# Subsea Engineering Competency Profile

| SURVEY, GEOPHYSICAL AND GEOTECHNICAL ENGINEERING ELECTIVE | GTP-002 |
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This competency demonstrates the Subsea Engineer has sufficient knowledge to effectively and successfully perform or supervise or approve the following:

- Offshore geophysical survey and geotechnical investigation requirements
- Geotechnical interpretative reports
- Geotechnical engineering design/analysis for foundations/anchoring systems
- Engineering of the interaction between subsea infrastructure and the seabed
- Installation engineering for various foundation/anchor types and other subsea infrastructure

| ELEMENT OF COMPETENCE | WHAT THIS COMPETENCE MEANS IN PRACTICE | INDICATORS OF ATTAINMENT<br><br>Refer to only as many Indicators of Attainment as you need to demonstrate the Element of Competence |
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| Expert knowledge of Codes and Standards relevant to geophysical surveys and geotechnical investigations. | Can supervise the application of recognised codes and standards applicable to subsea geotechnical engineering. | Can cite examples of where the engineer has supervised codes and standards within a project. |
| Expert knowledge of data gathering requirements as they apply to projects, various phases of projects and the tools required. This includes requirements for geophysical surveys and geotechnical site investigations. | Capable of:<br>• Identifying requirements for data acquisition<br>• Identifying specifications and developing scopes of work for gathering of geotechnical data relevant to design of subsea infrastructure<br>• Interpretation of the data to derive the required parameters | Can cite examples of where specification of data gathering scopes and equipment has been carried out within a project and/or oversees execution of such scopes. |
| Expert knowledge of laboratory testing requirements (including advanced testing) as they apply to the design of subsea infrastructure (including physical modelling). | Capable of preparing specifications for laboratory testing (including procedures), review of results and interpretation to derive design parameters. | Can cite examples of where laboratory testing has been specified relevant to the design of subsea infrastructure and the interpretation of the results to derive parameters for use in geotechnical design (including the preparation of geotechnical interpretive reports). |

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|---|---|---|
| Expert Knowledge in integration of geophysical interpretation and geotechnical data in a spatial framework. | Capable of correlating data sets to produce a spatially integrated interpretation. | Has prepared geotechnical and geophysical interpretative reports in a spatial framework. |
| Expert knowledge of geotechnical design requirements for various types of shallow and deep foundations and anchoring systems (including piles, mud-mats, suction caissons, drag anchors, etc) for supporting structures and pipelines and comprehensive understanding of the loading conditions that should be considered for the life of the project.<br><br>Expert knowledge of the geotechnical design/analysis process and how it fits within the overall project, including the interaction with other subsea engineering disciplines. | Capable of:<br>• Understanding the implications of seabed interactions for a range of different subsea facilities under a variety of geotechnical conditions.<br>• Leading a geotechnical design team during FEED and detailed design phases.<br>• Carrying out desk studies that identify geotechnical requirements for a subsea development (e.g. risks, data gaps, potential solutions) | Can cite examples where the engineer has led, approved or accepted subsea geotechnical designs on at least two projects at detailed design stage or later, where the design has been installed. |
| Working knowledge of geohazards and potential to impact on subsea facilities design and operation including shallow gas, turbidity/debris flows, unexploded ordnance, seabed mobility/scour. | Capable of defining the requirement for a specific geohazard survey and using data to mitigate the identified risk on the subsea facility. | Has assessed and mitigated geohazard risk for a subsea development. |
| Working knowledge of installation requirements (including risks and constraints) for subsea infrastructure, such as piles, mud-mats, anchors etc. | Capable of understanding key installation activities and risks. | Has participated in constructability/installation workshops and/or provided input into offshore installations of foundations/anchors. |
| Working knowledge of lifetime monitoring requirements for the various foundation/anchoring options. | Capable of writing operational integrity monitoring requirements for life of field and/or capable of assessing in-service integrity monitoring records | Can cite examples of participation in determining the requirements for monitoring of subsea facilities<br><br>Can cite examples of participation in assessments of subsea foundations/anchors in-service |

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