MSC Software Corporation
4675 MacArthur Court, Suite 900
Newport Beach, CA 92660

PRESS RELEASE

Marc 2018 Increases Efficiency and Quality in Rubber Simulations and other Workflows

NEWPORT BEACH, CA--(July 2018) – MSC Software Corporation, a global leader in simulation software and services, today announced the new release of Marc 2018 focused to further improve specific industry workflows, particularly for rubber and seal modeling. Additionally, the release provides advancements in contact analysis, multi-physics simulations, convergence control, solver interoperability, all tuned in for efficiency and quality. Some Highlights of the release:

Improvements to Seal and Rubber Workflows
The highly growing automotive industry is shifting engineers towards innovative designs that provide higher levels of passenger safety and comfort. Viscoelastic rubber materials are commonly used as shock absorbers or dampers within the auto industry to reduce vibrational effects in various types of vehicles. Design process is relatively straightforward when only considering the basic behavior of these materials under controlled loading. However, dealing with real world problems requires engineers to expand their simulation process beyond just mechanical properties and incorporate the thermal effects of viscoelastic rubbers. Under repetitive loading conditions, the energy dissipated by these materials is converted to heat. The resulting temperature increase can lead to degradation in physical properties of the material.

Marc 2018 provides coupled simulation techniques to calculate the resulting temperatures and study the self-heating behavior of viscoelastic materials under cyclic loading. The seamless process makes it easy to capture the interaction of thermal and harmonic effects and examine “what if” scenarios. This allows engineers to save operational costs by predicting the potential problems that can rise due to material degradation.

In addition to automotive applications, rubber materials such as seals and gaskets are extensively used within oil/gas, heavy machinery and other industries. Over the years, engineers have observed a major change and softening effect in mechanical properties of these materials. The phenomenon often referred to as the “Mullins effect”, leads to severe degradation of material properties and can significantly impact the operational performance of viscoelastic rubbers.

Marc 2018 introduces an additional damage model called Ogden-Roxburgh that provides engineers with another efficient and accurate method to predict the degradation process of rubbers that undergo cyclic loading. The new damage model has more flexibility in experimental data fitting and is the preferred method for many engineers, based on their own individual experience and institutional requirements.

Contact Analysis Enhancements

Creating a Contact Table for models that consist of several parts and components can get time consuming and result in errors. Marc and Mentat 2018, provide an automated contact detection method that enables engineers to quickly generate or modify contact tables based on the proximity of Meshed Bodies. This is a powerful capability that can significantly improve productivity by providing the ability to adjust the model without spending several hours.
Continuing along the same path, Marc 2018 can now use faceted (STL) surfaces directly in a contact analysis. STL is a CAD format that describes only the surface geometry of a 3D object using triangular shapes. Using this method can improve the fidelity and quality of contact definition as the solver internally uses smooth surface algorithms for rigid contact bodies.

Extended Multi-physics Capabilities

The extensive use of simulations in manufacturing operations enables users to confidently drive performance while reducing the significant costs and delayed times associated with physical testing. Induction heating processes are no exception. The physics involved in these problems are complex, and require a fully coupled FEA simulation to examine the interaction of temperatures, stresses and electromagnetic properties of materials. During the calculations, both the structure and the surrounding medium have to be included in the finite element analysis resulting in a large 3D model. Given these conditions taking advantage of symmetry can largely reduce the size of the model and thus enable users to perform detailed analyses with the least amount of time. As a multidisciplinary software, Marc 2018 provides advancements for multiphysics simulations to include symmetric and anti-symmetric boundary conditions through both coupled and sequential analyses. Some applications include optimization of gear teeth hardening through induction heating process.

Localized Convergence Checks

With over 40 years of proven industry records, Marc provides several advantages, especially for advanced simulations that require multiple iterations. Marc 2018 has a new convergence check that verifies equilibrium on a per node basis. The forces resulting from internal elements, contacts, and external loads are monitored for each node and compared to a user defined convergence tolerance: epsilon. The secondary convergence check is designed to reduce the amount of increments and improve the accuracy of results.

Use Marc 2018 to accurately predict the real-world behavior of rubber materials, easily manage analysis of multi-level assemblies, and address induction heating problems, all in a fully comprehensive and efficient workflow.

About MSC Software

MSC Software is one of the ten original software companies and a global leader in helping product manufacturers to advance their engineering methods with simulation software and services. As a trusted partner, MSC Software helps companies improve quality, save time, and reduce costs associated with design and test of manufactured products. Academic institutions, researchers, and students employ MSC's technology to expand individual knowledge as well as expand the horizon of simulation. MSC Software employs 1,300 professionals in 20 countries. For more information about MSC Software's products and services, please visit: www.mscsoftware.com

MSC Software is part of Hexagon (Nasdaq Stockholm: HEXA B; hexagon.com), a leading global provider of information technology solutions that drive productivity and quality across geospatial and industrial landscapes.