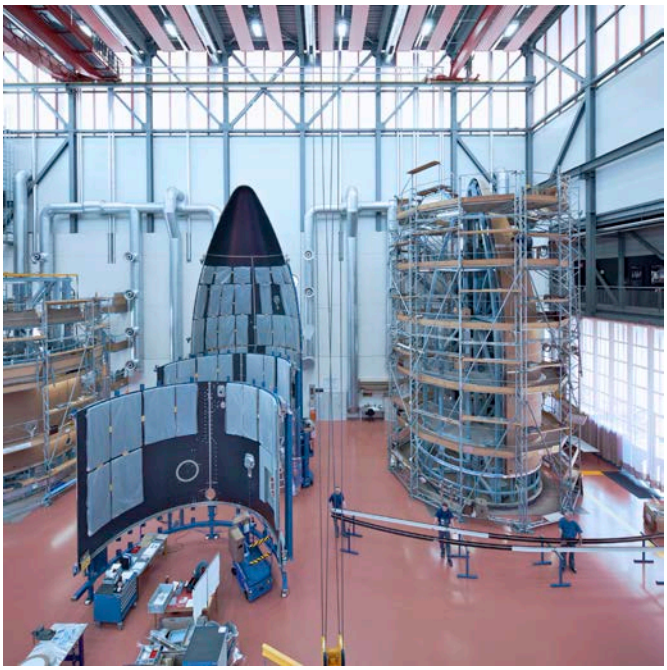
RUAG Space and Designworks: Managing materials information to enable Lightweighting projects

Lightweighting is a major motivating factor in many industry sectors, particularly transport, and success is dependent on a factor that cannot be weighed: information. In particular, materials information. As enterprises pursue weight reductions to minimize costs, meet stringent environmental regulations, or optimise performance, they constantly look to use new materials or make smarter choices with existing materials – metals, plastics, and composites. Smart choices need good information, and materials information can be make-or-break for effective, efficient lightweighting projects.

The **RUAG Space** and **Designworks** (a BMW Group subsidiary) case studies demonstrate the importance of an effective materials information management system where lightweighting is a key target. Substantial weight savings, cost savings, time savings, and the opportunity for greater understanding and insight have all been achieved.

RUAG Space: quick access to company-wide design data

RUAG Space is a leading independent supplier of products for the space industry in Europe, with a portfolio consisting of launcher structures and separation systems, satellite structures and instruments, digital electronics, and communication equipment. It has more than 1,200 employees in Switzerland, Sweden, Austria, Finland, and the United States who develop, test, and manufacture a wide range of innovative products.



It uses a wide range of materials – metals, plastics, composites, and adhesives, including special materials incorporating high-modulus fibers to meet the demands for lightweight, thermally-stable satellite structures. Lightweighting is one of the company's main targets – it recently built a 40cm aluminium antenna support for an Earth observation satellite that is half the weight of the original component, and stronger.

It has implemented the GRANTA MI™ system and created a single, reliable, company-wide source for all its materials data, capturing inspection data on the performance of materials from the production phase, along with proprietary data and external reference data. Key objectives are consistency and time-saving. As **Ulrich Krähenbühl**, **Manager for Materials & Processes at RUAG Space**, explains: "The system ensures that we use the same design data, company-wide, and can easily find these data in a quick way."

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This includes data from many sources: the company's own inspections; manufacturers' data

sheets; and The Metallic Materials Properties Development and Standardization (MMPDS) database, an authoritative reference on aerospace alloys. Data can be made accessible to design engineers and analysts through their familiar engineering software. Access to the database is provided from within the CATIA® Computer-Aided Design (CAD) software, and this integration will be extended to the Nastran® and Siemens NX® Computer-Aided Engineering (CAE) software.

The first stage of the project has ensured one consistent, accurate 'gold source' of design data, which is regularly updated. As well as capturing data, the company can capture valuable corporate 'knowledge' – for example, experience about how materials are applied. Among the next steps will be to introduce knowledge-tracking, and to log incoming inspection results on composites and adhesives.

Designworks: integrating diverse disciplines in product design

Designworks provides consultancy and design services to the automotive sector and a diverse range of other industries with a focus on mobility. The work of the team of materials scientists, automotive and product designers, engineering experts and sustainability consultants is geared towards innovation, with lightweight solutions being one of the key priorities.

Designworks has implemented the GRANTA MI system to create a materials database to enhance the integration of its diverse disciplines at the earliest stage of product conception. Staff can access one source with the relevant functional, environmental, sensual and emotional material properties to enable them to make holistic comparisons of a wide range of potential candidates. The opportunities to make early-stage simulations of late-stage factors offers great benefits for the design team and their clients, from better aesthetic solutions to cost savings and faster, more informed decisions. When working on a seat concept for the rail industry, Designworks was able to reduce weight by 25% with considerable financial benefits.

The system acts as an interface, bringing the diverse disciplines in the company closer together. **Anne Farken**, **Associate Director Sustainability and Creative Consulting at Designworks**, comments: "The global knowledge management frees up time that can be spent on creative work, increasing quality and innovation potential which can be detected via new agile processes and a genuine integration of the many disciplines."

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Designworks also uses the CES Selector™ software to support materials decision-making in product design and development. The software is used to screen the 'universe' of available materials to identify candidates for an application, especially when trying to find replacements for an existing material.

Further information

These case studies were first published in an article in *Lightweight Design* magazine (June 2016). It is available in PDF format via the Granta website here. The original publication is available from Springer on www.springerprofessional.de/