CURTISS-WRIGHT

Surface Technologies

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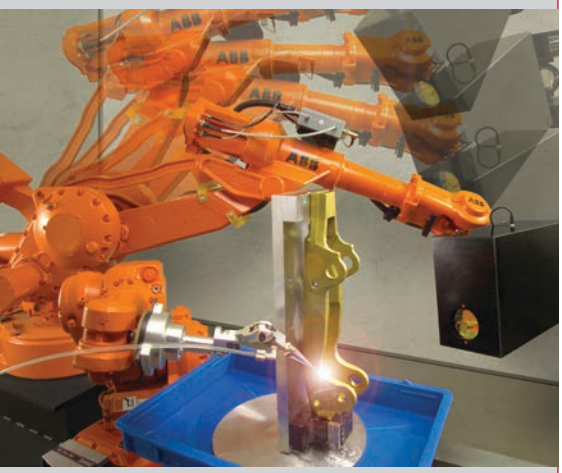
COMPANY PROFILE

Curtiss-Wright Surface Technologies (CWST) is a single source solution for all your surface treatments. We can reduce your turnaround times and costs through our network of 65 worldwide facilities.

Our proven surface treatments meet industry demands for lighter materials, improved performance and life extension in key markets such as Aerospace, Automotive, Energy, Military and Industrial. We can prevent premature failures due to fatigue, corrosion, wear, galling and fretting.



Surface Technologies is a Division of Curtiss-Wright (NYSE:CW) a global innovative company that delivers highly engineered, critical function products and services to the commercial, industrial, defense and energy markets. Building on the heritage of Glenn Curtiss and the Wright brothers, Curtiss-Wright has a long tradition of providing reliable solutions through trusted customer relationships.

CURTISS-WRIGHT

High Temperature Applications of Peening; Laser Peening Plus Thermal Microstructure Engineering

Laser peening (LP), a mechanical surface treatment generates deep levels of plastic compression thereby enhancing a treated material's resistance to surface-related failures. Although conventional peening works for low temperature applications, at temperatures greater than half a metal's melting temperature (T> 0.5Tm) peening, rolling and similar surface treatments degrade through dislocation annihilation, stress relaxation, and grain coarsening.

Curtiss-Wright (CW) has developed a novel technique, coined laser peening plus thermal microstructure engineering (LP + TME) and its application to AM (Adaptive Manufactured) superalloys imparts thermally stable microstructural modifications in both conventional and additively manufactured (AM) materials. By the use of TEM (Transmission Electron Microscopy), we were able to definitively show why the LP+ TEM processing was holding residual stress and generating good fatigue performance after thermal exposures by showing that our unique LP+ TME approach generates, precipitates and traps them in the LP-generated dislocations. This work was carried out on AM IN718. The trapped precipitates hold in the stress when the material is subjected to high temperature. The process is now being tested in a wide range of high temperature applications with emphasis on improving fuel efficiency and reliability of jet engines and gas turbines.

Curtiss-Wright Surface Technologies continually collaborates with industry leaders and researchers to advance our technologies. Below are recently published papers authored in collaboration with Professor Davami at the University of Alabama.

With partner Michigan State University (MSU), CW was awarded a U.S. Department of Energy Advanced Research Projects Agency-Energy (ARPA-E) program to develop an advanced heat exchanger for supercritical CO2 generators - a more energy efficient, more compact, and lower cost electric turbine that offers the potential to reduce greenhouse gas emissions. ***Read the press release.***

Recently Published Papers

- ***Thermal stabilization of additively manufactured superalloys through defect engineering and precipitate interactions***
- ***Laser shock peening and its effects on microstructure and properties of additively manufactured metal alloys: a review***
- ***Nanomechanical Characterization of Laser Peened Additively Manufactured Inconel 718 Superalloy***
- ***Test Results for Wrought and AM In718 Treated by Shot Peening and Laser Peening Plus Thermal Microstructure Engineering***
- ***Helium tribology of Inconel 617 subjected to laser peening for high temperature nuclear reactor applications***
- ***Laser Peening Analysis of Aluminum 5083: A Finite Element Study***

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