

STRUCTURAL INTEGRITY AND LIFE EXTENSION OF OFFSHORE INSTALLATIONS

Apply a proactive and preventive approach to safeguard the structural integrity of your offshore installations

25-27 May, 2015, Hotel TBC, Kuala Lumpur

KEY LEARNING OBJECTIVES

- Understand how a life extension program can prevent structural issues on an offshore installation
- Describe up-to-day technologies, theoretical and empirical, used to verify and continuously improve accuracy of FEA results
- Identify structural issues and their quantification
- Gather insights on range of engineering solutions available
- Comprehend the future development of topsides
- Apply fatigue assessment and fatigue design
- Explore main inspection methods with a practical approach

TESTIMONIALS

"Overall a well delivered course on improvement of fatigue performance of welded connections."

~SHELL

"A good balance between theory and practice. Very good with peening demonstration."

~AIBEL

"The content with respect to stress and fatigue in relation to Life Extension is good."

~BLUEWATER



The value of teamwork can never be underestimated. Attend and learn with your colleagues and be entitled to group discounts!

COURSE DIRECTOR



LUIS LOPEZ MARTINEZ
Technical Director,
LETS Global BV

With 30 years of experience in material fatigue Luis Lopez Martinez has been speaking at OTC (2010, 2011), OMAE (Rotterdam and Brazil) and IIW (1998, 2007, 2012). As a Technical Director for LETS Global, the company that is a pioneer in structural life extension by Ultrasonic Peening. The company, with the help of Luis, has developed the procedures and equipment needed to tackle the structural issues operators are facing today with ageing offshore installations. The methodology has been coined The Life Extension Concept and is implemented in the North Sea, the Gulf of Mexico and Brazilian offshore sector by leading organizations such as HESS, BP and Petrobras.

Notable clients include: BP, Hess, Petrobras, BHP Billiton, Dana Petroleum

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OVERVIEW

This course will give a fresh and practical input on the way engineers can go about safeguarding the structural integrity of any offshore installation preventing the use of hot-work. Using the three pillar of life extension concept, participants will learn to use Fatigue Assessment, Inspection and weld improvements techniques to enable new possibilities in life extension projects.

Attendees will be exposed to the creation of a complete Finite Element models of installations, review of structural data to a range of engineering solutions with a specific focus on Ultrasonic Peening. You will also explore the benefits of a range of engineering solutions. **At this exclusive masterclass you will uncover a range of solutions to help you optimise your facilities resulting in enhanced operational productivity. There will also be numerous opportunities available throughout the masterclass for you to bring along specific case-studies to discuss with your industry peers.**

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WHY YOU SHOULD ATTEND

This is a comprehensive course for participants to learn how to accurately assess their vessels' current fatigue life situation, what obstacles that might await them and how to produce an adequate action plan in order to achieve the required life extension.

Course participants will gain understanding in which steps to take when tackling structural integrity concerns prompted by fatigue issues. You will be able to accurately safeguard the structural integrity of offshore installations through a proactive and preventive approach model, used by the forerunners of the industry today.

WHO SHOULD ATTEND

- Structural Engineer
- Principal Engineer,
- Maintenance Engineer
- Technical Director / Manager
- Naval Architect
- Structural Project Engineer
- Maintenance Manager
- Asset Integrity Manager
- Marine Engineer

Pre-Course Questionnaire

In order to derive the maximum benefit from this course, delegates are invited to fill up a questionnaire on what they hope to learn and achieve, so that the trainer can tailor the course as best as he can to the delegates' expectations.

COURSE AGENDA

DAY 1

- **Module 1a) - Introduction to Life Extension Program**
 - ~ How is a Life extension program developed?
 - ~ What is a Life extension program used for?
 - ~ How efficient could this tool be to prevent structural issues on an offshore installation?
- **Driving forces for implementation of s Life Extension Program**
 - ~ Early signs of degradation
 - ~ Reservoir performance, relocation
- **Module 1b) - Early signs of hull degradation**
 - ~ Classification of coating defects in ballast tanks
- **Module 1c) - Finite Element Analysis (FEA)**
 - ~ Creation of complete FE model for the vessel
 - ~ Original design work: degree of accuracy and details
- **Analysis of coating defects influence on structural integrity**
 - ~ Comparison between deterministic and spectral fatigue analysis
- **Module 1d) - FE model verification and accuracy of model output**
 - ~ The course will describe up-to-day technologies, theoretical and empirical, used to verify and continuously improve accuracy of FEA results for life extension.
- **Module 2a) - Identified structural issues and their quantification**
 - ~ Technical review team: greater understanding and possible solutions
 - ~ CSM: benefits and potential solutions
 - ~ Range of engineering solutions
- **Practical Outcome**
 - ~ If all pieces are put together a LEP can be created; this will serve as a long term roadmap for any life extension project. With the help of LEP structural issues can be prioritized by evaluating impact on production, safety and repair implications.
- **Module 2b) – Range of Engineering Solutions**
 - ~ Pressure differential
 - ~ Ultrasonic Peening
 - ~ Long term solutions
 - ~ Flexible coating
- **Module 2c) – Future Development of Topsides**
 - ~ Implications of process equipment upgrade
 - ~ Design modifications
 - ~ Structural improvements



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DAY 2

- **Module 3a) - Introduction to Structural Life Extension**
 - ~ The introduction will briefly cover the three pillars of the Life Extension Concept, Fatigue Assessment, Inspection and Weld-Improvement methods.
- **Module 3b) - Fatigue of Welded attachments**
 - ~ The challenge in successfully being able to extend the service life of an offshore structure lies in the tackling of the fatigue hot-spots. The fatigue hot-spots are predominantly located at specific welded attachments. In this section we look into why welded attachments are relatively weak, what factors play a part in their fatigue life and how we can strengthen these locations of structural integrity concern.
- **Module 3c) - Weld Improvement Methods**
 - ~ Looking into the different weld improvement methods; Ultrasonic Peening, Burr Grinding, Hammer Peening and TIG Dressing focusing on the benefits and drawbacks of these methods as well as studying cases where these have been successfully applied. The main weld improvement method in this module and in the course as a whole will be Ultrasonic Peening. The participants will gain understanding of the procedures and the possibilities these methods enable as well as the pit falls.
- **Module 4a) - Fatigue Assessment**
 - ~ In Fatigue Assessment, we learn how to locate and evaluate fatigue hotspots with the current approaches used by the offshore industry today. Participants will learn how to interpret Finite Element (FE) Models and assess their accuracy by relating the theoretic of a model to the real structure, taking corrosion and weld quality into account. Examples will be presented to give participants confidence in assessing and using produced FE models.
- **Module 4b) - Fatigue Design**
 - ~ In Fatigue Design we look at what design options are available to extend the service life of the specific parts of a structure. We will look at cases where structural modifications have been successfully implemented in life extension projects.

Daily Schedule

08:30 Registration
09:00 Morning session begins
10:30 Refreshment and networking break
11:00 Morning session continues
12:30 Lunch
13:30 Afternoon session begins
15:30 Refreshment and networking break
16:00 Afternoon session continues
17:00 End of day

DAY 3

- **Module 5a) - Inspection**
 - ~ To ensure and maintain the structural integrity of an offshore installation, offshore inspections will always play a key role. In this section we look into the main inspection methods used in the offshore industry, all with a practical approach so the participants gets a better understanding of what is being carried out on the offshore installations.
- **Module 5b) – Practical demonstration of the application of Ultrasonic Peening**
 - ~ We will have a demonstration of the ultrasonic peening treatment. The participants will be allowed to use an ultrasonic peening system to treat the weld toe. Weld surface of a welded sample.
- **Module 6a) - Access**
 - ~ The method used to gain access to fatigue hot-spots either for inspection or for weld improvement methods can dictate the time/cost of the activity as a whole. Different ways of access will be discussed such as rope access, scaffolding and working in confined spaces.
- **Module 6b) - Case studies**
 - ~ As the three main pillars of the Life Extension Concept now has been covered. We will now look at some case studies of life extension projects.
 - TLP Neptune
 - UP treatment of pipe lines
 - FPSO Triton
 - UP Treatment of lattice tower
 - FPSO P-37
- **Module 6c) - Vessel Integrity Group (VIP)**
 - ~ When taking on a life extension project, the organization of a VIP is of paramount importance. The advantage of starting a VIP will be illustrated by a practical example based on instructor's experiences.
- **Module 6d) - Case studies with participants**
 - ~ Participants will be given scenarios where their newly acquired knowledge will be tested. Participants will be shown structural fatigue issues, and will be asked how they would approach the problem.

In-house training available

If your company has specific training needs, contact us at info@opuskinetic.com with your requirements and we can propose an inhouse workshop just for you.