

Assessing the Effects of Impact Forces on Subsea Flowlines and Pipelines

Chris Alexander - Stress Engineering Services, Inc.

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ABSTRACT

Damage associated with external impact can be a critical component in operating subsea flowlines and pipelines. External damage typically involves impact with anchors, although consideration of dropped objects is also important. Historically, operators assess damage after it occurs in an attempt to determine and establish mechanical integrity. For more than 30 years research has been performed studying the effects of external damage on subsea pipelines. In recent years there has been an interest in proactively addressing the potential for damage and attempting to quantify the severity of damage in terms of impact energies associated with anchors and dropped objects.

This paper presents insights garnered in assessing the severity of pipeline damage in the form of dents and gouges. Additionally, research associated with impact forces including experimental work is included as part of the presentation, as well as limit analysis techniques using finite element methods. The primary purpose of this paper is to communicate to offshore pipeline operators a methodology that can be employed to assess the severity of damage and quantify tolerance levels in terms of impact energy.

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