

## Rolls-Royce Guest Speaker at UK Seminar on Materials Information Technology in Industry

**Seminar**—*Birmingham, Nov 30, 2011* On Wednesday, November 30, materials specialists from Granta Design were joined by industrial engineers and materials scientists from across the UK. Industries represented included automotive, off-highway, aerospace, defense, and general manufacturing. They met at the National Motorcycle Museum, near Birmingham, for a seminar on Materials Information Technology in Industry.



In a building filled with over 650 fully-restored machines spanning the "60 Glorious Years" of motorcycle manufacturing in the UK, attendees shared their materials challenges, quickly recognising many common issues across the different industries represented. In particular, there was widespread interest in how best to approach materials substitution, as well as in maximizing the use of the materials knowledge already held within an enterprise.

Many of those present were already working with Granta software, giving the seminar the informal yet focused atmosphere of a user-group meeting. They were joined by those wanting to find out more, who had come to hear case studies and see the latest materials information technology in action, as well as to network with peers in leading engineering organizations, and to have their questions answered by Granta experts.

### Guest speaker—Practical Issues for Industry

**Darren Green, Chief of Materials Design Services at Rolls-Royce**, spoke about the drive towards continuous improvement in materials data quality in his organization. Rolls-Royce have been pioneers in implementing materials information management, and a key player in the Materials Data Management Consortium. The MDMC is a group of leading aerospace, defense, and energy organizations who have been defining best practice in the way materials information is stored and deployed since 2002.

The need for gold-standard materials information management is clear to Rolls-Royce: "Everything we make is from a material in some form." With more than

11,000 engineers world-wide, and nearly £8bn invested globally on research in the last ten years, the company wants to ensure efficient sharing of resources across the entire enterprise. However, Darren Green was clear that these challenges cannot be overcome by an IT solution alone. So Rolls-Royce is working to rationalize their data, aiming to use the same specifications, methodologies, suppliers, and data quality criteria wherever testing is performed.

There was wide agreement from the audience that much of the materials data generated throughout the industry is only used once. There are many reasons for this. The most common are:

- data is generated and used by an individual or group, and subsequently only stored locally;
- pedigree information is not available with the raw data when it is revisited;
- results are not part of an official dedicated testing process; or
- data on composites, welded joints, or high strain rate data, to name a few, are simply too complex to be stored in in-house data storage systems.

Even before adopting a new approach to materials data management, Rolls-Royce was able to reuse as much as 60% of all data. Now, they are in a position to work towards a 'zero data loss' policy. This will only come about by combining the right IT with the right corporate policies. They have already made substantial advances in the way new materials data is captured (complete with pedigree and metadata) and made available for global reuse, with appropriate access control.

The benefits of this approach are clear. As Darren Green commented, "every data-point is valuable, and can cost thousands of pounds". Rolls-Royce want to make the best use of this data, in a way that helps the materials design team to:

- meet regulations;
- reduce time needed to analyze data (in "a few minutes, rather than a few hours"); and
- reduce the time spent answering queries from designers and engineers around the world.

By synchronizing data globally, in a secure, access-controlled, and easily searchable information management system, and by implementing the new corporate policies, Rolls-Royce are now in a position to achieve this.

## Discussion—Applications for Materials Information Technology

The call for 'zero data loss' resonated with the desires of many present, who are looking for ways to ensure efficiency and maximize the use of pre-existing materials data within their companies. The lengthy discussion session that followed highlighted how engineers want to make systematic, repeatable materials choices, especially when considering cost reduction: it was clear that this will only be possible if the right, well managed, information is available.

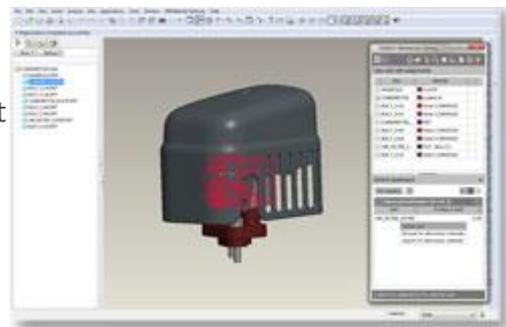
### Substitution and equivalency

The day continued with interactive presentations and case studies, providing a background for discussions on some specific challenges of materials selection and data management. Substitution and equivalency were key topics. For some, this is because current materials are becoming too expensive, or no longer available in a particular country. For others, formulation or composition change from their suppliers has led to 'property creep', meaning materials no longer have the right properties for their purpose.

More pro-actively, some companies are making the decision to substitute driven by an anticipated risk of phase out, a desire for dual sourcing, or a cost reduction strategy. Delegates were keen to discuss how new tools to systematically identify and assess potential replacement materials can overcome these challenges, and even provide additional opportunities to shorten design cycles, reduce risk, and improve quality.

### Integration with Design

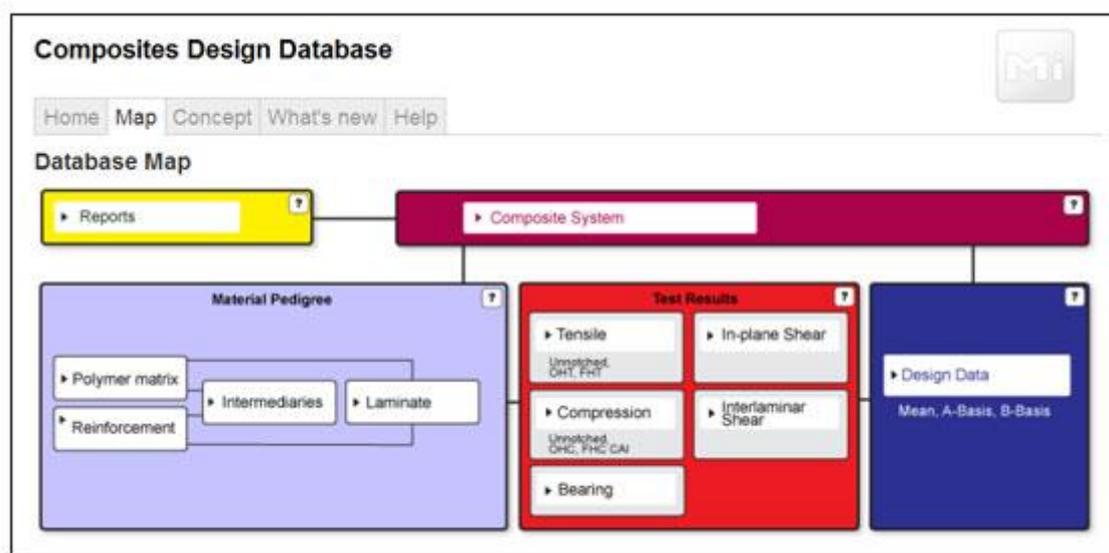
The value of materials data was widely recognized. But good materials data alone is not enough. Materials experts present expressed frustration that it can be hard to get crucial materials and processing information quickly, easily, accurately, and traceably into the hands of those who need it. Designers and engineers want to promote consistent, "right first time" materials decision-making. Both are welcoming new ways to access appropriate materials data and software tools within their familiar web browser, CAD, or PLM environments. A practical demonstration



using GRANTA MI:Materials Gateway, including restricted substance reporting from within Pro/ENGINEER (pictured), was particularly well received.

## Composite information management

Managing and applying complex composite information poses a particular challenge, one which engineers working in aerospace and defense industries were keen to address. Considering the full complexity of composites data (the interrelations of some key components and test areas are show in the diagram below), it is not surprising that standard data-storage systems often struggle. For this reason, the MDMC has guided the development of GRANTA MI to be a best-practice commercial off-the-shelf solution, designed to manage even highly complex materials such as composites. This session gave opportunities to explore the software, to ask question of Granta's experts, and to see how MI:Composites Lab provides integrated composite data analysis using tools such as STAT-17.

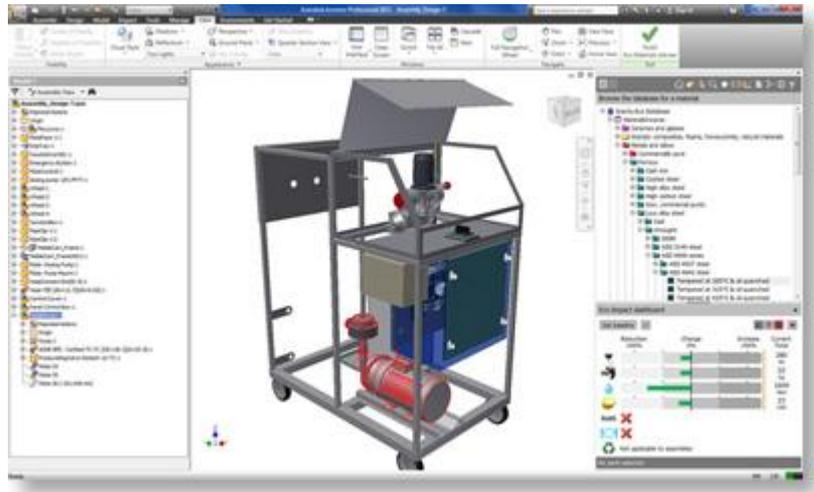


*The flexible database schema in GRANTA MI can be readily adapted for other complex materials information challenges. The picture shows a schematic representation of the schema designed for composite materials by the MDMC.*

## Eco Design

Finally, the focus turned to another current hot topic: eco design. The National Motorcycle Museum itself has just been awarded the Carbon Trust Standard after measuring, managing, and reducing its carbon footprint by over 7%.

In the engineering industries too, designers and engineers are facing increasingly complex regulatory pressures, as well as needing to respond to customer concerns. The discussions centered on how best to react to these pressures, and the importance of considering environmental issues at the early stages of design when changes cost least and have maximum impact. The case studies showed the benefits of integrating these capabilities with materials and process selection, and making them accessible within familiar desktop environments, including CAD packages such as Autodesk Inventor (pictured).



*Eco Materials Adviser within Autodesk Inventor provides access to an authoritative source of materials property data and new environmental assessment tools to help optimize eco impact, cost, and performance.*

## Conclusions

The day concluded with a final questions and answers session, with the panel of Granta experts providing insights into the wide range of software tools and data available to support materials information technology in industry. Then the delegates were free to explore the museum's comprehensive cross-section of motorcycles, seeing how the museum is meeting its aim "to preserve these pieces of history... as a reminder of this great nation's industry, engineering prowess, and work ethic." An appropriate conclusion to a day focused on maximizing the use and reuse of many years of materials research within Industry!



Granta would like to thank Darren Green of Rolls-Royce for his presentation, and are grateful to all the participants for making this an instructive and informative day. If you would like to know more about how Granta can support your organization, please get in touch.