

An Ontology-Based Framework to Support Asset Integrity Modeling: Case Study of Offshore Riser Integrity

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Abstract : This paper proposes an Ontology framework for knowledge modeling and representation of the equipment integrity process in a typical oil and gas production plant. Our aim is to construct a knowledge modeling that facilitates translation, interpretation, and conversion of human-readable integrity interpretation into computer-readable representation. The framework provides a function structure related to fault propagation using ISO 14224 and ISO 15926 OWL-Lite/ Resource Description Framework (RDF) to obtain a generic system-level model of asset integrity that can be utilized in the integrity engineering process during the equipment life cycle. It employs standard terminology developed by ISO 15926 and ISO 14224 to map textual descriptions of equipment failure and then convert it to a causality-driven logic by semantic interpretation and computer-based representation using Lite/RDF. The framework applied for an offshore gas riser. The result shows that the approach can cross-link the failure-related integrity words and domain-specific logic to obtain a representation structure of equipment integrity with causality inference based on semantic extraction of inspection report context.

Keywords : asset integrity modeling, interoperability, OWL, RDF/XML

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