

Repair of lean amine suction impeller using wire laser metal deposition

Lean amine suction impeller received at Norway service centre with cavitation damage on vanes. The two options were to either repair the damage or use the impeller after polishing. Client insisted on 'weld' repair of the cavitation damage.



As received impeller



Cavitation damage



LMD deposit



Finished vane



Finished/tested/passed impeller

The work scope

- Base material A995 5a (Super duplex stainless steel) is highly challenging to weld repair- known for microstructural and distortion issues
- Component is finish machined so any distortion had to be minimal or none.
- Needed to keep the HAZ to a minimum or none existent and not significantly increase material hardness.

Our solution

Wire LMD was deemed most suitable option considering it is the low heat input process with minimum dilution, small HAZ and the flexibility required around the geometry for access.

Customer benefits

- Impeller repaired in record timescales using advance additive manufacturing method.
- No impact on impeller dimensions substantiated by dimensional checks.
- High material integrity (minimum HAZ, no porosity and cracks) and finish achieved and verified by dye penetrant inspection.

Key equipment data

- Model- 300-400-33/4S
- API pump type-HPCPV
- Retrofit type
- Flow 1'120 m³/h
- Head 978 m
- Power 3'852 kW

Establish process parameters for LMD on a test block

Material testing to check material structure and integrity

Down select parameters and conduct repairs

Dimensional and DPI check

Balancing and final checks

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