Castolin Eutectic®
Eutectic Castolin

RESEARCH AND DEVELOPMENT

Experts in repair and maintenance at your SERVICE

Stronger, with Castolin Eutectic

Surface Engineering in Extreme Environments

The advanced Castolin Eutectic workshop in Newcastle, UK, is the project lead manager in four Innovate UK funded projects with a budget close to £2m. We currently run two EPSRC funded PhD programmes with Nottingham and Surrey Universities. We have close collaboration with several research institutes and are active participants in the largest Surface Engineering Hub in the UK.

With a growing portfolio of products and an increasingly comprehensive range of services our investment in research and technology is vital to ensure we remain market leaders. Two-thirds of our investment is aimed at improving the technical and environmental performance of our products. For example, investing in Hard Chrome Replacement for the aerospace, oil & gas, steel, marine and energy sectors. Other areas of focus include renewable energy and nanotechnology.

Our investment focuses into technologies that we intend to take to market. We believe it is important to achieve the right mix of innovation, investment and risk taking. Developing the right technologies requires looking far into the future and generating a clear understanding of our customer's needs.

Technology acquisition is planned over three Technology Readiness Levels (TRL):

- **TRL 1-2 Exploring New Ideas:**

These levels are technologies that target future generations of developments within a ten-year timeframe. These are at the strategic research stage – emerging or as yet unproven – but will ensure that our workshop is prepared for future market developments, by focusing our extensive research base (including universities and institutions) on the technology requirements of future generations of products.

- **TRL 3-5 The Next Generation:**

These levels embody technologies currently at the validation stage which are due to be commercially available within the next five years. The next generation of our workshop's market-leading developments will rely largely on TRL 3-5 technologies.

- **TRL 6-7 Applying Technology:**

Are the technologies that are readily available to market. TRL 6-7 activities will ensure that current developments remain market leaders in every aspect of performance, reliability and cost.

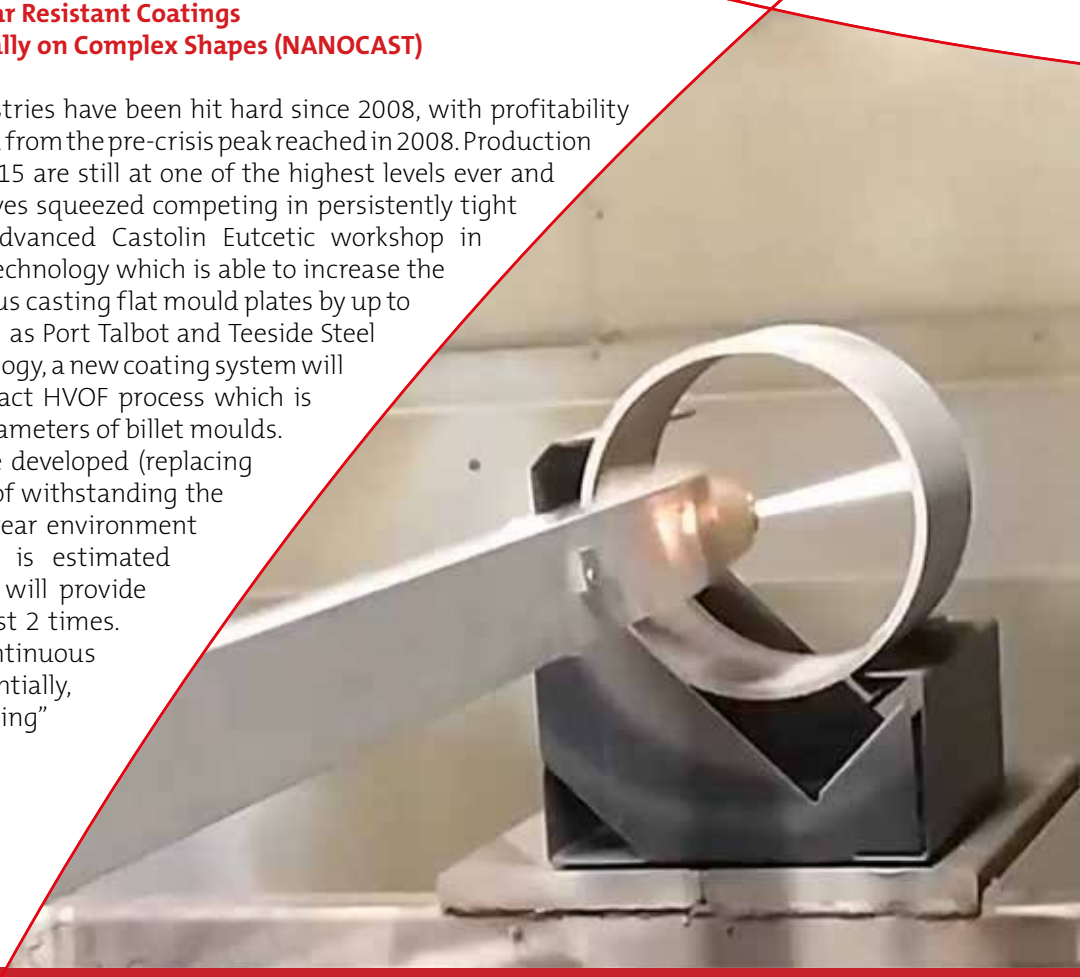
Active Research Programmes

Exothermic Reactive Seal Coatings (ER-Sealcoat)

The need to reduce CO2 emissions is pushing thermal power plants to use higher operating temperatures and biomass/waste derived fuels, and these factors combine to create demanding environments for heat exchanger tubes. The 'ER-Sealcoat' project aims to develop a low cost method of producing customisable coatings that can coat 3D geometries (internal and external) and protect against aggressive high temperature environments. The process will use exothermic reaction synthesis to modify low cost sprayed metallic coatings. The seal coating is produced as a two-part slurry containing chemically active components, which reacts with the sprayed base coat exothermically. This reaction adds chemical energy that enhances diffusion and intermetallic formation with the basecoat, producing a sealed surface with a bespoke chemical gradient capable of resisting fireside corrosion and high temperature oxidation. The ER-Sealcoat would result in improved performance through its functional gradient design and ability to close surface breaking porosity and seal the coating. Direct and indirect process costs would also be reduced compared to current industrial coating methods.

Improved Wear Resistant Coatings Applied Internally on Complex Shapes (NANOCAST)

The UK steel industries have been hit hard since 2008, with profitability down by 80% in 2012 from the pre-crisis peak reached in 2008. Production costs in 2014 and 2015 are still at one of the highest levels ever and UK mills find themselves squeezed competing in persistently tight global markets. The advanced Castolin Eutcetic workshop in Newcastle, UK, applies technology which is able to increase the in-service life of continuous casting flat mould plates by up to 6 times in companies such as Port Talbot and Teeside Steel plants. Based on this technology, a new coating system will be developed using a compact HVOF process which is capable of coating internal diameters of billet moulds. Three coating systems will be developed (replacing hard chrome plating) capable of withstanding the aggressive high temperature wear environment during continuous casting. It is estimated that the down selected coating will provide an extended service life of at least 2 times. The production costs for Billet Continuous Casting steel will drop substantially, measured as "a £ per tonne saving" against current production costs.



Advanced Hex Chrome-free Surface Technologies for Corrosion Protection (COLM)

Hexavalent chromates set the benchmark for corrosion protection for a number of industries and they are essential for the safety of current Aerospace products. However, EU REACH legislation has tightly restricted the sale and use of these chemical substances which creates a business continuity threat to the UK and EEA supply chains. One key technology is chromate conversion coatings (CCC) that are essential for the protection of aluminium components. While there are a number of proposed alternatives on the market, previous work has identified these to be unsuitable. A consortium has been brought together in order to develop and industrialise CCC alternatives to ensure that they meet stringent requirements set by the Aerospace industry. The lifetimes of these hex-chrome technologies will be measured using advanced methodology so that they can be safely introduced into Aerospace products. Furthermore, the new technologies will be available for the entire UK supply chain to use, including for other industries such as medical, automotive, oil and gas.

Acoustic Emission Analysis for Continuous Monitoring of Thermal Spray Processes (AE)

The proposed feasibility study is to lay the ground for the development of a novel on-line, non-destructive monitoring technology for the low temperature thermal spray processes based on the acoustic emission (AE) during the coatings. The key objectives are: identification of the elements in the AE of the thermal spray process that contain information about the coating quality; continuous on-line monitoring of the coating process so that deviations from the optimum spraying conditions can be detected early and corrected promptly; greatly reducing product rejections and re-coating compared to the inadequate post-spray quality check.

Stronger, with Castolin Eutectic

Castolin Services

Castolin Eutectic®
Eutectic Castolin

Accredited Nadcap Coatings

bsi. ISO 9001 Quality Management | AS/EN 9100 Series Aerospace

Our address:

2 Elm Road, West Chirton North Industrial Estate, North Shields, Tyne and Wear, NE29 8SE, UK

Tel: +44 (0) 191 293 7040 Fax: +44 (0) 191 293 7041

Your resource for protection, repair and joining solutions

www.castolin.com ***www.eutectic.com***