

# Preface

API (WSD) and ISO 19902 (LRFD) codes are being used nowadays for design of Jacket platforms all over the world. ISO code is a probabilistic code which takes into account the uncertainties of material and loads and thus enables economised designs. This advantage is not available for API code. The sustainable development of physical structures depend not only on reliability of structures but also on cost saving. ISO load factors are calibrated using Gulf of Mexico and North Sea environmental data. In this book, three offshore regions of Malaysia have been taken separately. The probabilistic uncertainty models for resistance and loads for local conditions are determined. Resistance uncertainty is evaluated using data collected from fabrication yard in Malaysia. Geometrical and material variations are statistically analysed from this data using probability distributions. Uncertainty model for nine component stresses and eleven joint stresses is analysed using MATLAB and statistical distributions. Environmental load uncertainty model included wave, wind and current parameters. The platform-specific and regional data is used for the analysis. The extreme distributions, i.e. Weibull and Gumbel are fitted for the analysis and their parameters are evaluated. SACS software is used to find the component stresses. Morrison Equation is used for application of wave load and BOMEL and Heideman's Equations are used to find the response from the stresses. 100-year loads are used to find the reliability. Seven code Equations are used to find the component reliability. The member selection for reliability analysis is based on diameter, thickness and slenderness ratios. The component reliability is found through FORM method of reliability using MATLAB code. For the target reliability API WSD code is used. Thus the environmental load factor which gives higher reliability than the target is selected. Codes define three types of Joints, K, T/Y and X in Jacket platforms. The environmental load factor is proposed using local geographic conditions. Though codes use component and joint-based environmental load factors only it is found necessary to include and check the system-based approach for the load factor also. ISO requires that to assess the strength of structure for extension of life, change in load or resistance of Jacket, 10,000-year load should be applied and Jacket strength evaluated. API and ISO code require that they should be checked against

probability of failure of  $10^{-4}$ . In this text the probability of failure is determined and it is updated by applying the Bayesian updating technique.

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