

New Manufacturing Project to Save Millions in Reclaimed Parts

RECLAIM, a cutting-edge project at the £40 million Manufacturing Technology Centre (MTC) in Coventry, United Kingdom, has the potential to save UK industry millions of pounds by re-manufacturing high-value components, such as turbine blades, that would otherwise have gone for scrap.

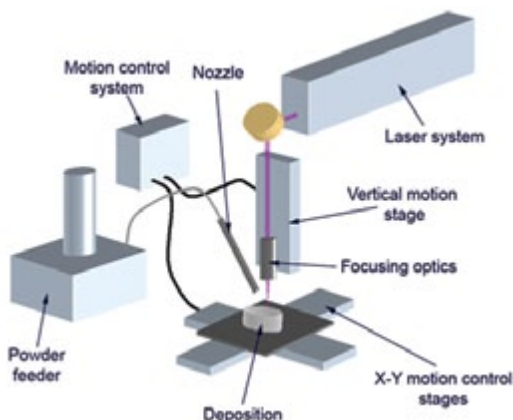
The RECLAIM project uses laser cladding, automated inspection and high-speed machining in a single, fully integrated re-manufacturing cell. The technology enables manufacturers to repair and recycle worn high-value components to a consistently high quality. The innovation is expected to make a major contribution to the efficiency of the aerospace, defence and power industries in particular.

As well as repairing damaged and worn parts, the system can be used to manufacture complex new metal parts, upgrade obsolete parts and reconfigure standard parts for low-volume applications.

The work is being carried out under the auspices of the Technology Strategy Board, a body established by the UK government to drive innovation. The Board has contributed more than half of the million pound-plus research and development costs. As well as the Manufacturing Technology

Centre, the industrial partners in the RECLAIM project include software developer Delcam plc, metrology equipment developer Renishaw plc, laser processing equipment manufacturer ElectroX, CNC integration experts Precision Engineering Technologies Ltd., and turbocharger manufacturer Cummins Turbo Technologies. In addition, Leicester DeMontfort University played a key role in the development of the laser cladding system.

MTC operations director Leigh Carnes said every industrial sector has a requirement for re-manufacturing and it contributes around £5 billion to the UK economy, not to mention its impact on environmental sustainability and the avoidance of waste. However, conventional re-manufacturing processes are slow and labour intensive. “The new process enables cost-effective, rapid and reliable re-manufacturing of high-value engineering parts. It can be fitted onto existing machine tools, and allows seamless transition between cladding, machining and inspection operations. There is no doubt that this technology—a world first for the MTC and its partners—will transform the whole process of re-manufacturing,” said Mr. Carnes.



WHAT IS LASER CLADDING?

Laser cladding is a method of depositing material by which a powdered or wire feedstock material is melted and consolidated by use of a laser in order to coat part of a substrate or fabricate a near-net shape part (additive manufacturing technology).

It is used to improve mechanical properties or increase corrosion resistance, repair worn-out parts, and fabricate metal matrix composites.

Image and information courtesy of Wikipedia

Remanufacturing occurs to some extent in every industrial sector. It is most prevalent in sectors with high-value goods or high technological content, for example aerospace, defence and power turbines. It is one of the most efficient ways of recycling worn parts as remanufacturing consumes only a fraction of the energy required to manufacture of new parts. Remanufacturing contributes around £5 billion to UK economy and makes a substantial impact on quality-of-life and environmental sustainability by employing over 50,000 people and recovering around 270,000 tonnes of high value materials with an equivalent carbon saving of 800,000 tonnes of CO₂.

Unfortunately, remanufacturing of engineering components entails a series of operations requiring parts to be transferred around manufacturing facilities and often to subcontractors. Each process is labour intensive and dependant upon the skill of the operator. The new RECLAIM cell enables cost-effective, rapid and reliable remanufacturing of high-value engineering parts. Current commercial competition in this field is limited to specialised laser cladding cells which can cost in excess of £1m to buy. These cells are not only expensive, but they are only able to undertake cladding operations and inspection and machining has to be processed on other equipment.



The beauty of the RECLAIM system is that it can be fitted onto an existing machine tool. When not in use, the laser cladding and inspection heads are housed in the tool changer and are ready to be brought into action, this enabling seamless transition from between cladding, machining and inspection operations.

The RECLAIM cell was assembled in the Manufacturing Technology Centre and tested on a range of industrial components including automotive turbochargers produced by the Cummins Turbo Technologies Ltd., who are the key end-user partner in the project.

In addition to filing patents to protect innovative features of the cell, a company is being established to commercialise the RECLAIM system. To support the commercialisation of the results of the RECLAIM project, the Manufacturing Technology Centre is undertaking further work to refine the design of the system. ●

ABOUT THE MTC

The Manufacturing Technology Centre (MTC) opened in 2011 following a £40 million cash injection from the West and East Midlands development agencies. It is a partnership between some of the UK's major global manufacturers and three forward-thinking universities: Birmingham, Nottingham and Loughborough as well as TWI Ltd, the operating division of The Welding Institute.

The MTC aims to provide a competitive environment to bridge the gap between university-based research and the development of innovative manufacturing solutions, in line with the UK government's manufacturing strategy. The MTC has been established to prove innovative manufacturing processes and technologies in an agile environment in partnership with industry, academia and other institutions. The MTC provides a high quality environment for the development and demonstration of new technologies on an industrial scale, providing a unique opportunity for manufacturers to develop new and innovative processes and technologies in a low-risk environment.

The areas of MTC's technology focus are appropriate to both large and small companies and are applicable across industry sectors. Founder industrial members of the MTC are Rolls-Royce, Aero Engine Controls and Airbus UK and members now include manufacturing companies from multiple sectors.

Further information, visit the MTC website at www.the-mtc.org or telephone Eleanor Thomas at 02476 701683.



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