
Lockheed Martin's Materials Data Management Project

A WEB SEMINAR REPORT

At a web seminar hosted by NASA Tech Briefs, Renae Rippere, a Mechanical Engineer in the Materials and Process (M&P) Engineering Group, Lockheed Martin, Missiles and Fire Control, described the results of a recent materials data management program. The specific focus was on how designers choose an appropriate material and assign the associated materials property data to their product designs. Rippere explained how the use of GRANTA MI:Materials Gateway has delivered significant benefits, including consistent material usage, improved documentation, traceability, and considerable time savings. She also shared tips for other companies considering adopting such an approach.

*The full webinar (also featuring Honeywell and NASA) is available to watch on demand on the Granta website:
www.grantadesign.com/products/mi/casestudies.htm#lm*

How Lockheed Martin, Missiles and Fire Control, are using GRANTA MI:Materials Gateway to ensure a companywide preferred materials selection strategy

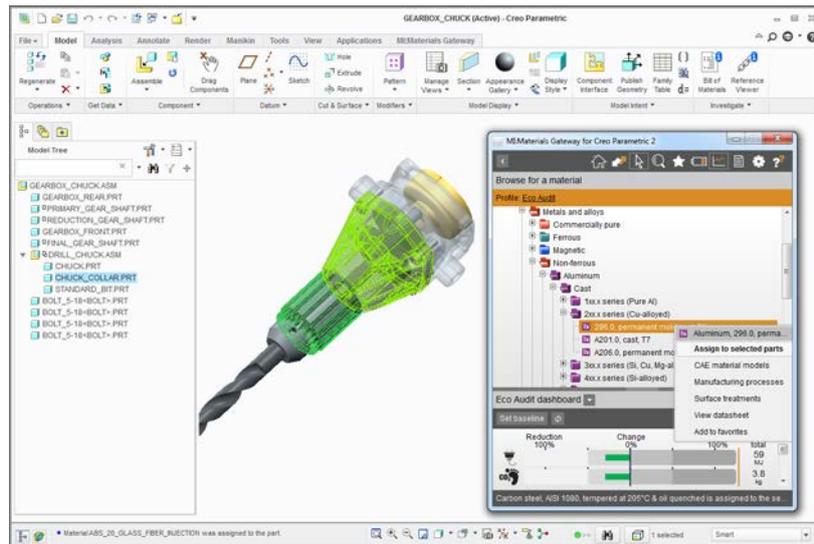
The challenges Lockheed Martin were facing

Lockheed Martin is a global security and aerospace company, headquartered in Bethesda, MD. The recent program to implement new tools for integrating validated materials data with engineering design packages has been spearheaded by the Missiles and Fire Control business.

The program started with an assessment of existing custom and practice in selecting and assigning appropriate materials properties. From interviewing staff, it was found that, as in many aerospace engineering organizations, design teams were using a variety of sources and methods to obtain materials data. (Typically, these include unstructured internet searches, the use of hard copy technical data sheets, and applying values taken from previous product designs, rather than specifically selecting for best performance.) It was found that, although some data sharing did occur, there was scope for more consistent material selection across design teams, programs, and from site-to-site. A desire for improved documentation and traceability for previous material choices was also highlighted—and for more consideration to be given to material cost, lead time, and scarcity, in addition to direct application requirements.

The solution: GRANTA MI:Materials Gateway

Lockheed Martin, Missiles and Fire Control, were already using GRANTA MI, the leading system for materials information management in engineering organizations. This solution enables the control, analysis, and secure sharing of critical corporate data in materials and processes. User organizations can both manage their proprietary in-house data and access their choice from Granta's comprehensive library of reference data, including the MMPDS handbook, a key reference for aerospace alloys.



GRANTA MI:Materials Gateway enables access to all of this information from within an organization's CAD, CAE, or PLM systems. The data can then be applied within those systems—for example, assigning materials properties to parts in a CAD model to enable accurate mass roll-ups, or importing validated materials models for use in CAE.

The implementation process

The Materials & Process (M&P) function is central to managing materials properties, so a small team of M&P engineers were tasked with overseeing implementation of GRANTA MI:Materials Gateway as the portal for designers into Lockheed Martin's materials knowledge. They determined that the first stage would be to implement a Preferred Materials List which would be rolled out for use by all design engineers working with the Pro/ENGINEER CAD system. The team focused, to begin with, on metals, and developed the Preferred Materials List based on the criteria of: commonality, most easily procured, reasonable pricing, and those used in most existing product applications.

The expected benefits of this Preferred Materials List were to ensure material traceability whilst eliminating the use of uncontrolled, undocumented data which lacked a verified source. Rippere explained that the **“best return on investment was the time savings”** made by engineers searching for materials property data.

The new materials data management program has been implemented for new design and metallic parts. Use of MI:Materials Gateway quickly provides vetted and consistent information to designers and removes the opportunity of choosing data values from

unapproved searches or using the 'easy option'—familiar, historical data values. To ensure mandatory use, Lockheed Martin has included the use of GRANTA MI:Materials Gateway generated materials data into their company policies and procedures. Indeed, design-checkers verify that the material assignment did indeed come from MI:Materials Gateway.

Looking back: top tips for implementation

Rippere concluded that keys to success in implementing such a program include:

- Management support and buy-in.
- Early involvement of technical staff to assist in the writing of procedures and directives, to help ensure a smoother change transition.
- The opportunity for 1:1 discussions and functionality demonstrations enabling staff to try out the software and build familiarity.
- The use of a trial period (approximately 2 months in the Lockheed Martin case) to enable system refinement before mandatory usage.
- Starting out with a small, focused subset of materials (metals in this case) to enable design teams to get used to the process progressively, prior to broader use.

Conclusion

As established GRANTA MI users, Lockheed Martin were aware of the benefits of centralized organization and management of materials property data, validated by M&P engineers. As they sought to eliminate the use of uncontrolled data without documented, verified sources, and to increase traceability of materials selection, they drew on the shared experiences of the MDMC as they adopted GRANTA MI:Materials Gateway. This is providing a **“solid modeling plug-in that provides vetted and consistent information to designers.”** Following the first phase of GRANTA MI:Materials Gateway implementation for new design and metallic parts, the division now plans to expand to other material specifications. The most significant benefit has been the considerable time savings for design engineers seeking approved and consistent materials data.

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