



SUBSEA ENGINEERING COMPETENCY FRAMEWORK

GUIDELINES FOR CANDIDATES

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1 INTRODUCTION

This manual has been compiled to act as a guideline for engineers as to how the Subsea Engineering Competency framework is to be used.

The document sets out the requirements that a subsea engineer needs to satisfy to achieve a designation of “competent” in their areas of practice.

1.1 BACKGROUND

The Society for Underwater Technology (Perth Branch) (SUT) is a not for profit learned society with an interest in developing Subsea Engineering capabilities in Australia.

In collaboration with industry and academia SUT have defined a competency framework for assessing the competency of subsea engineers. The subsea engineering competency framework:

- Provides training and career planning guidance for graduates who intend to become subsea engineers
- Assists employers in determining if their subsea engineers are competent to undertake the roles required of them
- Provides a framework for assessing Subsea Engineers for admission by Engineers Australia as Chartered Professional Engineers
- Provides a framework for assessing Subsea Engineers for the National Engineering Register in the Area of Practice of Subsea Engineering
- Provides confidence that a person with CPEng (Subsea) has a minimum level of competence.

1.2 FRAMEWORK LAYOUT AND COMPOSITION

Owing to the nature of the subsea engineering discipline, engineers will specialise in one or more areas of competence. The areas of competence include (refer Appendix A):

- Field Development Planning / Concept Selection
- Corrosion and Materials Engineering
- Flexible Flowlines and Risers, Umbilicals and Cables
- Geotechnical Design
- Subsea Structural Engineering

- Mechanical Engineering
- Subsea Control Systems
- Dynamic Risers & Moorings Design and Analysis
- Construction Engineering and Construction Spread Management
- Pre-Commissioning & Commissioning
- Subsea Asset Management
- Discipline Engineering Fundamentals

1.3 DEFINITION OF TERMS

Specific definitions of terms have been adopted in this framework as per the following table:

Term	Definition
Competent	has the minimum knowledge, expertise and experience in an area of practice
Awareness	is aware of what others do but cannot do it themselves
Knowledge	has a theoretical understanding of the subject matter, but has not applied it in the workplace, (EA terminology: “Developing”)
Working Knowledge	has independently undertaken and/or managed work that applies the theoretical understanding, (EA terminology: “Functional”)
Expert Knowledge	has significant expertise in their discipline or acts as a technical authority in this field, (EA terminology: “Proficient”)
Experience	The process of gaining knowledge and skills from action, observation or participation. The experience requirements are contained in each Subsea Engineering competency profile under the heading “What this competency means in practice”
Subsea Facilities	means an aggregated system of subsea permanent equipment installed in a field. Includes all facilities underwater but excludes rigid pipelines.

Term	Definition
Subsea Equipment	means single items of permanent equipment, construction hardware or intervention tooling
Mandatory Competency	Applicants must meet these requirements
Fundamental Competency	Consistent with working knowledge
Elective Competency	Consistent with expert knowledge

2 ASSESSMENT OF COMPETENCE

This framework is intended for the assessment of Subsea Engineers who have more than five years of relevant experience in the industry. A graduate engineer would not be able to meet the minimum requirements for being deemed competent. This is compliant with the present standards for chartered status with Engineers Australia and admission to the NER.

Three levels of competency profile are defined in the framework: Mandatory, Fundamental and Elective.

Mandatory competency profiles represent the minimum requirements that a Subsea Engineer must meet before being considered for further assessment.

Fundamental competency profiles represent the list of competency elements that a Subsea Engineer needs to understand about other disciplines in order to perform in their own discipline. For example: a structural engineer needs to understand the Fundamentals of Geotechnical Engineering, Corrosion and Materials and Ocean Engineering in order to successfully design structures that are fit for purpose.

Elective competency profiles represent the competencies of an engineer with significant experience in that discipline. To be deemed competent in an Elective describes a person with a detailed understanding of the subject material.

2.1 PRE-REQUISITES

For any given competency profile, the candidate engineer shall be aware of the prerequisite competency profiles that must be satisfied prior to their panel assessment.

Refer to the pre-requisites identified in the Competency Profile Nomination Form.

2.2 REQUIREMENTS

In order to be considered competent according to this framework, a Subsea Engineer shall demonstrate that they meet the minimum requirements for admission by Engineers Australia as a Chartered Professional Engineer.

The applicant for CPEng (Subsea) shall also demonstrate competence in 7 competency profiles, comprising:

- the two mandatory profiles
- five additional competency profiles, one of which must be an Elective
- typically only one elective would be nominated given the expert knowledge and experience required for each elective

In order for a Subsea Engineer to be deemed competent for a single competency profile, they must demonstrate 80% attainment of the competence elements comprising that competency profile.

Typically, seven years of relevant work experience would be required to be able to demonstrate competency.

2.3 APPLICATION FOR RECOGNITION OF SUBSEA ENGINEERING

Applicants can apply for recognition of competence in the area of practice (AoP) of Subsea Engineering via a number of different routes:

- National Engineering Register under the Subsea Engineering AoP
- CPEng (Subsea) via the EA Stage 2 assessment
- As an existing CPEng applying for additional recognition in the Subsea Engineering AoP
- Eng Exec via the EA Stage 3 assessment – EngExec gives Chartered status in Leadership and Management (L&M). Applicants for EngExec can also elect to request recognition in the subsea engineering AoP at the same time. The Stage 3 EngExec process covers the L&M AoP. Subsea Engineering AoP is assessed separately but at the same time.

2.4 APPLICATION PROCESSES

2.4.1 NER

The application process for inclusion on the National Engineering Register in the area of Practice of Subsea Engineering is managed by EA and published on the EA website.

SUT provides information to applicants in the area of Subsea Engineering, including a listing of subsea engineering competency profiles.

The details of the 49 subsea competency profiles are provided on the SUT (Perth Branch) website.

During the self-assessment phase, applicants are requested to nominate the 5 additional competency profiles they believe support their claim for competency in Subsea Engineering.

Applicants can download the subsea competency profile nomination form from the SUT (Perth Branch) website.

The subsea competency profile nomination form along with CV and CPD record are then uploaded on the EA website as "Application Supporting Document".

2.4.2 CPEng and Subsea Engineering AoP

The application process standard for Stage 2 assessment leading to CPEng is managed by EA and published on the EA website.

It is important that all applicants for Stage 2 assessment review and understand the standard before submitting an application.

SUT provides information to applicants in the area of practice of Subsea Engineering, including a listing of subsea engineering competency profiles.

The details of the 49 subsea competency profiles are provided on the SUT (Perth Branch) website.

During the self-assessment phase, applicants are requested to nominate the 5 additional competency profiles they believe support their claim for competency in Subsea Engineering.

Applicants can download the subsea competency profile nomination form from the SUT (Perth Branch) website.

The subsea competency profile nomination form along with CV and CPD record are then uploaded on the EA website as "Application Supporting Documents".

SUT supports EA in the assessment process with review of submitted information, attendance at candidate interview and input to the assessment decision. All SUT assessors are CPEng and accredited in the Subsea Engineering AoP.

2.4.3 Existing CPEng applying for Subsea Engineering AoP

The application process for recognition of the Subsea Engineering AoP is managed by EA and published on the EA website.

The application process follows that described in 2.4.2 without reference to the Stage 2 assessment.

2.4.4 Eng Exec and Subsea Engineering AoP

The application process for Stage 3 assessment leading to Eng Exec and recognition of the Subsea Engineering AoP is managed by EA and published on the EA website.

The application process follows the stage 3 assessment and that described in 2.4.2 without reference to the Stage 2 assessment.

2.4.5 Existing Eng Exec applying for Subsea Engineering AoP

The application process for recognition of the Subsea Engineering AoP is managed by EA and published on the EA website.

The application process follows that described in 2.4.2 without reference to the Stage 2 or Stage 3 assessment.

2.5 ONLINE INFORMATION AND APPLICATION

2.5.1 SUT

SUT provide online resources for graduates pursuing a career in Subsea Engineering and candidates considering applying for recognition of the Subsea Engineering area of practice. Refer to

<https://www.sut.org/branch/australia-perth/subsea-engineering/>

2.5.2 EA

EA provides online information and access to the application processes via a number of locations;

NER:

<https://www.engineersaustralia.org.au/Engineering-Registers/National-Engineering-Register/NER-Info>

CPEng:

<https://www.engineersaustralia.org.au/For-Individuals/Chartered-Engineer>

EngExec: <https://engexec.org>

Subsea Engineering AoP:

<https://www.engineersaustralia.org.au/Chartered/Chartered-areas-of-practice>

2.6 ONGOING CPD REQUIREMENTS

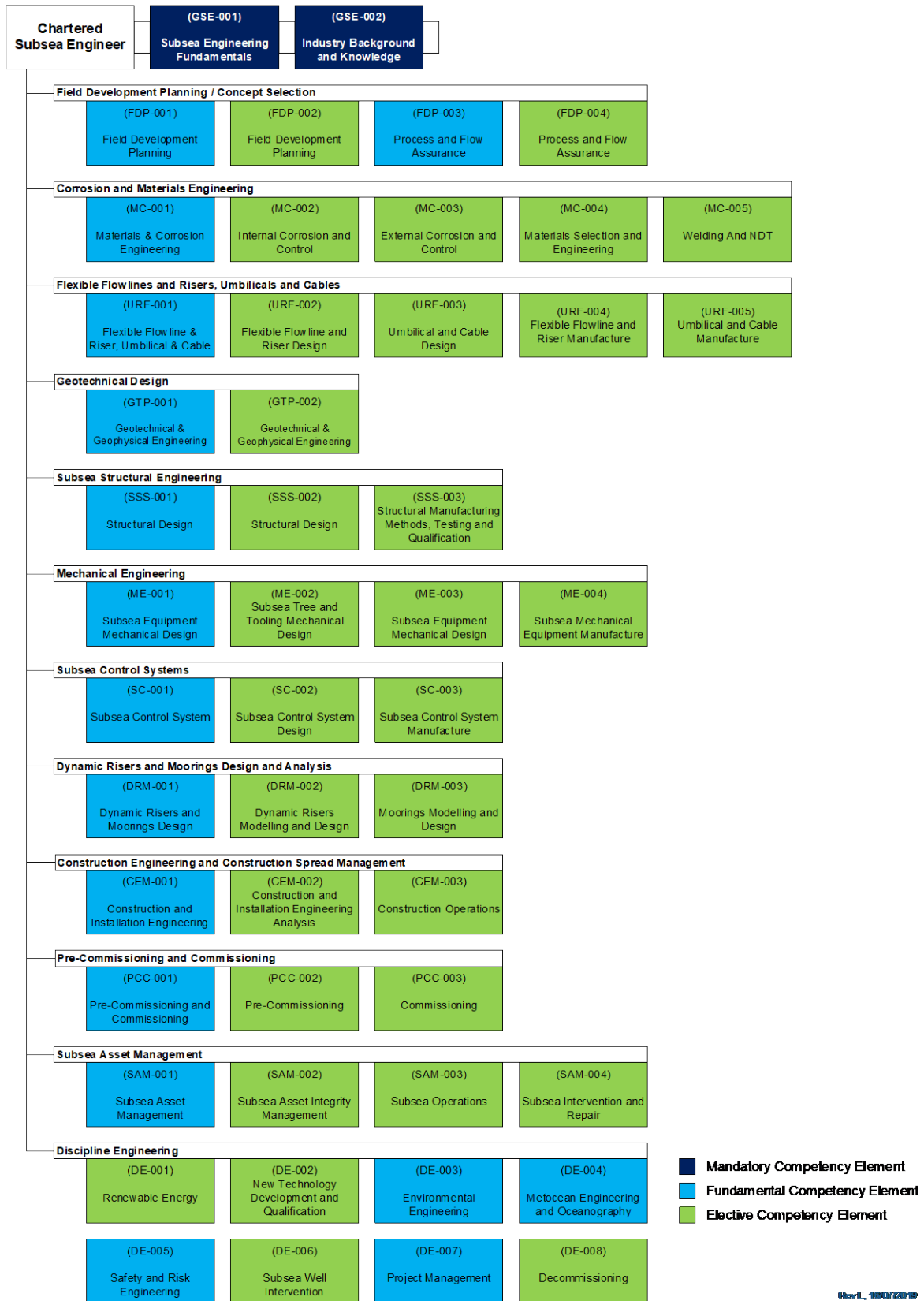
Having achieved recognition of the Subsea Engineering area of practice, the candidate has an ongoing obligation of continued professional development (CPD) to maintain accreditation. This is achieved by completing 150 hours of applicable CPD in a rolling three year period.

Candidates should consider attendance at relevant events and training opportunities provided by SUT, EA and others.

Membership details for SUT can be found via the following link:

<https://www.sut.org/branch/australia-perth/membership/>

Appendix A. List of Competency Profiles



Appendix B. Subsea Engineering Competency pre-requisites

Code	Subsea Engineering Areas & Competencies	Core / Elective	Pre-Requisites
General Subsea Engineering			
GSE-001	Subsea Engineering Fundamentals	Mandatory	na
GSE-002	Industry Background and Knowledge	Mandatory	na
Field Development Planning / Concept Selection			
FDP-001	Field Development Planning	Fundamental	
FDP-002	Field Development Planning	Elective	FDP-001
FDP-003	Process and Flow Assurance	Fundamental	
FDP-004	Process and Flow Assurance	Elective	FDP-003
Corrosion and Materials Engineering			
MC-001	Materials and Corrosion Engineering	Fundamental	
MC-002	Internal Corrosion and Control	Elective	MC-001
MC-003	External Corrosion and Control	Elective	MC-001
MC-004	Materials Selection and Engineering	Elective	MC-001
MC-005	Welding and NDT	Elective	MC-001, MC-004
Flexible Flowline and Riser, Umbilical and Cable			
URF-001	Flexible Flowline and Riser, Umbilical and Cable	Fundamental	
URF-002	Flexible Flowline and Riser Design	Elective	URF-001, MC-001, DRM-001
URF-003	Umbilical and Cable Design	Elective	URF-001
URF-004	Flexible Flowline and Riser Manufacture	Elective	URF-001
URF-005	Umbilical and Cable Manufacture	Elective	URF-001
Geotechnical Design			
GTP-001	Geotechnical and GeoPhysical Engineering	Fundamental	
GTP-002	Geotechnical and GeoPhysical Engineering	Elective	GTP-001
Subsea Structural Engineering			
SSS-001	Structural Design	Fundamental	
SSS-002	Structural Design	Elective	SSS-001
SSS-003	Structure Manufacturing Methods, Testing and Qualification	Elective	SSS-001
Mechanical Engineering			
ME-001	Subsea Equipment Mechanical Design	Fundamental	
ME-002	Subsea Tree and Tooling Mechanical Design	Elective	ME-001
ME-003	Subsea Mechanical Equipment Design	Elective	ME-001
ME-004	Subsea Mechanical Equipment Manufacture	Elective	ME-001
Subsea Control Systems			
SC-001	Subsea Control System	Fundamental	
SC-002	Subsea Control System Design	Elective	SC-001
SC-003	Subsea Control System Manufacture	Elective	SC-001
Dynamic Risers & Moorings Design and Analysis			
DRM-001	Dynamic Risers and Moorings Design	Fundamental	
DRM-002	Dynamic Risers Modelling and Design	Elective	DRM-001
DRM-003	Moorings Modelling and Design	Elective	DRM-001
Construction Engineering and Construction Spread Management			
CEM-001	Construction and Installation Engineering	Fundamental	
CEM-002	Construction and Installation Engineering Analysis	Elective	CEM-001
CEM-003	Construction Operations	Elective	CEM-001
Pre-Commissioning and Commissioning			
PCC-001	Pre-Commissioning & Commissioning	Fundamental	
PCC-002	Pre-Commissioning	Elective	PCC-001
PCC-003	Commissioning	Elective	PCC-001
Subsea Asset Management			
SAM-001	Subsea Asset Management	Fundamental	
SAM-002	Subsea Asset Management Engineering	Elective	SAM-001
SAM-003	Subsea Operations	Elective	SAM-001
SAM-004	Subsea Intervention and Repair	Elective	SAM-001
Discipline Engineering			
DE-001	Renewable Energy	Elective	DE-004
DE-002	New Technology Development and Qualification	Elective	DE-007
DE-003	Environmental Engineering	Fundamental	
DE-004	Metocean Engineering and Oceanography	Fundamental	
DE-005	Safety and Risk Engineering	Fundamental	
DE-006	Subsea Well Intervention	Elective	ME-001
DE-007	Project Management	Fundamental	
DE-008	Decommissioning	Elective	FDP-001, FDP-003, ME-001, CEM-001