

Long-term Degradation

PAFA Consulting Engineers offer capabilities to investigate the effects of degradation on materials. These include those arising from: fatigue, fracture, corrosion and abrasion.

Fatigue assessments have been performed on fixed offshore platforms, floating structures (FPSOs and FSUs), marine vessels, hydro tunnels and flood barriers. These have often been undertaken to investigate the potential to extend the design life of the structure without the need for expensive repair or replacement.

Several papers have been written and presented at The International Symposium on Tubular Structures on appropriate Stress Concentration Factors (SCFs) to use at complex tubular connections.¹

Our work on both SCFs and S-N fatigue methods have been incorporated into ABS, Lloyds Register and ISO Standards.

Fracture Mechanics (FM) assessments have been performed on offshore fixed & floating structures and nuclear containment vessels in accordance with BS 7910. These have generally been performed following crack detection or for cracks with less than detectable size, to estimate the remaining time to through thickness cracking or brittle fracture.

Corrosion and Abrasion have been considered in terms of their effect on long term reliability of floating offshore structures.²

The benefits of coatings including anodes, paints and fibre reinforced polymer coverings have been studied.

¹ Smedley, P. A. "Advanced SCF formulae for simple and multi-planar tubular joints", 10th Int. Symposium on Tubular Structures, ISTS-10, Madrid, Spain, 2003.

² Shi, W. B. and Frieze, P. A. "Time variant reliability analysis of a mobile offshore unit", Ship Structure Symposium, Jersey City, USA, 1993.

Summary

- Advanced SCF formulae for complex connections
- Assisting Classification Societies to develop their fatigue S-N approaches
- Fatigue and fracture mechanics assessments to extend design life
- Comparison of corrosion and abrasion resistant coatings

Clients

- ABS
- BP
- Burlington Resources
- Halcrow Group
- Health & Safety Executive
- Lloyd's Register

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