

Supporting Materials Strategy – Realizing the Value from a Materials Property

Database

Arthur Fairfull

Over the last 20 years many organizations have developed materials property databases – as in-house resources, or as commercial ventures. Some have been successful – many have not. From experience with three materials software providers over this 20 year period, this presentation begins by assessing the criteria for success and reviewing “lessons learned”. In particular, many database implementers pay insufficient attention to ensuring the system satisfies the requirements of its customers, the data users – in terms of providing the information they require, in appropriate formats and terminology, and via a user interface that integrates well with their workflow.

The second part of the presentation therefore reports on an innovative new approach to effectively applying materials property data in support of materials and design decisions. The work builds on research at the University of Cambridge and the input of a multi-partner industrial collaboration. By modeling an understanding of a company’s materials and process costs, it is possible to establish a corporate strategy for preferred materials aimed at maximizing product performance while minimizing cost (whether financial or environmental). Designers and materials specifiers can then make decisions not with “raw” materials property data – but with performance indices relevant to their design objectives, calculated *from* the property data by the system. Examples will be provided in the presentation. The resulting optimization of materials specification and use delivers real value to the organization, far beyond that envisaged for the early laboratory database systems.

Best Practice Materials Data Management

Will Marsden

In aerospace, energy and defense engineering, quality is paramount. All design and production decisions must be carefully modeled using accurate materials property data. Often, this data must be certified by internal experts or external regulators. So using the right reference sources is vital. Excellence in managing and analyzing test data is also important in order to guarantee the reliability of internal design data and the quality of your production materials. Such data consists of a huge range of parameters — materials, properties of interest, components, operating conditions, tests, analyses, and more — posing a formidable information management challenge. Best practice also demands that your design decisions are fully traceable and that problems can be quickly diagnosed. Ideally, all relevant data and analyses should be retained, along with the connections between them.

Organizations in these sectors also need to deploy approved materials information effectively across their networks — for example, making it easy to access and use for your stress engineers and analysts as they perform CAE simulations. In an environment where information can be highly sensitive, security is essential in this deployment process. Data must get to those authorized to use it, when and where they need it — and to no-one else.

Yet the best organizations want to do more than just cope with overwhelming materials data. They aim to turn it to their advantage. They may wish, for example, to continuously assess data on the performance of materials in use, in order to improve design allowable values. Or they may wish to use materials information to support key decisions as they optimize their materials strategies.

GRANTA MI is the leading system for materials information management. Its development is guided by the Material Data Management Consortium (MDMC), a collaboration of top organizations such as NASA, GE - Aviation, Rolls-Royce, Honeywell, and Oak Ridge National Labs.