

MIC Markets

INNOVATORS IN TECHNOLOGY



**Metal Improvement
Company**

Subsidiary of Curtiss-Wright Corporation

Oil, Gas and Petrochemical



Enhancing the performance
of metals and materials

www.metalimprovement.co.uk

**CURTISS
WRIGHT**

Oil, Gas and Petrochemical markets



Metal Improvement Company (MIC) is a global organisation specialising in metal and material surface treatments which enhance performance and extend the life of critical components, enabling component designs to achieve their maximum potential.

Established in 1945, MIC has over 60 operating divisions in Europe, USA, Canada and Asia with on-site processing worldwide.

We offer a quality controlled and cost effective service, working in partnership to meet our customer's needs.

MIC division approvals, where appropriate, include: FAA, AS9100, NADCAP, ISO 9001:2000, ISO 9001:2008 plus other specific OEM, company and industry approvals as required.



Metal Improvement Company is a subsidiary of the Curtiss-Wright Corporation, a diversified international provider of highly engineered products and services to the Motion Control, Flow Control and Materials Treatment industries.

www.curtisswright.com



Metal Improvement Company (MIC) are specialists in enhancing the performance and extending the life of highly critical engineered metals and materials which are subject to harsh and extreme conditions typically found within the oil, gas and petrochemical industries.

The services we offer form an integral part of the manufacturing process for highly engineered products and by extending plant and equipment life we reduce maintenance and whole life costs.

The premature failure of many components can be directly related to residual tensile stresses induced by manufacturing methods and unexpected service conditions.

We can alter these undesirable manufacturing and operational stresses to life enhancing residual compressive stresses therefore extending component life.

In addition, through the development and use of dry film lubricants, wet polymer coatings as well as bespoke and standard coatings (including licensed products) we are able to protect against corrosion and wear, improve part life and reduce maintenance costs.



Typical failure modes are:

- Metal fatigue
- Corrosion fatigue
- Corrosion
- Stress corrosion cracking
- Fretting
- Galling
- Spalling
- Wear

These failures account for more service and maintenance stoppages than any other issue relating to engineered components.

PROVIDING SOLUTIONS

Fatigue

Fatigue is defined as: cumulative, localised and permanent damage caused by repeated fluctuations of stress, sometimes below the static design stress of the structure. Shot peening the finished part to remove the residual tensile stresses caused by manufacture significantly reduces the applied load/stress which can extend the life and strength of the component significantly.

Stress corrosion cracking (SCC)

SCC is a phenomenon characterised by deep fissuring of the surface and occurs when a susceptible alloy in contact with a corrosive environment is subjected to a sustained tensile stress which may be well below the elastic limit of the material. SCC can be avoided if tensile stresses resulting from manufacture or in-service use, are converted to compressive stresses by shot peening.



Extending the life of welded components

The residual tensile stress from welding is created because the weld consumable is applied in its molten state, when it is at its maximum heat and expansion. It then bonds to the base material. As the weld cools rapidly, it is unable to shrink because it has already bonded to the cooler, stronger base material. The net result is a weld that is essentially being "stretched" by the base material and residual tensile stresses result.

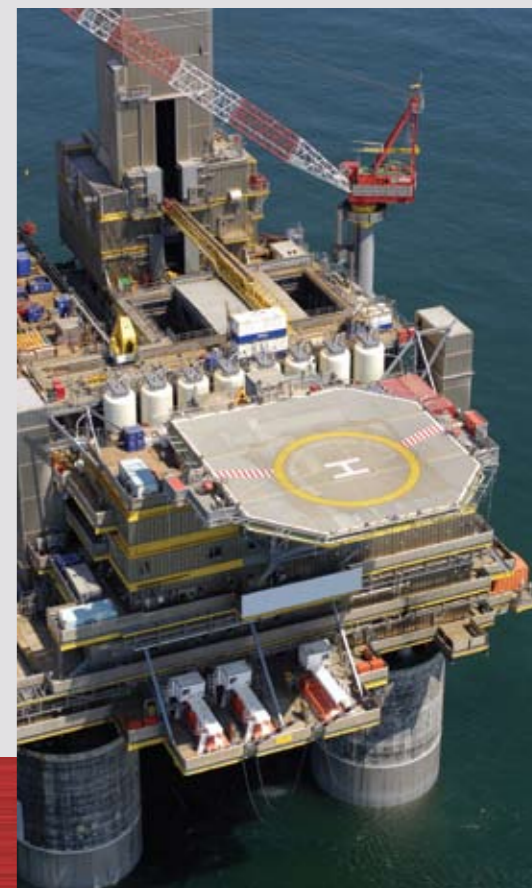
Welded structures whether new or repaired can be shot peened to convert tensile stresses to compressive thus extending the life of the structures.

Corrosion fatigue

Corrosion fatigue is the failure of components in corrosive environments associated with cyclic applied loading. The failure mechanism is similar to that of SCC but is driven by the cyclic application of tensile stress rather than by a sustained tensile stress. Shot peening surfaces to introduce compressive stresses can extend component life considerably.

Applications include

- All rotating components where life improvement is desired
- Gas turbine generator sets
- Steam turbine and diesel driven generator sets
- Turbo expander sets
- Air cooled heat exchangers and fans
- Centrifugal and HP fluid pumps
- Compressors
- Control and safety valves
- Drill collars and drill string components
- Welded parts, assemblies and structures
- Containers, holding and pressure vessels
- Angel hair reduction caused by friction at the wall of transfer piping



INNOVATORS IN TECHNOLOGY

MIC MARKETS INCLUDE:

- **Aerospace**
- **Architectural**
- **Automotive**
- **Chemical & food processing**
- **General & structural engineering**
- **Marine**
- **Medical**
- **Military**
- **Off-road & earth moving equipment**
- **Oil, gas & petrochemical**
- **Power generation**
- **Railways**

MIC SERVICES INCLUDE:

- **Controlled shot peening**
induces engineered residual compressive stresses
- **Shot peen forming**
creates curvature and corrects distortion
- **Laser peening**
induces deeper residual compressive stresses
- **Engineered coatings**
improves performance, prevents corrosion and aids lubricity
- **C.A.S.E. (isotropic finishing)**
removes surface asperities reducing friction
- **On-site processing**
provides services on customers' own premises
- **Peentex (architectural finishing)**
creates decorative and aesthetic texturing
- **Surface texturing**
applies a textured engineered finish
- **Peenflex mouldings**
protects against processing and handling damage

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