



Robot welding gets 5 times faster as €4 Million project replaces guess work with maths

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Remote Laser Welding (RLW) is rapidly emerging as a powerful replacement for spot welding technology in vehicle manufacturing. It promises 5 times the speed of spot welding and far more efficiency – however this can only be achieved through a frustrating process of guess work and trial & error today. Now WMG at the University of Warwick has been awarded 4 Million Euros by the European Commission Framework 7 Programme (FP7) to lead a project that will replace guess work and wasteful trial & error with precise mathematical modelling that will quickly deliver the efficiencies manufacturers want from this process.

Lead researcher on the €4 Million 3 year RLW Navigator project (full title being "Remote Laser Welding System Navigator for Eco & Resilient Automotive Factories") WMG Professor Darek Ceglarek said:

"Our project will integrate universal simulation engine and experimental models to precisely model, configure, optimise complex control laser welding in complex multistage assembly processes. The project will take advantage of the three main characteristics of laser welding: non-contact, single side joining technology, and high power beam capable of creating a joint in fractions of a second."

The promise and power of Remote Laser Welding (RLW) as an alternative to spot welding in vehicle manufacturing is due to a combination of laser power and optics. Unlike spot welding, which requires access to both sides of an assembly to create a joint, laser welding is a single sided joining technique. By having laser optics embedded into the robot, and a scanning mirror head as the end-effector, RLW can easily create joints in different locations of the product through simple robot repositioning and laser beam redirection from a remote distance. This means that as long as there is a 'line of sight' between the scanning mirror and the joint location on the assembly creating a laser weld may be feasible. The WMG research will give manufacturers the ability to easily and comfortably create assembly systems using the technology that will quickly realise the savings and efficiencies promised by this technology.

Those potential benefits include:

- Faster processing speed –laser welding is 5 times faster than spot welding for an equivalent strength weld.
- Reduced floorspace –studies have shown that for the equivalent process content a laser welding cell occupies 50% less floorspace.
- Lower Investment Costs –studies have shown that for the equivalent process content a laser welding cell has 80% fewer robots and less tooling stations
- Lower Operating Costs -studies have shown that for the equivalent process content a laser welding cell has 10% lower operating costs
- Single sided access –laser welding does not require access to both sides of the part, resulting in higher process content per weld station
- Significant reductions in energy use and reduced environmental impact of vehicles
- Improved dimensional accuracy / lower assembly distortion as a result of reduced joining process related heating
- New design opportunities that would be infeasible with more established joining technologies

Provided by University of Warwick

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