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Defect Detectability Improvement for Conventional Friction Stir Welds

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Overview

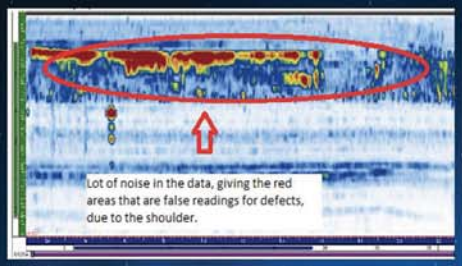
This research was conducted to evaluate the effects of defect detectability via phased array ultrasound technology in conventional friction stir welds by comparing conventionally prepped post weld surfaces to a machined surface finish. A machined surface is hypothesized to improve defect detectability and increase material strength.

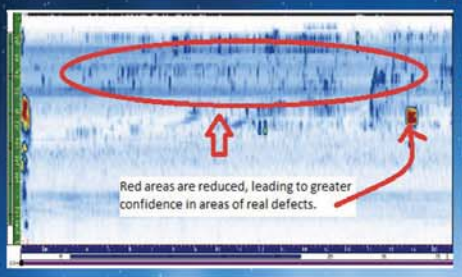
Key Findings

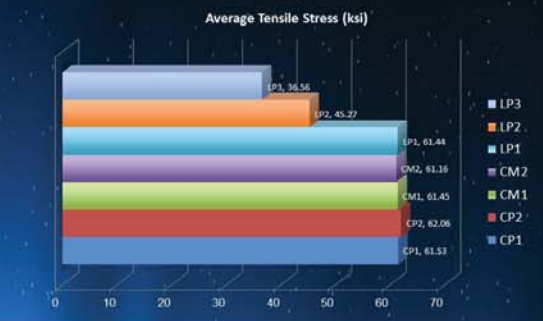
Comparing the before and after machining PAUT scan results shows a significant increase in clarity of the weld shoulders. This increased clarity leads to less time performing tests to determine the cause of the unwanted noise as well as better defect detectability in the shoulder and the center of the weld. By machining the surface, repeatability of clarity is gained in the results. Mechanical testing shows no significant loss in materials strength.

Impact

A clean weld shoulder shows that the accuracy of PAUT defect detectability is increased as well as the time it takes to get results back. This helps keep projects on schedule and virtually eliminates the chance of defects hiding in welds due to high noise levels caused by flash. Quicker results, and higher quality checks leads to better welds used and higher mission safety with the possibility in reduced overall cost.







Explanation

The process of joining metal is crucial to space exploration and travel. Ensuring clean, strong welds is critical for the safety of every mission. This research helps ensure that each weld made is able to be tested as thoroughly as possible ensuring only the best is sent to space.

Acknowledgements

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