Take Simulation to the Next Level with Accurate Materials Data

Finding the right materials property data for simulation can be time-consuming and costly. Accurate simulations require accurate property data. Engineers need a reliable data source and to avoid introducing errors as data is transformed and input. These challenges are addressed with a new materials data set, embedded within ANSYS Mechanical and ANSYS Electronics Desktop, providing access to richer data and tools to connect managed corporate material intelligence.

By **Beth Harlen**, Technical Marketing Communications Specialist

Simulation can do incredible things in the world of product development. Simulation models can refine and validate products in development, ensuring that they are optimized for manufacturability, durability, sustainability and other factors that affect the product lifecycle. Assuming, that is, that analysts have access to accurate material inputs and can be assured of their pedigree — for example, through traceability back to the source test data.

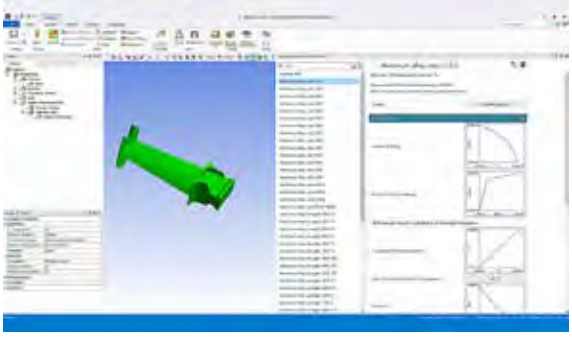
Without validated and consistent materials data, simulation is hindered by design restrictions, errors, delays and costs. Through the acquisition by ANSYS of Granta Design, a Cambridge University spinoff that provides materials information and related software, new opportunities exist for improving the accuracy of engineering simulations and analyses.

Different companies need different solutions to the problem of efficiently finding materials data. A starting point is to have a good set of reliable, easily accessed data that is valid for many simulations. "ANSYS GRANTA Materials Data for Simulation puts validated materials input data right at users' fingertips within their ANSYS simulation tools," says Stephen Warde, who heads the product management and marketing team at ANSYS Granta. "Taking this one step further — which is especially relevant for larger enterprises — ANSYS GRANTA MI helps companies ensure they are making best use of proprietary, in-house materials data along with more in-depth reference information."

VALIDATED MATERIALS DATA AT YOUR FINGERTIPS

Materials Data for Simulation is a dataset of over 700 materials — including metals, plastics, polymers, composites, magnetic materials, ceramics and more — with properties specifically chosen to support ANSYS simulations. It supports multiphysics workflows by making the same, consistent data available through ANSYS Mechanical and ANSYS Electronics Desktop, so engineers analyzing both structural and electromagnetics issues can benefit from consistent, validated materials.

The Materials Data for Simulation dataset provides the material property data needed for structural and electromagnetic analysis. Room-temperature



A dataset of over 700 materials — including metals, plastics, polymers, composites, magnetic materials, ceramics and more — is available through ANSYS Mechanical.

Access consistent, validated materials data within the ANSYS Electronics Desktop user environment.

materials properties of the following types are available for all 700+ materials:

- Linear, isotropic elastic (Young's modulus and Poisson's ratio)
- Thermomechanical (thermal expansion coefficient)
- Thermal (thermal conductivity and specific heat capacity)

Where relevant, users will also find electrical and magnetic properties for many materials, e.g., electrical conductivity, dielectric constant, dissipation factor, magnetic coercivity and permeability, core loss and B-H curves.

The data are collated and maintained by ANSYS and are based on proven sources, including the Granta Material Universe database and the JAHM simulation data set from JAHM Software, Inc.

"Every datasheet in the GRANTA Materials Data for Simulation dataset represents a generic materials type, rather than a specific product from a materials producer," Warde says. "This means that each record furnishes representative values for the properties offered by the available grades of the material. The goal is to support the early phases of design and to provide a wide-ranging reference source that supports simulation to obtain reliable results quickly."

LEVERAGE CORPORATE MATERIALS DATA

Completing the journey toward best practice requires organizations to think about two factors. First, what wider reference data sources are available to supplement the generic data available in GRANTA Materials Data for Simulation? The ANSYS GRANTA Selector software provides access to the complete Granta library of reference data, including rich sources of grade-specific data for metals and polymers. The software provides an array of tools to analyze this data and export it for use in simulation.

Second, and more strategic, how can organizations ensure best use of their own materials data — particularly where they have in-house expertise focused on analyzing test data to generate the materials models needed for simulation? Here the ANSYS GRANTA MI software can help, Warde explains.

"GRANTA MI is a dedicated materials information management system," he says. "It enables organizations to manage corporate materials data alongside the Granta library, creating a single source for materials data. Capture all of your test data, analyze that data to generate inputs for simulation, and make that input data available via an app within ANSYS Workbench, while ensuring all of this information remains linked for full traceability."

ANSYS GRANTA MI provides an enterprise-level solution to the wider "material intelligence" challenge.

MATERIAL IMPORTANCE

Materials data is critical to the success of simulation. However, users must make a point to ensure that data is validated, consistent and fully traceable. The process must begin with the right materials information.

"If materials input data are not reliable or simply are not available, simulations will never deliver on their true value," says Warde.

Through ANSYS GRANTA Materials Data for Simulation, users can access more than 700 material records directly within ANSYS products, saving costs, minimizing risk and improving their time to market. That value can be built on with a richer source of validated reference data via GRANTA Selector. Ultimately, GRANTA MI materials information management system enables the full lifecycle of simulation-related data to be consistently and securely managed.