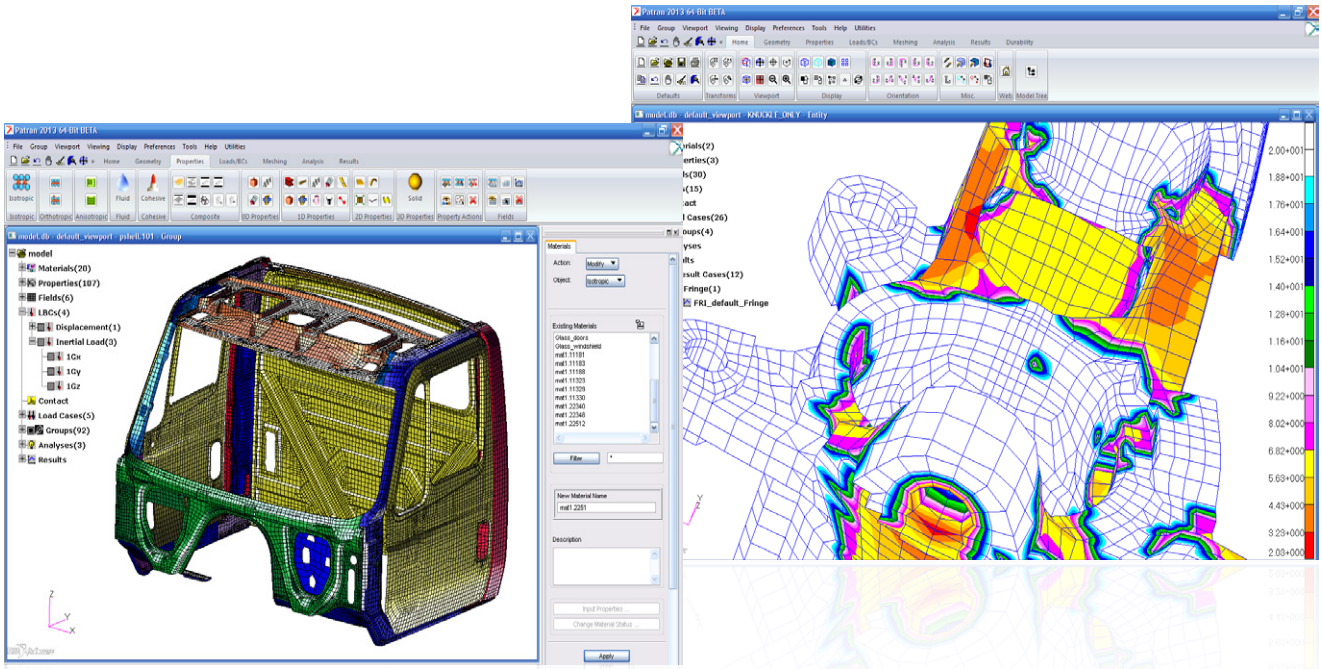
Patran™ 2013



MSC Software

Welcome to Patran 2013

Patran 2013 release is focused on providing enhanced support for MSC Nastran, including the newest capabilities of Nastran Embedded Fatigue introduced in MSC Nastran 2013. This document details key features available in this release, and how they can meet your CAE needs. Key features of this release include:

MSC Nastran Support

- Enhanced post-processing support for MSC Nastran
- Pre- and post-processing support of Nastran Embedded Fatigue capability for solver based durability calculations
- Easy to use new contact-pair modeling
- User friendly, automatic contact body and contact creation
- Improved support for MSC Nastran's User Defined Services (UDS)

MSC Fatigue Support

- Multi-layer composite support for higher fidelity results
- Hot spot filtering for more efficient fatigue life calculations

Sinda

- New Environment Simulation Module for realistic solar heating simulation on the Earth using Sinda and Thermica
- Enhanced Thermica Integration (version 4.5.3 and later)

In addition to the above enhancements, several defects have also been addressed to provide a robust modeling solution for our users. Thank you for being a loyal customer of MSC Software, and we look forward to your feedback.

Patran Product Team

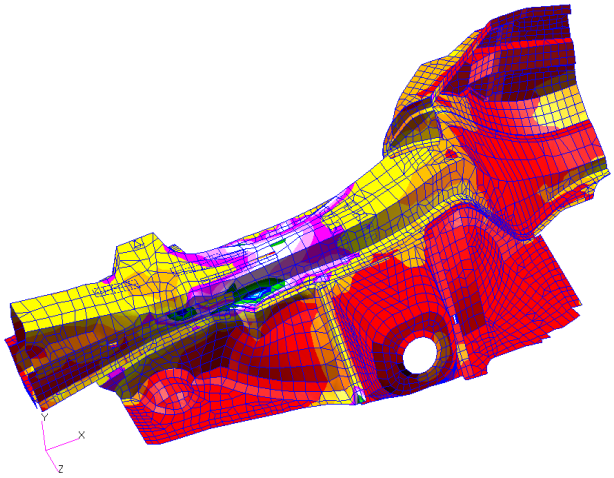
OP2 Format

Patran 2013 provides enhanced post-processing support for MSC Nastran's new OP2 format that supports the latest SOL400 results, Nastran Embedded Fatigue results, and user defined service results. In addition to supporting Direct Results Access (DRA) attachment, Patran also provides the correct defaults which allow for OP2 import or DRA attachment.

During pre-processing Patran will select the appropriate output format based on the version of MSC Nastran file being written.

Nastran Embedded Fatigue

The fatigue calculation process has been traditionally a post-processing task, requiring users to read in large results files to perform fatigue analysis. MSC Nastran Embedded Fatigue provides a much easier way by coupling stress and fatigue calculation processes into a simultaneous operation. Patran 2013 improves ease of use of this groundbreaking new capability by supporting pre- and post-processing of the functionality. Users can input the required material properties, load and event manipulation and handling, and perform post-processing in Patran.

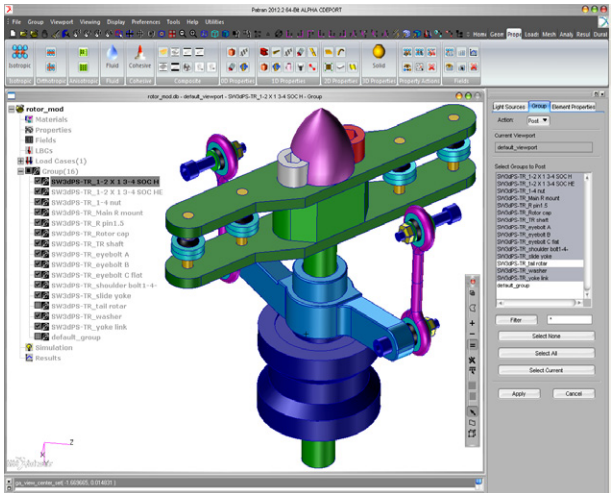


New Contact Pair Modeling

Contact pair definitions are introduced in MSC Nastran 2013.1 for additional flexibility in creating a contact model. Patran 2013 provides a new contact pair load and boundary condition graphical user interface allowing users to create contact pairs using individual contact property sets, or re-use existing interface definitions by referencing existing property sets. This capability, along with Patran's global property editing capability, provides a powerful, scalable UI that is suited equally well to creating both individual contact pairs, and large numbers of complex contact pairs, using common properties.

Automatic Contact Body and Pair Creation

A new set of tools that allows users to automatically create contact bodies and contact pairs based on user-defined criteria is introduced in this release. The contact bodies can be created based on property sets, material sets, group membership, element topology, connectivity and geometry. Automatic contact pair creation based on proximity of the bodies saves considerable time in contact analysis set-up.



User Defined Services/Subroutines (UDS)

Patran 2013 provides enhanced support to the UDS functionality of MSC Nastran with the ability to specify one or more MSC Nastran User Defined Services to connect to when submitting an MSC Nastran analysis, and to specifically call out which Patran functionality will use UDS, such as materials, element properties etc.

Users can also defined state variables for user material subroutines in Patran, and additional arguments to the subroutines allow for passing of internal data, such as element Gaussian point volume, procedure phase and convergence flag.

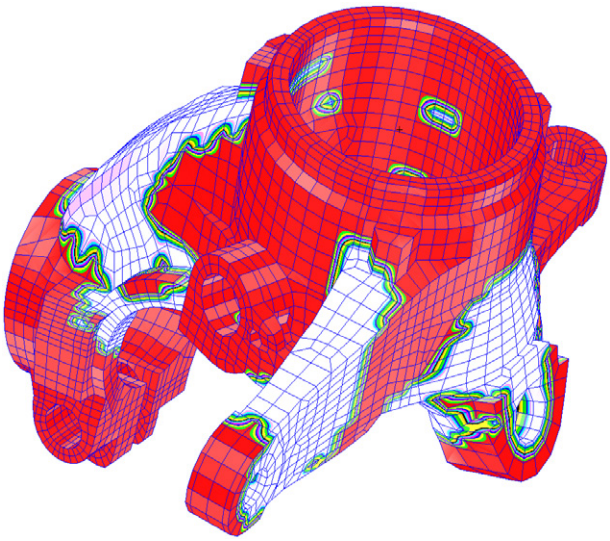
MSC Fatigue

Multi-Layer Support

Multi-layered composite materials may be comprised of tens or hundreds of plies. The new multi-layered element support allows the selection of top, bottom and intermediate shell layers providing higher fidelity visualization of results.

Hot Spot Filtering

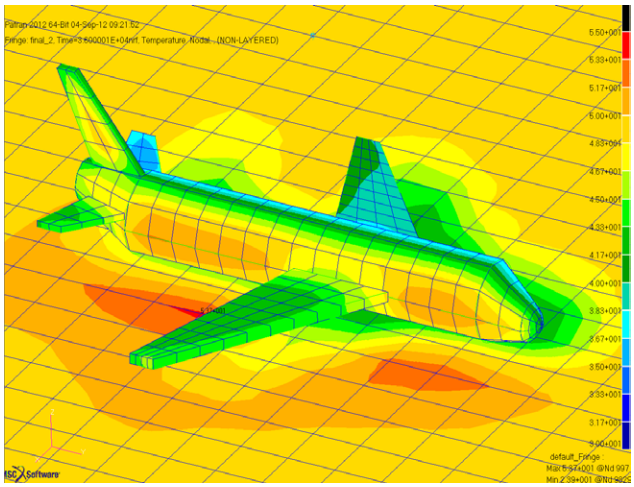
Much of a large FE model may not experience stresses severe enough to cause appreciable fatigue damage, and it can be time consuming to perform fatigue analysis of every entity. The new hot-spot filtering methods perform fatigue analysis in two stages – a relatively low-cost stage in which more highly stressed or damaged entities (hot-spots) are identified, followed by a full fatigue analysis of these hot-spot entities. This improves efficiency and performance of the analysis providing critical results faster.



Sinda

A comprehensive GUI was added to Patran to allow for realistic solar heating simulations on the Earth using Sinda and Thermica. These simulations use a US government worldwide weather database to model realistic terrestrial solar heating, including effects of cloudiness, convection, and both direct & diffuse solar heating. Applications include solar heated/cooled buildings, electronic equipment exposed the environment, aircraft on a runway to size the ECS system and also to determine temperate of composite surfaces, and Spacecraft inside a launch vehicle on pad.

Using Thermica v4 with Sinda and Patran is now much more automated and includes batch capabilities. Users can take advantage of the higher level of integration to improve the modeling and process efficiency.



Patran – For Your Current and Future Modeling Needs

User Efficiency and Lower Cost of Ownership

With the new and upcoming enhancements, you can see your current and future training support and training expenses reduced not only because of staying with proven, familiar software, but also because of the usability improvements.

CAE Modeler Designed For Multidisciplinary Analysis with Multi-solver Support

Patran currently supports capabilities across multiple disciplines, including linear, nonlinear, implicit and explicit dynamics, thermal and so on. Its commitment to open architectures lets you use a solver of your preference, even though it may not be from MSC Software. Such openness and flexibility, Patran is always available as your simulation needs grow or change.

Modernized Interface for Improved Efficiency

With the redesign of interface, you can gain an immediate boost in efficiency. The interface updates provide ease of use and make job of modeling/analysis/post-processing easier by making commands more accessible and getting the tasks done quicker. All this is done, without sacrificing the flexibility and openness of the product and without affecting any customizations you have implemented.

Improved Performance

Performance is a moving target, and Patran continues its efforts to provide the best-in-class performance. With the ports for 64-bit platforms, Patran is able to work with extremely large models, with your system sources as the only limit. Further enhancements can be seen in the next and future releases.

MSC's Commitment to its Customers

MSC.Software recognizes the needs of our customers and appreciates the confidence and trust they have placed in our products all these years. This is also demonstrated by the customizations of the product and level of integration of our products into their CAE processes. MSC.Software commits itself to customer needs and requirements and as such, has focused on improvements in usability, performance and solver support. You will be seeing more advances going into the product and we, as always, are pleased to have you as a customer and partner.

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