



SONATS

Empowering Technologies

MAINTENANCE, REPAIR AND OVERHAUL SOLUTIONS (MRO)

ON-AIRCRAFT REPAIR USING ULTRASONIC PEENING SOLUTION

The Ultrasonic Shot Peening process (STRESSONIC® technology) for on-aircraft structural repairs can save on aircraft downtime, reduce man-hours associated with peening set-up and mitigate the risk of Foreign Object Damage.

This process is an innovative solution using a small customized chamber, containing media during the peening to expose only a defined area to the shot stream. As a result, a few grams of media is used, no masking is needed, and energy consumed is reduced. These technical advantages combine with the equipment portability lead to save valuable time.

Compared to conventional peening methods, Ultrasonic Shot Peening portability and capability allow the treatment to be achieved on-site without dismantling the part. **The equipment is brought directly to the flight line.**

Our MRO solutions can be applied on aircraft structures, engines, landing gears, blades and other components. Our solutions are suitable for commercial and military aircrafts to fit aerospace quality requirement.

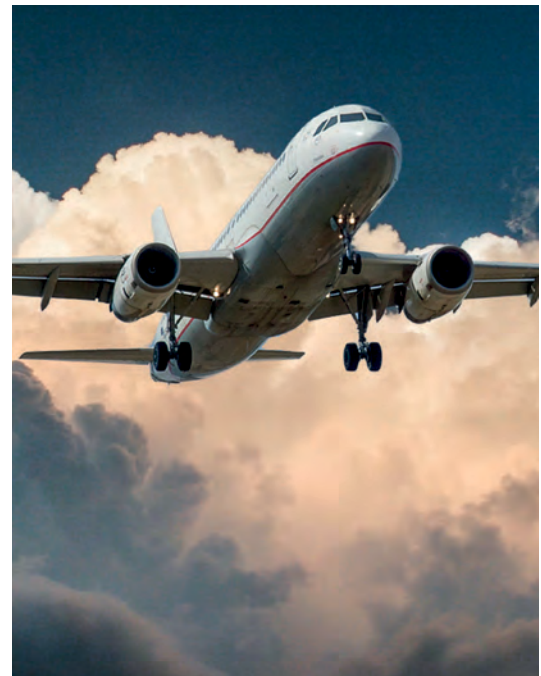
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Critical area processed by Ultrasonic Shot Peening impact compression

Ultrasonic Shot Peening (USP - STRESSONIC® Technology) process is similar to Conventional Shot Peening (CSP) in that it is a cold-working surface treatment. Both use media to impact the surface of a mechanical part, generating a compressive residual stress layer and improving material mechanical properties. Both enhance fatigue life and resistance to Stress Corrosion Cracking (SCC).

USP differs from Conventional Shot Peening methods by the way kinetic energy is provided to the shot. Instead of using a constant air flow, gravity or high speed rotation of a turbine, USP uses the acceleration of a vibrating surface called a sonotrode. The frequency of vibration is within the ultrasonic wave range (20 KHz), which explains the name of the process.

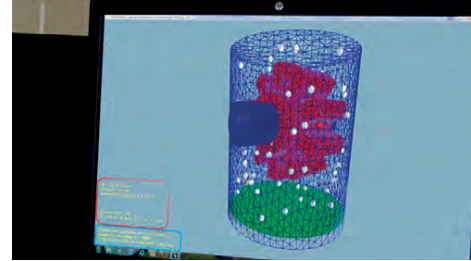
This method is often needed to repair or prevent cracks. It reduces downtime by focusing treatment which does not require dismantling.



OUR APPROACH



DESIGN - Parts, subassemblies and enclosure 3D design



ENGINEERING - Feasibility study, process definition and implementation (treated area accessibility and analysis of clients specifications)



TESTING - Surface characterization, test and process industrialization



APPLICATION - Solutions to implement ultrasonic shot peening process with STRESSONIC® technology

OUR SOLUTIONS

- In-situ services without parts or subassembly parts dismantling by EMPOWERING TECHNOLOGIES' technicians
- Standard equipment sales and leasing
- Subcontracting in our workshop

If needed we provide shot peening training level 1 and 2 and rotary flapper peening accredited FAA.

OUR STANDARDS & CERTIFICATIONS

SAE/AMS - AMS2430

«Shot Peening, Automatic»

SAE/AMS - AMS2432

«Shot peening, Computer Monitored»

SAE/AMS - AMS 2580-2585

«Ultrasonically activated shot peening»

BNAE - NF L 06-833

«Aerospace series -Ultrasonic shot peening for inducement of compressive surface stresses for metallic parts »

THEY TRUST US

AIRBUS, CAC, DASSAULT, AIRBUS HELICOPTER, LATECOERE, SAFRAN (MESSIER BUGATTI DOWTY, SNECMA, TURBOMECA), MITSUBISHI HEAVY INDUSTRIES, MTU AERO, SALJUT, SKF AERO, UTC (RATIER FIGEAC), PRATT&WHITNEY, ROLLS-ROYCE, US ARMY, US AIR FORCE, XAC...



OUR CAPACITIES

Ultrasonic Shot Peening systems

STRESSVOYAGER® USP



Portable and compact shot peening system - STRESSONIC® technology

Ruggedized STRESSVOYAGER® USP



Machine equipped with built-in damping allowing transportation and exterior intensive use - STRESSONIC® technology

PRODUCT AND PROCESS CHARACTERIZATION

Product Features

- Portable
- User friendly
- Low media consumption
- Move easily
- Various size repair

Process Features

- Customized tooling to avoid media loss
- No part masking
- Industrialization ease
- Process real time monitoring and recording
- High repeatability

Process Characteristics

- Compressive residual stress up to 1mm
- Compressive maximum stresses up to -1400MPa
- Almen intensities range from 4 to 10C

System Requirements

- 115/220V (400 Watts)
- 14 cfm (at 90 Psi /6 bars)



PROCESS BENEFITS

- Fatigue life improvement
- Stress corrosion cracking (SCC) prevention
- Nanocrystallisation
- Very low roughness after treatment

EXAMPLES OF APPLICATIONS

Helicopter Rotor Blade Repair

Issue: Mechanical and/or corrosion damage on Critical Safety Items of dynamic helicopter components.

Service: On-site repair worldwide.

Solution: Development of a reliable, computer controlled, field portable device to restore beneficial compressive residual stresses on Main Rotor Blades previously considered non-repairable.

Benefits: ROI of over \$27 Millions (cost avoidance for the replacement of 160 new Main Rotor Blades).

Results: Development of many patents on repair operation for US-Army.



Fan Hub Disk Repair

Issue: Mechanical and/or corrosion damage on fan disk.

Service: MRO facilities worldwide.

Solution: Development of a very innovative solution for surface impact treatment w/o engine dismantling (no risk to loose media).

Benefits: High ROI and savings for the customer. No necessity to dismantle the engine.



Spool Repair

Issue: Mechanical and/or corrosion damage on sensitive aero-engine components.

Service: MRO facilities worldwide.

Solution: Development of a solution reliable, computer controlled, suitable for field work to restore beneficial compressive residual stresses.

Benefits: High ROI for the customer. The Ultrasonic Shot Peening treatment lasts 3 days on this part in opposition to Conventional Peening treatment which would last about one month.

Results: An operator can complete the setup and validation process in a few minutes and perform repairs immediately afterwards.

