

Ultrasonic Peening System SSP-4 Subsea Applications

ULTRASONIC PEENING

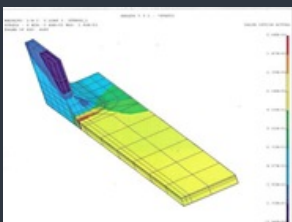
Ultrasonic Peening is a post weld treatment that increases resistance against fatigue cracking. If the treatment is applied when 50% of the fatigue life of a weld connection has been consumed, the fatigue life of this weld will be reset to zero. Likewise any weld with irregularities or uneven quality would be restored to an acceptable level by ultrasonic peening treatment. The treatment combines the benefit of weld-toe geometric modification and the redistribution weld induced tensile residual stresses at the HAZ (heat affected zone).



ADVANTAGES

Ultrasonic peening is the preferred fatigue life extension method for in-situ applications. It performs three distinct improvements during one treatment operation:

- * Removal of weld defects.
- * Lowers stress concentrations.
- * Redistributes tensile stresses and/or introduction of compressive stresses.



LET'S Global has developed its own ultrasonic peening equipment for over 10 years. We have extensive hands-on experience in shipboard weld treatment including areas of difficult access and tough working conditions. Therefore we have a profound understanding of equipment requirements and the necessary robustness for offshore and subsea applications.

Our new line of Ultrasonic Peening Systems is based on a 4th generation design utilizing a number of refined changes to make our equipment suitable for the most demanding tasks.

Subsea Ultrasonic Peening Benefits

Wet welding is known to produce a number of negative effects on the quality of the weld. When and how can ultrasonic peening treatment enhance the wet weld quality?

- Loss of alloy elements from weld metal
 - * Not influenced by ultrasonic peening.
- Porosity of the welds
 - * **Improved surface quality, hardness and resistance against fatigue.**
- Slag bounded in the welds
 - * **Improved surface quality less slag on the weld surface.**
- Increased carbon & oxygen content in welds
 - * Not influenced by ultrasonic peening.
- Increased tendency to cracking
 - * **Great benefit from ultrasonic peening**

Weld Peening & Life Extension

Ultrasonic peening is a highly effective engineering solution used to avoid premature fatigue cracking in high stressed areas.

The aim with the ultrasonic peening treatment on post weld repairs is to avoid future weld repair and contribute to the structural integrity of the installation during its remaining service life.

Fatigue life extension has been achieved by the application of ultrasonic peening to high stressed areas on the pallet stool and on longitudinal-weld details on the ballast tanks on a FPSO installation. The fatigue life for the treated welds were extended to twenty years which is the targeted service life for the installation.

THE PROBLEM

Example Premature Fatigue Cracking on Pallet Stool Weld.



Uncertainties in load spectra and the hull's response are the main reason to early signs of degradation as premature fatigue cracking. Further signs of early hull degradation could be coating damage in high stressed areas in ballast tanks among others.

ULTRASONIC PEENING SOLUTION:

Welds and surfaces are significantly improved by hammering the steel surface with a hardened steel peen at a high frequency. Due to the high intensity and frequency of the strikes the steel peen creates a smooth transition between plate and weld, called the weld toe groove. The powerful peen strike makes a compressive layer at the treated surface. This layer greatly increases the weld-toe resistance against fatigue cracks.



For more information on any of our products or services please visit us on the Web at:

www.Lets-global.com/equipment

SSP-4 Subsea System Specifications



Subsea System:

- Power Options: 400W, 600W, or 1000W
- System Output Frequency: 20 kHz

Hand Tool:

- Length 450 mm
- Weight approx. 3 kg
- Handheld or Robotic Mount Options
- Cable Length Generator to Peen Tool Up To 60 meters (197 feet)
- Includes single pin working head, two or three pins in line working head, and multi-striker.
- Sealed & Combined air and electrical inlet allow use of single hose line to power and air supply station.
- Sealed Ultrasonic Transducer for submersible applications
- Sliding outer housing with spring shock absorbers reduces vibration.
- Vented housing for economical sea water contact cooling
- Non-Corrosive materials

Ultrasonic Power Generator:

- Dimensions: 260 x 85 x 370 mm
- Weight: 4 kg
- Electronic protection measures:
 - * Overload
 - * Short circuit
 - * Over temperature

System Requirements:

Mains Supply: 210 - 250 VAC, 50 - 60Hz

Current Consumption: max. 7 A

Temperature Range -10 to +40°C



SERVICES AVAILABLE

- Technical Support
- Installation and Setup
- Maintenance
- Application Support
- Hardware Support
- Repairs

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