FATIGUE AND LIFE EXTENSION OF FIXED & FLOATING FACILITIES AND MOORING SYSTEMS

Moderators:
Marilyn M. Sauls, BSEE
Jim Maher, Vulcan Offshore
Jonathan Brewer, Stress Engineering
What can be done to infer the conditions of un-inspectable equipment?

- From hull perspective, most equipment are inspectable.
- Use of monitoring data: Most operators aren’t doing real time data assessments. However most are performing data monitoring. Available data are helpful in terms of performing life extensions and integrity management.
- Visual inspection is very important. Tools such as high fidelity cameras may be used for a view of both inspectable and some previously un-inspectable items.
- Encourage sharing of information through forums, discussion etc. among operators about history of incidents related to mooring systems. It may be included in API RP 2MIM.
- Performance of operators is important so that systems are maintained to a minimal safety level.
• Good safety may be improved with good inspection and assessment of data and the people doing it are knowledgeable.

• High consequence systems need to be addressed. With lower consequence ones, a little more risk can be taken as long as they are well monitored and handled.

• What answers we get from fatigue calculations depend on the quality of data used? Uncertainties in such results need to be understood well.

• If something is going to be un-inspectable and critical by design then there should be more rigorous inspection techniques during fabrication for purpose of record keeping and data collection.
• Proper selection of material is a line of defense that ensures good fatigue management especially for components that cannot be inspected

• Economic drivers should be separate from HSE drivers. HSE should not be compromised

• Many failures are not a violation of design assumptions but a result of unknown design conditions (manufacturing defects, lack of quality etc.)

• Strength and fatigue performance of un-inspectable items may be inferred from performance of similar inspectable items.
How do you assess the remaining life of the components?

• Be careful about how we select our target life and understand uncertainties in the set target. If a single point value is being used for fatigue determination, then the uncertainties in that data and all factors affecting it need to be considered too.

• Throughout the life cycle, if something creeps up, alertness and due diligence in following up is the key issue to prevent failure.

• If design conditions are exceeded for some reason, the facility should be re-assessed.
How do you assess the remaining life of the components?

• Analytical data vs. measured data can be used to verify initial assumptions.

• By normalizing number of failures based on the increase of mooring numbers and life of equipment, we may notice that failure rates have not gone up

• When considering failures, we need to consider all factors such as overloading, manufacturing defects etc. to get the real values.