- Issues related to complex eigenvalue analysis linked to geometric nonlinear analysis.
- Issues related to selection of material database.
- Issues related to assembly info with laminates.
- Issues related to bookmarks.
- Issues related to bolt forces.
- Several crashes have been fixed.
- Several instabilities have been resolved with improved adaptation.

Altair SimSolid 2024 Release Notes

2

Highlights

- Composites (Beta)
- Nonlinear transient thermal
- Complex eigen value modes
- Wind loads
- Shock absorber

New Features

Composites (Beta)

SimSolid supports converting imported skins or surfaces into layered composites. The imported skin can be mid-surface, top or bottom layer of the solid. Creation of laminates that consist of several plies with assigned thickness is also supported. Currently, only isotropic materials can be applied to all plies in the laminate. SimSolid implicitly creates solids that represent every ply in the laminate. All results can be queried across all the plies in the model.

This feature also allows performing design changes within SimSolid by modifying the sheet thickness and materials which can aid in carrying-out optimization studies.

Composites are also supported for all the solutions.

Nonlinear transient thermal

Transient thermal solution can now include temperature-dependent material properties. It includes temperature dependent material properties for thermal conductivity, specific heat capacity, convective heat transfer coefficient and density.

Complex eigen value solution

Complex eigen value solutions, including frequencies and damping, can now be output by defining damping on bushings or shock absorbers.

Wind load

Wind load is now supported as a boundary condition in structural analysis. This feature automatically evaluates and applies variable pressure based on an empirical equation. The input includes ground, wind direction, wind profile, height axis, air density, friction coefficient and shape factor.

Wind load also has an option to enable shielding, which restricts application of pressure on surfaces that have obstructions along the wind direction.

Wind load, hydrostatic pressure and uniform pressure have all been grouped together under pressure.

Shock absorber

A new virtual connector called shock absorber is now supported. It is defined by stiffness and damping along the length of the shock absorber.

Enhancements

Dynamics

- Power Spectral Density (PSD) functions can now be visualized and input on a log-log scale in addition to the linear scale.
- For modal analysis, displacements can now be output to UNV file for rigid body modes as well.
- Evaluation of frequency and random dynamics output with base excitation was improved. With this enhancement, the output response now matches with the input response at faces where base excitation has been applied.

Fatigue

- Fatigue material properties for SN curve can now be created by importing points that define the stress versus number of cycles.
- Fatigue life can now be plotted on a log scale in addition to the linear scale.

Thermal convection

Convective heat transfer coefficient under thermal transient analysis can now be temperature-dependent or time-dependent.

Export deformed shape

Deformed shape can now be exported for multi-loadcase analysis.

Solution settings

Solution settings from a group such as Adapt to features and Adapt to thin solids can be applied to all groups defined under solution settings using a new option called Apply to all groups.

License

- Basic edition of SimSolid is no longer supported.
- A new named-user version of SimSolid is now available in addition to the named-user version of SimSolid Advanced.
- The Altair unit draw for SimSolid and SimSolid Advanced has been changed to 50 units and 75 units respectively.

Others

- Bolt internal forces now include reactions for connections and supports associated with the bolts.
- Adaption has been improved for perforated parts such as separators used for battery cells.
- Adapt to features has been improved to eliminate spurious modes coming from prestressed modes or linear buckling analysis.
- Improvements in connections for PCB models using precise connections.
- Improvements in adaptation for thin solids used in PCB models.
- Teamcenter version 14.3 is now supported.
- Flux and convection boundary conditions are supported on the same geometric entity.
- Stresses under seam weld reactions are now calculated based on the extracted forces.
- Density of spots is increased to reduce stress concentration.
- Spots on cylinders now have input for spot center coordinates.

- Result graph output now includes path length along projected line in addition to the coordinates.
- A new connection resolution level called Extreme is available under **Add/edit connections > Primary/Group connect**.
- Improved creation of bearing load in structural analysis.

Updated CAD import formats

The list of supported CAD formats were updated.

File Format	Supported Versions
Pro Engineer	13 – Creo 10
Inventor	All – 2024
NX	11.1 – CR2306
3D EXPERIENCE	2014x – 2022x

Known Issues

The following known issues will be addressed in a future release as we continuously improve performance of the software.

- Issues with linear guide joint under virtual connectors.

Resolved Issues

- Issues caused by bookmark browser.
- Issues with creating sampling points in squeak and rattle analysis.
- Issues with transient thermal plots.
- Missing frequency span option for modes when buckling analysis is defined.
- Improved thermal transient results to avoid temperatures outside the bounds.
- Issues with response mesh.
- Issues related to inflation of sheets.
- Issues with pick info when exporting the results to .csv.
- Issues with pick info when the results are evaluated in a local coordinate system.
- Issues with zooming-in for spot welds.
- Issues reverting to base color for skins.
- Stress linearization is disabled for orthotropic materials.
- Issues with modal contributions in a response for orthotropic materials.
- Issues with part names of skins for new design studies.
- Issues translating labels on the plot.
- Issues with run times running a single analysis versus multiple analysis.
- Issues with run manager.
- Issues with face to surface connections.
- Issues visualizing precise connections.

- Issues with strain energy plots upon result plot refinement.
- Several crashes and instabilities.
- Issues related to seam weld reaction forces and stresses in sequential analysis.
- Improved the run time for material nonlinear analysis.