Guidelines for the management of structural ALE issues for mono-hull FPSOs

energy institute

GUIDELINES FOR THE MANAGEMENT OF STRUCTURAL ALE ISSUES FOR MONO-HULL FPSOs

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FOREWORD

This document has been produced by Marine Technical Limits (MTL) on behalf of the Energy Institute (EI). It is intended to address the management of structural ageing and life extension (ALE) issues for mono-hull floating production storage and offloading (FPSOs).

Although it is anticipated that this publication will assist those involved in the maintenance and operation of ageing FPSOs, the information contained in this publication is provided as guidance only. Whilst every reasonable care has been taken to ensure the accuracy of its contents, the EI and the technical representatives listed in the acknowledgements, cannot accept any responsibility for any action taken, or not taken, on the basis of this information. The EI shall not be liable to any person for any loss or damage which may arise from the use of any of the information contained in any of its publications.

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Suggested revisions are invited and should be submitted to the Technical Department, Energy Institute, 61 New Cavendish Street, London, W1G 7AR.

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1 INTRODUCTION

1.1 INTRODUCTION

Worldwide, there are many mono-hull FPSOs in operation that are approaching, have reached, or exceeded their original design life. During the life cycle of these assets there is a need to ensure that they remain fit-for-purpose (including hull structural integrity), which can be achieved through the application of a robust Structural Integrity Management System (SIMS). The SIMS must ensure that, as the FPSO ages, any degradation is properly predicted, detected, monitored, assessed and remediated as required.

There is considerable information available publicly for the application of SIMS. This document aims to complement existing information on SIMS to address issues specifically related to ALE of the hull structures of mono-hull FPSOs.

This document aims to guide the reader through the management of this process, highlighting the key stages and supporting analysis through to the potential implications and remedial actions on the asset.

It is highlighted that this document considers the main hull structure of mono-hull FPSOs. Other ALE aspects of FPSOs are not included within; however, where possible, relevant signposts are provided to existing publications and guidance.

Although this document relates to mono-hull FPSOs, much of the guidance notes contained within are applicable to other FPSO/floating storage unit (FSU) designs.

1.2 SCOPE

This document provides guidance to address common issues relating to the ALE of mono-hull FPSOs. The focus of this document is on hull structures for mono-hull FPSOs, including cargo oil tanks, water ballast tanks, voids, internal caissons, topside module structural connections which integrate with the hull structure, etc.

This document excludes guidance for the following:

– semi-submersible structures;
– topside structures;
– marine systems;
– watertight integrity;
– operational aspects;
– turrets and station keeping systems, and
– subsea-to-surface interface equipment, i.e. risers, mid-water arches, umbilicals etc.

2 APPLICATION

This document is intended as a guide to support duty holders, operators and contractors with the Structural Integrity Management (SIM) of ageing FPSOs in the oil and gas industry.

The document should be used to guide the reader through the engineering assessment process in response to common ageing related assessment triggers. The guidance is intended to be informative and offer possible assessment approaches for FPSO hull structural issues, but it is not intended to be a prescriptive assessment approach. Instead it should be used to select a suitable and proportionate assessment approach in response to a given triggering event, whilst considering the data available as part of a holistic approach.

It should be used alongside other industry information sources available, such as *Guidance on the management of ageing and life extension for UKCS floating production installations* and International Association of Classification Societies (IACS) *Common structural rules (CSR)*.