

Strain Based Fracture Assessment – 1 day workshop

Chairman: Prof Steve Garwood FEng
 Venue: Conference centre, TWI, Cambridge, UK
 Date: 25th February 2016

Background

Engineering Critical Assessment (ECA) procedures such as those of BS 7910 "Guide to Methods for Assessing the Acceptability of Flaws in Metallic Structures" and R6 are now well established for assessing the fitness for purpose of Engineering components.

For assessing the significance of girth weld flaws in pipelines under elastic loading, BS7910 is generally adopted. Subsea pipelines may, however, be subject to significant axial plastic straining during installation (e.g. by reeling) and/or during operation, e.g. due to lateral buckling, where the pipeline may experience biaxial loading. Land pipelines may experience axial plastic straining combined with internal pressure for example due to frost heave or seismic ground movement. The Technical Advisory Group on Structural Integrity of Nuclear Plant (TAGSI) has also recently considered the use of R6 for high strain applications. Even when stresses are limited by design codes for pressurised applications, certain welded configurations may experience high strains.

Substantial research has been carried out over the past 15 years to develop improved design tools for such pipelines and pressurised applications including, in particular, ECA methods for assessing the significance of girth weld flaws under longitudinal tensile plastic straining. Some of these projects focussed on onshore pipelines and led to detailed methods for estimating tensile strain capacity (maximum tensile strain that can be sustained for a given combination of a girth weld flaw and pipe geometry, tensile and fracture toughness properties, and pipeline loading). Other projects led to the development of ECA methods for ductile tearing assessment of girth weld flaws in subsea pipelines, which experience plastic straining during installation. All these methods were developed and validated based on results from finite element analysis (FEA) and/or test data.

However, the approaches adopted to develop some of these methods have varied significantly with regard to the derivation and/or expression of: the crack driving force; scope and implementation of relevant failure criteria; characterisation of fracture toughness; and scope of validation against numerical and/or test data. Given these differences, the application of these methods could potentially lead to a wide range of results, as has been demonstrated in limited published comparisons. This situation together with the lack of industry consensus and absence of well-established codified guidance is clearly unsatisfactory, as it can create significant uncertainties with regard to the practical use of these methods.

In order to address issues like these for companies who are considering engineering applications under severe conditions, FESI will be holding a one-day workshop. Delegates will be invited to participate in a discussion to identify challenges and express their view on the methods to ensure high integrity in safety-critical structures operating in harsh environments. At the end of the workshop FESI would summarise the gaps in knowledge and possible ways that these could be addressed.

Who Should Attend

Engineers and Scientists involved in the repair and maintenance of plant and pipelines. That should include designers and safety case authors who evaluate the results, operational staff, in-service-inspection staff and the maintenance staff. The output from this workshop will be circulated to attendees, published in the FESI Bulletin and posted on our website at www.fesi.org.uk. All attendees will receive a CFD Certificate of Attendance.

Workshop Fees

Workshop fees are: £170 (£204 inc. VAT) for Non-FESI members; £130 (£156 inc. VAT) for FESI members and Corporate Sponsors and co-sponsors; and £60 (£72 inc. VAT) for students

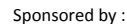
Programme

10:00	Introduction and Approaches Strain Based Design from TAGSI Steve Garwood, Imperial College London	13:00	Strain Based Fracture Assessment - which strain demand for which pipeline Roberto Bruschi, Saipem
10:15	R6 Approach to High Strain Loading Peter Budden, EDF Energy	13:30	Strain Based Design and Integrity Assessment of Offshore Pipelines in Complex In-service Loading Conditions Yuri Tkach, Wood Group Kenny
10:45	Fracture Assessments in High Strain Pipeline Applications Henryk Pisarski, Consultant	14:00	High Strain Operational Experience (2) Doug Fairchild, ExxonMobil Upstream Research Company
11:15	Refreshments	14:30	Application of Strain Based Design to Submarine Pipelines Installed by Reel-Lay Tomasz Tkaczyk, Technip
11:30	Overview of methods for Strain Based Design Assessment Mohamad Cheaitani, TWI	15:00	Refreshments
12:00	Lunch	15:15	Discussion Steve Garwood and speakers
		16:00	Finish

Corporate Members of FESI



(Registration Closing date: 22 February 2016)



Last Name

Date:

- Student rate: £60 + VAT (£72.00)

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