



# Subsea Engineering Competency Profile

## METOCEAN ENGINEERING AND OCEANOGRAPHY FUNDAMENTALS

**DE-004**

This competency demonstrates a subsea engineer has a broad understanding of metocean engineering and its application to subsea engineering.

ELEMENT OF COMPETENCE	WHAT THIS COMPETENCE MEANS IN PRACTICE	INDICATORS OF ATTAINMENT
<p>Working knowledge of how metocean parameters are applied in subsea engineering for:</p> <ul style="list-style-type: none"> <li>● design</li> <li>● installation</li> <li>● operations (monitoring, fatigue, etc.)</li> </ul>	<p>Requires that metocean parameters are analysed and presented in a manner which is fit for engineering end use</p>	<p>Has used metocean criteria in subsea engineering analysis or design</p> <p>Has communicated interpretation of metocean information to others for subsea engineering application.</p>
<p>Working knowledge of operational and tropical cyclone weather forecast products available.</p>	<p>Ability to use forecasts when following Offshore Procedures and Cyclone Response Plans.</p>	<p>Demonstrated ability to interpret weather forecasts for safe operations offshore, and for cyclone avoidance.</p>
<p>Working knowledge of the elements of subsea engineering which require metocean input, the required levels of accuracy and source be it regional, field measured or modelled data</p>	<p>Ensures metocean risks are defined for subsea engineering design elements.</p> <p>Ensures that metocean data acquisition is available in time at the required level of detail to reduce risks to ALARP.</p>	<p>Has specified the requirements of metocean data acquisition programmes, accounting for uncertainties in the metocean site conditions, to satisfy subsea engineering requirements on more than one project phase.</p>
<p>Awareness of physical oceanography and marine meteorology including:</p> <ul style="list-style-type: none"> <li>● winds</li> <li>● waves</li> <li>● tides and water levels</li> <li>● currents</li> <li>● water temperatures</li> </ul>	<p>Can explain regional conditions (e.g. cyclones, tides, eddies, solitons etc) and how these processes are likely to impact on site specific subsea design elements including surface facilities behaviours.</p>	<p>Has worked with metocean engineers or consultants to define schedule and / or scope of metocean data acquisition, modelling and studies for subsea engineering applications.</p> <p>Has demonstrated the ability to address metocean in risk assessments and HAZIDs</p>



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<p>Awareness of the limitations of data (measured and modelled), calibration requirements, analysis methods and uncertainties including:</p> <ul style="list-style-type: none"><li>• literature review, measurements</li><li>• numerical modelling (forecast and hindcast)</li><li>• quality control and calibration of models</li><li>• database lengths</li><li>• the risk of uncertainties in the input</li></ul>	<p>Allows for selection of optimal databases and methodology for metocean parameter generation.</p> <p>Understands the confidence interval associated with metocean parameters and the effect on subsequent calculations</p>	<p>Has assessed available metocean information, established knowledge gaps, and identified required data to develop relevant parameterization.</p>
<p>Awareness of methods for deriving extreme and operational metocean criteria including independent and joint conditions, methods of response-based extremes, operability and weather windows analysis.</p>	<p>Able to scope metocean requirements for subsea engineering application, defining metocean measurements, modelling and studies</p>	<p>Has prepared fit for purpose design and operational metocean criteria.</p> <p>Has scoped metocean requirements for transport, installation and operation.</p> <p>Has included required metocean design criteria in Basis of Design or Design Premise documentation.</p>