

Sharing of Common Issues in International Codes and Standards for Offshore Linepipes

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Introduction

- PETRONAS Carigali Sdn Bhd or PETRONAS Carigali for short is the Exploration and Production subsidiary of PETRONAS, Malaysia's national oil company. PETRONAS Carigali operates onshore and offshore within Malaysia and internationally in 23 countries including, among others, Sudan, Turkmenistan, Pakistan and Vietnam.
- For offshore pipelines, the PETRONAS Technical Standards (PTS) based on the amendments to API 5L (40th edition) has been the main standard, as API 5L is the recognized standard under the Petroleum Development Act (PDA), 1974.

Introduction

- For international operations, there is now a shift from using API 5L to ISO 3183. The shift is primarily due to the comprehensiveness of ISO 3183 with respect to chemical composition, mechanical properties, inspection and non-destructive testing (NDT) requirements, sour service applications, etc.
- This presentation will highlight common issues in using these standards.

Common Issues

- Chemical composition
 - ❖ Modify levels of specific chemical elements and CEV (carbon equivalent) in order to comply with minimum design temperature, steel grade and pipe size.

- Mechanical properties
 - ❖ Yield to Tensile ratio affected by wall thickness (WT) to outside diameter (OD) ratio, minimum design temperature, steel grade etc.
 - ❖ % shear fracture area for impact test is not applicable to the weld metal.

Common Issues

- Sour Service
 - ❖ Current API 5L grades are limited to X65 only.
 - ❖ Limited worldwide availability of pipe mills that can produce quality sour service linepipes.

- Welding
 - ❖ Specify minimum welding frequency for high frequency – electric resistance welded (HF-ERW) linepipes, e.g. 150 kHz.
 - ❖ Some pipe mills are requesting for weld repair on pipe body.

Common Issues

- NDT
 - ❖ Limited NDT facilities on seamless pipe mills which produces Oil Country Tubular Goods (OCTG) and linepipes together.
 - ❖ Ultrasonic testing (UT) calibration standards practices, i.e. a calibration standard for each pipe size, pipe grade etc.

- Dimensions
 - ❖ Consider to remove cold expansion by internal hydrostatic pressure in controlling out of roundness (OOR) as it is not effective as mechanical devices?

Common Issues

- Documentation
 - ❖ Impose the requirement that all mill documentation shall be in English as a pre-requisite for mill audits, API 5L license, etc.

- Others
 - ❖ Will ISO have similar requirements as API monogram ?
 - ❖ Upgrading of pipe grades by heat treatment, e.g. X52 to X65.
 - ❖ Forgery of ex-stock pipes, i.e. physical pipe, mill certificates, etc.

Conclusions

- Standards developers should consider a wider pool of inputs / feedback from standards users when developing or revising standards.
- Harmonisation of other related standards i.e. pipeline bends, pipeline fittings, etc should follow after API 5L/ISO 3183.

THANK YOU
