RESIDUAL CONSTRAINTS AFTER WELDING OPERATIONS

CREDOS PROJECT

The CREDOS project aims to reduce the deformations occurring after the machining of thick aluminium alloy sheets assembled by friction stir welding (FSW) by proposing a methodology to limit the apparition of residual stress during the welding operation.

TECHNICAL AND ECONOMIC IMPACTS

Better understanding of residual stress
Improved Buy-to-Fly* ratio
Increased competitiveness of metal processes for aerostructures

* Ratio of raw material weight to final part weight

PARTNERS

IRT JULES VERNE, AIRBUS, AIRBUS ATLANTIC, CONSTELLIUM

BUDGET

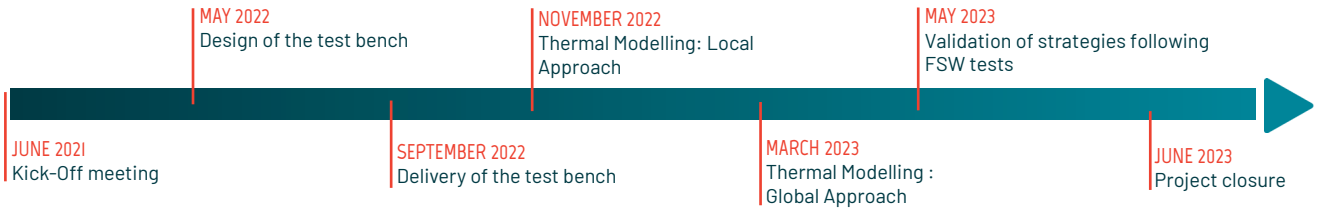
1800 K€

KEYWORDS

Welding - Reconstituted blanks - Aluminium - Residual stress
Deformation - FSW

RESEARCH THEMES AND EXPERTISES

Process innovation
Assembly



INDUSTRIAL CONTEXT

The FSW (Friction Stir Welding) process allows the welding of aluminium alloy sheets without the difficulties associated with conventional fusion welding processes. It can therefore be used to produce blanks closer to the dimensions of the final parts and to reduce the Buy-to-Fly ratio. However, during the production of the complete manufacturing range, from welding to machining, strong deformations appear.

The objective of the project is to achieve FSW welding of aluminium alloy sheets without residual deformation after the entire process (welding, clamp release and machining) by working to minimise residual stresses in the welded blanks. A test bench will evaluate the potential of different stress minimisation technologies.

INNOVATIVE FEATURES

- Thermal modelling of FSW: Local and global approach
- Controlling residual stress on thick aluminium alloy sheets assembled through FSW
- Reconstructed blanks without deformations caused by residual stress

INDUSTRIAL APPLICATIONS

Ultimately, the project aims to make it possible to produce blanks in aluminium alloys, in order to limit the quantity of swarf during the machining phase, and thus improve the Buy-to-Fly ratio.

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