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## Life extension of FPSO's structural details using ultrasonic peening

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### Abstract

Fatigue life extension has been achieved by the application of ultrasonic peening to high stressed areas on pallet stool to deck and longitudinal to frames weld details on FPSO installations. High stressed welds showed too short fatigue lives in as-welded condition. The aim with the ultrasonic peening treatment was to avoid any further weld repairs during the remaining service life of these installations. Fatigue test results of treated relevant weld details have been used to assess the potential life extension. The results showed four to six times fatigue life extension. The fatigue test was designed to confirm that relaxation by external loads of the induced compressive stresses during treatment would not diminish the benefit. The fatigue lives for the treated welds were extended up to twenty years which often is the targeted service life for these installations. Quality Assurance and Quality Control were covered by Ultrasonic Peening Procedure Specification, applied for every treated weld. It ensures that the treatment is exactly reproduced to achieve the expected life extension.

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### 1. Introduction

The application of fatigue life improvement techniques is gaining popularity during the last years. Classification Societies have been focusing more and more on these techniques and the latest document dealing with it [1] presents recommendations for weld toe profiling by machining and grinding, weld toe grinding, TIG-dressing and hammer peening.

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