A Logical Path to Life Extension

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- Regulatory Expectations
- Goals
- Case Studies
- Life Extension Process
Decision making is at the core of Asset Operations

- Risks
- Data Management
- Inspection or Monitoring
- Fitness for service
- Technology
- Optimisation

Global FPSO forum
Elements of life extension decision making

- Requirements
- Risks
- Run
- Repair
- Replace
- Retire
Life Extension Overview

**Inspection & Monitoring**
- General visual, CP
- In-line Inspection Monitoring

**System Analysis**
- Fatigue analysis
- ECA/FFS
- Soil Data
- Metocean
- Vessel Motion
- Software

**Modifications**
- Critical component replacement
- Coating repairs
- VIV Suppression device cleaning

**As-Built Design**

**System Analysis**

**Inspection & Monitoring**

**Modified Life**
In discussions with BSEE we received the following feedback

- Fatigue and Corrosion are biggest threats;
- Demonstrate integrity through in service inspection and monitoring;
- Inspection and repairs history and results must be verified by CVA (30CFR 250.909 to 250.921).
What would really help?

<table>
<thead>
<tr>
<th>Vehicle Information:</th>
<th>2008 ACURA MDX TECH</th>
</tr>
</thead>
<tbody>
<tr>
<td>VIN:</td>
<td></td>
</tr>
<tr>
<td>4 DR. WAGON/SPORT UTILITY</td>
<td></td>
</tr>
<tr>
<td>3.7L V6 PFI SOHC 24V</td>
<td></td>
</tr>
<tr>
<td>4 WHEEL DRIVE</td>
<td></td>
</tr>
</tbody>
</table>

**Search for other 2008 ACURA MDX vehicles**

- **No accident / damage reported to CARFAX**
- **CARFAX 1-Owner vehicle**
- **6 Service records available**
- **Personal vehicle**
- **39,500 Last reported odometer reading**
- **$70 Above retail book value**

This CARFAX Vehicle History Report is based only on information supplied to CARFAX and available as of 5/7/12 at 4:33:16 PM (EDT). Other information about this vehicle, including problems, may not have been reported to CARFAX. Use this report as one important tool, along with a vehicle inspection and test drive, to make a better decision about your next used car.
**Where Do We Stand**

**Field with NO IM history**
- Low confidence
- Critical equipment not identified
- Substantial work needed

**Field with limited IM history**
- Some confidence
- Critical equipment partially identified
- A combination of investigative and targeted work needed

**Field with complete IM history**
- High confidence
- Critical equipment identified
- Only targeted work needed
Asset Lifecycle Risk Management

Reference: OE – Improved Risk Assessment Enhances IM

Life of an Asset
Hull Life Extension Considerations

- Hull Structural Integrity
  - Strength, Fatigue & Damage
  - Corrosion Protection (Coating + Anodes)
- Hull Watertight Integrity
  - Sea Chest
  - Overboard
- Station Keeping
  - Spread Moored Systems
  - Heading Control + Mooring Assist
- Turrets and Swivels
  - Turret
  - Swivel
- Marine Systems
  - Ballast System
  - Cargo System
  - Marine Utilities
  - Control Systems
  - Inert Gas

Reference: Oil and Gas UK: Guidance on the Management of Ageing and Life Extension for UKCS Floating Production Installations
Objective – To demonstrate use of data in determining fitness for service decision based on our experience
Case Studies

Improved fatigue management through planned vessel relocation

- SCR zone fatigue;
- Mooring line integrity.

Reference: OMAE2015-41199 - Global Benefits and Operational Challenges of Vessel Relocation
Case Studies

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Case Studies

Fatigue management of hull, moorings, and risers through monitoring data –
• Compared measured versus design environmental conditions;
• Reduced conservatism in remaining life estimation by using measured current data profiles.

Reference: OMAE2015-41199 - Global Benefits and Operational Challenges of Vessel Relocation
Risk based CP surveys allowed early identification of reduced CP levels and optimized installation of anode retrofit sled.

Reference: OMAE2015-41199 - Global Benefits and Operational Challenges of Vessel Relocation
Conclusions

Remember - There is always a path to life extension

Understand objectives;

Perform due diligence on your system;

Identify critical equipment and verify FFS;

Submit life extension request;
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QUESTIONS