Abstracts of plenary presentations

Modelling, prediction and factors in the corrosion of steels in marine environments

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Recent applied research focused on the severity and progression of the marine corrosion of steels is reviewed. Protective measures such as protective coatings and cathodic protection are not always possible, effective or even cost effective. A model for marine corrosion prediction for steel as a function of time is outlined. The model is based on theoretical concepts but is calibrated to actual field data drawn from field exposure results from a wide variety of compatible sources, ranging from the Tropics to sub-Arctic conditions. The important difference between initial and short-term 'corrosion rates' versus longer-term corrosion is noted. The effects of water salinity and water velocity are described, also based on field studies. The effect of microbiological corrosion and when it can be important are described and its modelling are described. Steel composition is discussed briefly but is not a significant factor for low carbon structural steels. As well as 'general' corrosion, consideration is given also to the progression of pitting corrosion and the mechanism under which it occurs in the medium to longer term. This is important in understanding the effectiveness of coatings and cathodic protection for already corroded steels surfaces. The work described has been applied to a number of practical projects. These are outlined and include corrosion of steel sheet piling, ballast tank corrosion, corrosion inside bulk carrier ship holds and corrosion of FPSO mooring chains.