



Technical Bulletin No. 1

Friction stir welding of steel for Shipbuilding and marine applications

RESURGAM

Robotic Survey, Repair & Agile Manufacture



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Technical Bulletin

This **Technical Bulletin** summarizes progress made during the first months of the project, specifically regarding technical achievements in developing the FSW tools and welding techniques that provide the underlying process technology.

The **objectives** of the process development that forms Work Package 1 of the RESURGAM project are to:

1. Develop FSW tools suitable for welding marine grade steels in air and liquids;
2. Establish the performance (longevity and reliability) of FSW tools for steel used in air and water;
3. Establish the FSW process envelope for specific tool sizes in air and water;
4. Determine the weld properties of marine grade steels welded by FSW in a air and water;
5. Develop a route map that will enable guidelines to be drawn up to allow the use of steel FSW for marine applications

Work performed on the fundamental **friction stir welding technology** that underpins **RESURGAM** during the first months of the project has shown that:

1. Steel up to 12mm thick can be friction stir welded by the tools developed by Element Six;
2. Butt welds in the grades of steel being targeted can be made whose strength is at least equal to that of the parent metal;
3. 2-dimensional lap welds suitable for making fully sealed patch repairs can be made through 6mm thick steel plate;
4. An integrally stiffened panel (ISP) can be made from rolled T sections and flat plate, reducing the number of welds required by half when compared with conventional welding techniques.