

Granta and the HITEA project: researching replacements for hexavalent chromium

HITEA (Highly Innovative Technology Enablers for Aerospace) was a 17-strong consortium, led by Rolls-Royce* for industrial aerospace end-users, suppliers, paint application companies and UK universities. It was formed to address the need to find replacements for hexavalent chromium following the introduction in 2007 of new regulations to control the use of the material from 2017 in the European Economic Area.

Objectives

The aerospace industry has been heavily reliant on surface treatments containing hexavalent chromium to prevent corrosion and wear in components with a design life of more than 40 years. Concerns about the health implications of hexavalent chromium compounds led to them being included on the list of substances regulated by the European Union's REACH legislation, with a 'sunset date' of September 2017. HITEA addressed the urgent need for replacements through the development of valid, industry-wide test methodologies and the application of these methods to REACH-compliant replacements. The ability to share knowledge resulting from testing across the industry sped up the search for replacements.

Managing one shared source of knowledge

Granta enabled the project to develop a single shared source of knowledge, through the use of GRANTA MI™, the leading materials information management system. GRANTA MI hosted a central materials database for the project, and GRANTA MI tools were used by all the consortium partners to capture and consolidate materials knowledge about alternative coating systems into the database. This data could then be used to evaluate risks associated with these systems, to aid appropriate down-selection, and to improve reporting on these alternatives in line with industry needs.

Key benefits of using Granta's technology and tools

Existing test data on the performance of wear and corrosion solutions has been generated over the past 40 years, and the data sources from within the consortium, and from external sources, were complex and wide-ranging. The Granta team worked with the project partners to configure the standard GRANTA MI materials database so that it could store this data and its inter-relationships. Such adaptability is a standard feature of GRANTA MI. Large quantities of data could be quickly and easily uploaded, enabling the project to build on this valuable information resource.

GRANTA MI tools then enabled project members to make use of this information. For example, they could compare the proposed chromium-free alternatives identified within the consortium against relevant lists of restricted or authorised materials. Granta's Restricted Substances Data Module is a digital reference source that brings together many of these lists and links them to data on the affected substances, and the coatings and materials that contain these substances. This enabled quick comparison to ensure that the alternatives being

considered were not subject to restrictions in emerging legislation. This process ensured that the next generation of materials systems are compliant and sustainable in the long term.

Conclusion

By consolidating legacy data and the results of new testing on materials properties, and processing available to each partner with unique reference data on restricted substances and related regulations, the consortium was able to support effective decision making in the specification and use of alternative coating solutions. The reliability of new REACH-compliant coatings was assessed prior to more extensive (and expensive) component testing within the consortium.

* Project partners were Rolls-Royce, Monitor Coatings, Ashton & Moore, Indestructible Paint, The Manufacturing Technology Centre, Birmingham University, Loughborough University.