Corrosion fatigue – need for further research?

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Abstract

A significant number of offshore structures have been developed and installed for use in aggressive marine environments over the past decades, in which structures for renewable energy applications (*e.g.* offshore wind turbine generators) represent a considerable fraction. Fatigue has been widely recognized by the industry and research community as an important element in the design and maintenance of such offshore structures. The complex phenomenon related to fatigue deterioration is thereby further amplified as offshore structures are operating in an aggressive environment. Thus, the detrimental effects of fatigue loading are combined with harmful and destructive effects of for example corrosion. In these situations, the environment becomes a significant factor in determining the fatigue resistance of structures and in evaluating the service life. Existing fatigue design guidelines were developed on the basis of (experimental) studies conducted in connection to oil and gas structures over 30 years ago. These design codes and semi-empirical models, developed by certification authorities such as DNV GL and the American Petroleum Institute for the oil and gas industry, are

currently widely used for other offshore structures. Considering the differences in design requirements of for example offshore wind turbine structures compared to oil and gas structures as well as the rapid development in the offshore industry, currently available design standards may not be able to accurately predict the fatigue performance of offshore structures.