

**CURTISS -
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Naval Laser Peening

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COMPANY PROFILE

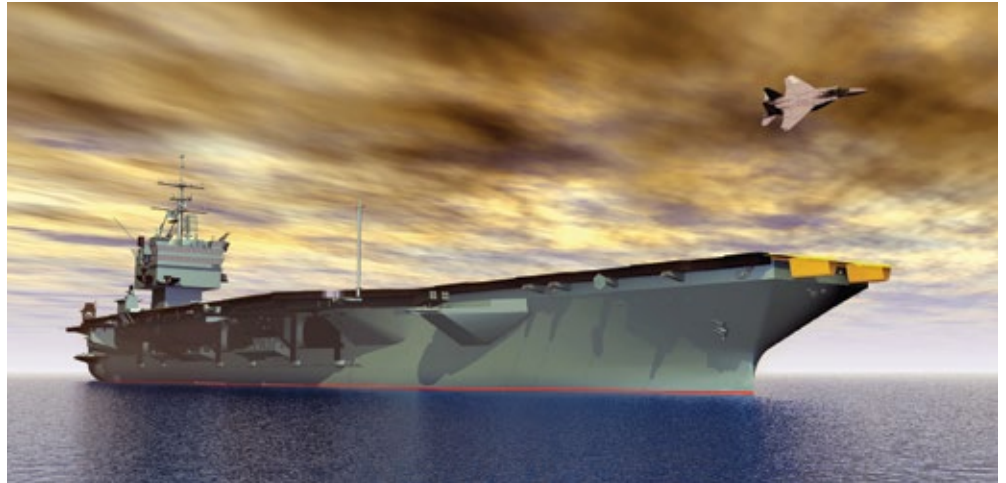
Curtiss-Wright Corporation (NYSE:CW) is a global integrated business that provides highly engineered products, solutions and services mainly to Aerospace & Defense markets, as well as critical technologies in demanding Commercial Power, Process and Industrial markets.

Our proven surface treatments meet industry demands for lighter materials, improved performance and life extension in key markets such as Aerospace, Automotive, Energy and Medical. 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.

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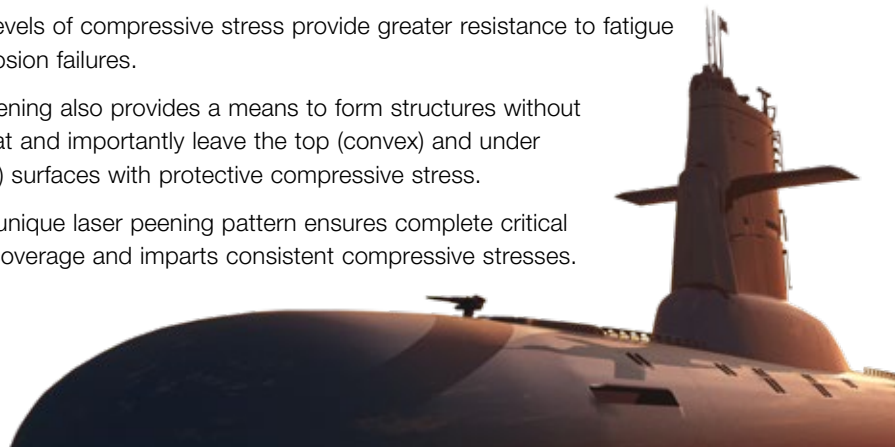


Laser Peening & Peen Forming

Laser peening is proven to extend the service lifetime of common shipbuilding metals including aluminum and steel by fighting failures of sensitization induced cracking, corrosion and fatigue cracking.

How it works:

- Laser peening uses a high energy laser fired at the surface of a metal part.
- The surface pressure pulse is adjusted to be above the yield stress of the material and importantly penetrated to a depth as much as 0.25-inches.
- The laser generated pressure wave plastically compresses the near surface layer to depth 5 to 10 times deeper than conventional peening allowing the component to develop deep levels of protective compressive stress.
- Deeper levels of compressive stress provide greater resistance to fatigue and corrosion failures.
- Laser peening also provides a means to form structures without using heat and importantly leave the top (convex) and under (concave) surfaces with protective compressive stress.
- CWST's unique laser peening pattern ensures complete critical surface coverage and imparts consistent compressive stresses.



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Laser Peening in the Shipyard

Fatigue failure can result from dynamic loads placed on different components as well as static loads experienced in stress corrosion cracking and in sensitization-induced cracking. These failures are costly to repair and put the ship out of commission for far too long. Laser peening and laser peen forming applications can save time and money by efficiently protecting parts and extending the life of important aspects of the ship.

Laser peening can demonstrate material improvements in a variety of metals for shipbuilding including: titanium alloys, steel alloys, stainless steels, nickel alloys, aluminum alloys, carburized and nitrided steels.

Common Shipyard Challenges:

- Shipyards are currently having difficulty installing aluminum water tight doors with wavy edges and are using flame straightening to accomplish this, despite the fact that high heat reduces the aluminum's resistance to brittle fracture and cracking.
- Shipyards are currently using a costly process to prevent general corrosion of Inconel cladding on 23284A steel of the propulsion shafting.
- Sensitization cracking of 5000 series steel is a problem on ship structures and as demonstrated by ASTM 36 test result can be eliminated by the deep compressive stress of laser peening.

Advantages of Laser Peening:

- Laser peening has proven to extend the service life of common shipbuilding metals like aluminum and steel as well as greatly extending service life of weld repairs.
- Not only does laser peening extend the service life of shipbuilding materials, it can also be used to correctively form panel and structure shapes eliminating fit up errors which result in time consuming straining of structures and resulting in tensile stress problematic for inducing future cracking.
- Laser peening stops stress corrosion cracking and hydrogen driven corrosion-fatigue failures.
- Laser peening reduces costs, and improves vessel availability by extending the time between costly scheduled maintenance and overhauls.

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