

## Reliability Based Design Procedure of Offshore Wind Turbine Foundation

### Overview


Reliability analysis is used increasingly over the alternative deterministic approach. It allows for more targeted safety factors to be established and takes into account the uncertainty of the associated material and geometrical parameters. The high degree of uncertainty associated with marine and geotechnical conditions makes consideration of such uncertainty particularly vital if a safe and suitable design is to be obtained. The course aims to integrate offshore wind turbine foundation structure design and reliability analysis so that suitable safety margin equations and statistics of the basic variables are established. The two most common foundation types to be considered including monopiles and jacket piles. A reliability analysis program CALREL will be used to demonstrate the applications of the reliability analysis to a jacket pile structure. The participants will be exposed to the structural reliability analysis concept and the course will provide participants with the tools required for the monopiles and jacket piles design along with the knowledge required to assess the ultimate and fatigue limit state of monopiles and jacket piles. Further, the course will enhance the capability of the participants to calculate the probability of failure.

<b>Course Duration</b>	<b>17<sup>th</sup> April 2023 to 21<sup>st</sup> April 2023</b>
<b>Mode of Course</b>	<b>Offline/Online</b>
<b>Modules</b>	<p>The course will cover following topics:</p> <ul style="list-style-type: none"> <li>• Introduction to Reliability, Concept of Limit state and Reliability.</li> <li>• Simulation Methods in Reliability Analysis.</li> <li>• Structural Reliability Analysis using Response Surface Method, Adaptive Response Surface Method and Stochastic Response Surface Method.</li> <li>• Applications of Reliability Methods.</li> <li>• Wind, wave and current loading on offshore wind turbine.</li> <li>• Code Calibration and Partial Safety using Stochastic Models of Loads, Partial Safety Factors, Safety Checking Format, System Reliability, Bounds on System Reliability.</li> <li>• Structural analysis of Monopiles and Jacket structures.</li> <li>• Reliability analysis for ultimate strength and Fatigue strength.</li> </ul>
<b>Host Institute</b>	<b>National Institute of Technology Karnataka, Surathkal</b>
<b>No. of Credits</b>	<b>1</b>
<b>Maximum No. of Participants</b>	<b>50</b>
<b>You Should Attend If...</b>	<ul style="list-style-type: none"> <li>• You are an Executive/Engineer/Researcher from private and government organizations including R&amp;D laboratories.</li> <li>• You are a student at (BTech/MTech/PhD) of Ocean Engineering and Naval Architecture, Mechanical Engineering, Civil Engineering and Marine Structures.</li> <li>• You are faculty members from reputed academic and technical institutions.</li> </ul>




<b>Course Registration Fees</b>	<p>The participation fees for attending the course is as follows:</p> <p><b>Participants from abroad:</b> US\$ 200 + 18% GST <b>Industry/Research Organizations:</b> Rs. 5000/- + 18% GST <b>Academic Institutions (Faculty members):</b> Rs. 3000/- + 18% GST <b>Academic Institutions (Research scholars):</b> Rs. 1000/- + 18% GST</p> <p>The above fees include all instructional materials and tutorials.</p>
<b>Accommodation</b>	<p>The participants will be provided with single bed accommodation on payment basis.</p>

### Course Faculty

	<p><b>Prof. Purnendu Kumar Das</b> is presently Director of ASRANet Ltd., Glasgow, UK. He retired as Professor of Marine Structures from Department of Naval Architecture and Marine Engineering, Universities of Glasgow &amp; Strathclyde. He has worked as principal Research Officer/Principal Structural Engineer in the Marine Structures and Offshore Division of BMT CORTEC Limited, Wallsend, Tyne and Wear, UK. He has expertise in the field of static and dynamic structural response of floating and fixed marine structures. He has supervised around 18 PhD students and has worked on various projects sponsored by US Navy, EPSRC, Royal Society of China, Lloyd Register and BAE Systems. His research interest includes strength modelling at component and system level of engineering structures, reliability-based code development, non-linear structural analysis using Finite Element techniques and fatigue and fracture analysis. He has published peer reviewed papers in various International Journal, conference proceedings and book chapters.</p>
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### Host Faculty

	<p><b>Dr. Debabrata Karmakar</b> is an Assistant Professor at the Department of Water Resources and Ocean Engineering, National Institute of Technology Karnataka, Surathkal. His research interest includes Coastal Hydrodynamics, Offshore wave and wind energy, hydroelasticity of floating structures and wave-structure interaction problems. He has worked as a researcher at Centre for Marine Technology and Ocean Engineering (CENTEC), Instituto Superior Técnico, Lisbon, Portugal and Assistant Professor in the School of Naval Architecture and Ocean Engineering, Indian Maritime University, Visakhapatnam, India. He is presently working as Technical Committee Member of the ISSC Committee V.6 on Ocean Space Utilization of the International Ship and Offshore Structures Congress (ISSC). He has published peer reviewed papers in various International Journal, conference proceedings and book chapters.</p>
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### Course Coordinator

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