REGISTRATION AUTHORITY
FOR CHARTERED PROFESSIONAL ENGINEERS

Self assessment tool

Preparing for chartership

June 2024

Contents

Purpose

The purpose of this tool is to assist engineers on their journey towards Chartership in New Zealand. We encourage engineering graduates to use this tool to help record progress and identify areas of development in relation to the 12 competency elements that are assessed during a competence assessment for Chartership in New Zealand.

How to use this tool

For each competency element, record your current level of attainment. It's recommended you work through this with your manager or a mentor. Provide a brief statement that describes the type and content of the work you have done, which you may be able to provide as evidence during a competence assessment for Chartership, or record development areas or opportunities for work on future projects with your manager. Record the complexities in the work undertaken to determine whether this may meet the requirements for Professional Chartership, Engineering Technologist, or Engineering Technician level Chartership (see Appendix 1 for complexity definitions).

Levels of proficiency

There are three levels of proficiency defined for each competency element.

Level	Description
Knowledge	» Has a foundational understanding and knowledge of the competency element and why it is important.
Application	» Is part of a process or provides advice, working under supervision or in simple applications. » Does not hold higher responsibility, including decision making and people management.
Ability	» Demonstrated ability to take responsibility for complex engineering activities in multiple different scenarios. » Considered suitably proficient to work without supervision and to train others.

Competencies assessed for Chartership

There are 12 competency elements that are assessed during a competence assessment for Chartership in New Zealand. These are grouped into 4 competency groups – or 'Pillars', as shown below:

Engineering knowledge	Managing engineering work	Professional accumen	Developing technical solutions
Engineering principles	**Decision-making**	**Ethics**	**Defining, investigating, and analysing engineering problems**
Local knowledge	**Managing complex activities**	**Social, Cultural, Environmental and Economic Impacts**	**Developing solutions**
Keeping up to date	**Sound professional judgment**	**Communication**	
	Risk identification and management		
Professional Engineer: Washington Accord level degree or equivalent. Work on complex engineering problems and activities.			
Professional Engineering Geologist: Post-graduate level engineering geology qualification. Work on complex engineering problems and activities.			
Engineering Technologist: Sydney Accord level qualification. Work on broadly defined engineering problems and activities.			
Engineering Technician: Dublin Accord level qualification. Work on well-defined engineering problems and activities.			

Pillars: Four foundational pillars, or Competency Groups, reflect the core areas of competency in engineering practice.

Elements: The elements are the building blocks of each pilar.

Levels of proficiency: Within each element, three levels of proficiency are defined.

Type of Chartership: The pillars, competence elements and levels above are applicable to Professionals, Technologists and Technicians; with the difference being the type of engineering work that technicians and technologists do being at different levels of complexity (see Appendix 1 for complexity definitions).

Performance Indicators: If you're aiming for Professional Chartership, have a look at Appendix 2, which provides you with performance indicators for each competency element, at each level of proficiency, to help you assess your current level of proficiency.

Self-Assessment Tool

1 – Engineering Knowledge

The competency elements within the engineering knowledge competency group relate to the:

- minimum education requirement for engineers which align to the international education Accords – Washington (for professional engineers); Sydney (for Technologists) and Dublin (for Technicians) Accord.
- ability to comprehend and apply knowledge of accepted principles underpinning widely applied good practice; and
- the requirement for engineers to comprehend and apply local requirements to their engineering activities within their area of practice.

Engineering professionals are also expected to demonstrate curiosity and a persistent desire for continuous learning to ensure they maintain their engineering knowledge and apply good practice for engineering within their practice field.

Engineering professionals should participate in learning activities, should know when it is necessary to acquire new knowledge and skills, and should take steps to develop and maintain their knowledge, skills and expertise by actively pursuing opportunities to broaden and deepen their knowledge and skills.

	Knowledge	Application	Ability	Evidence and notes on complexity / plan for attainment
Engineering Principles Comprehend, and apply knowledge of accepted principles underpinning widely applied good practice for engineering				
Local knowledge Comprehend and apply knowledge of accepted principles underpinning good practice for professional engineering that is specific to New Zealand1				
Keeping up to date Maintain the currency of professional engineering knowledge and skills				

1 Note: This is not a requirement for Chartered Membership – however it is a requirement for registration as a Chartered Professional Engineer.

2 – Managing Engineering Work

This competency group reflects the crucial role of managing both people and projects as an engineering professional. In managing engineering work, professional engineers are able to take ownership of decision-making in complex engineering tasks, including being accountable for personal and team outputs.

Engineering professionals should be capable of effectively overseeing engineering activities in accordance with established engineering management practices. This entails skills like project planning, scheduling, quality assurance, resource management, and navigating diverse environments.

Engineering professionals are expected to exhibit sound professional engineering judgment by identifying and evaluating alternative options and making informed decisions. Engineering professionals are able to identify, assess and manage engineering risk; this includes the ability of engineering professionals to identify potential impacts on safety, environment, and assets; and to implement risk management policies, hazard mitigation, and safety-conscious design practices.

	Knowledge	Application	Ability	Evidence and notes on complexity / plan for attainment
Decision-making Take responsibility for making decisions (all or part of) on one or more complex/broadly defined/well defined engineering activities				
Managing engineering activities Manage (all or part of) one or more complex/broadly defined/well defined engineering activities in line with good engineering management practice				
Professional judgement Make sound professional engineering judgement				
Risk identification and management Identify, assess, and manage engineering risk				

3 – Professional Acumen

This competency group represents the professional skills and work readiness skills that most employers demand when working with an engineering professional. The competency elements that make up this pillar relate to an individual's personal attributes; their integrity; ability to engage effectively with others; and respect of the social, cultural and environmental context in which they are working. These competencies reflect an engineer's responsibility to be accountable for their actions; to behave ethically; and to treat others fairly, with honesty and respect.

	Knowledge	Application	Ability	Evidence and notes on complexity / plan for attainment
Ethics Conduct your professional engineering activities to an ethical standard at least equivalent to the code of ethical conduct				
Social, Cultural, Environmental and Economic impacts Recognise the reasonably foreseeable social, cultural, environmental and economic effects of professional engineering activities generally				
Communication, interpersonal skills Communicate clearly to other engineers and others that you are likely to deal with in the course of your professional engineering activities				

4 – Developing Technical Solutions

This competency group relates to an engineer's critical and analytical thinking, and their ability to generate innovative and creative solutions to engineering problems. This includes an engineer's ability to identify the problem and gather relevant information to analyse and define critical issues and propose possible solutions. Engineering professionals need to be able to generate a variety of high-quality alternative approaches to the problem and be able to skillfully use logic and analysis to identify the strengths and weaknesses, costs, benefits, and short- and long-term consequences of different solutions or approaches. They should be able to decisively choose the best solution after evaluating the relative merits of each possible option.

	Knowledge	Application	Ability	Evidence and notes on complexity / plan for attainment
Defining, investigating, and analysing engineering problems Define, investigate, and analyse complex/broadly defined/well defined engineering problems in accordance with good practice for professional engineering				
Developing solutions Design or develop solutions to complex/broadly defined/well defined engineering problems in accordance with good practice for professional engineering				

Appendix 1: Complexity definitions for Chartership categories

Engineering New Zealand defines Chartered Membership categories according to the level of complexity of engineering work. These are defined below.

Problem	Activity
Chartered Member and CPEng	
Complex engineering problems Problems that include some or all of the following: » Wide-ranging or conflicting technical, engineering, and other related issues » No obvious solution, which means an original method of analysis is needed. » Can't be resolved without in-depth engineering knowledge » Issues not often experienced » Aren't covered by the standards and codes of practice for professional engineering » Diverse groups of stakeholders with a wide range of needs » Significant consequences in a range of contexts	**Complex engineering activities** » Activities or projects that include some or all of the following: » Diverse resources, eg people, money, equipment, materials and technologies » Resolving critical problems that occur when a variety of technical, engineering and other related issues interact » New materials, techniques or processes, or the innovative use of existing materials, techniques, or processes » Significant consequences in a range of contexts
Chartered Member (Engineering Technologist)	
Broadly-defined engineering problems » Problems that include some or all of the following: » A variety of factors that may create conflicting constraints » Can be solved by applying proven analysis techniques » Knowledge of principles and applied procedures or methods » Belong to groups of familiar problems that are solved in well-accepted ways » May be partly outside problems covered by standards or codes of practice » Several groups of stakeholders with differing needs that occasionally conflict » Consequences that are important locally but may have wider implications » Are parts of, or systems within, complex engineering problems	**Broadly-defined engineering activities** Activities or projects that include some or all of the following: » A variety of resources, eg people, money, equipment, materials, information and technologies » Resolving occasional interactions between limited technical, engineering and other related issues where only a few conflict » Using new materials, techniques or processes in innovative ways » Consequences that are very important locally, but may have wider implications » Knowledge of normal operating procedures and processes
Chartered Member (Engineering Technician)	
Well-defined engineering problems Problems that include some or all of the following: » Several issues, but only a few that result in conflicting constraints » Can be solved using a systematic approach » Resolved with limited theory but extensive practical knowledge » Frequently experienced and so familiar to most practitioners in the practice area » Covered by standards and/or documented codes of practice » Limited range of stakeholders with differing needs » Consequences that are important locally but aren't far-reaching » Discrete components of engineering systems	**Well-defined engineering activities** Activities or projects that include some or all of the following: » Limited range of resources, eg people, money, equipment, materials, information and technologies » Resolving interactions between limited technical and engineering issues where wider issues have little or no impact » Using existing materials, techniques or processes in new ways » Consequences that are important locally but aren't far-reaching » Knowledge of practical procedures and practices for widely applied operations and processes

Chartered Member (PEngGeol)	
Complex engineering geological problems	**Complex engineering geological activities**
Problems that include some or all of the following: » Wide-ranging or conflicting engineering, engineering geological and other related issues » Not easily recognised, understood or solved, which means an original method of analysis is needed » A wide range of issues that might be in an unfamiliar setting » Aren't covered by guidelines, standards and codes of practice for professional engineering geology » Diverse groups of stakeholders with a wide range of needs » Significant consequences in a range of contexts	Activities or projects that include some or all of the following: » Diverse resources, eg people, money, equipment, materials and technologies » Recognising, understanding and resolving significant problems when wide-ranging or conflicting engineering, engineering geology and/or other related issues interact » New techniques or processes, or the innovative use of existing techniques or processes

Appendix 2: Performance Indicators – Professional Chartership Journey

Engineering Knowledge

Pillar	Competency Element	Knowledge	Application	Ability
Engineering Knowledge	**Engineering Principles** Comprehend, and apply knowledge of accepted principles underpinning widely applied good practice for professional engineering	» Washington Accord degree or equivalent. » Solid understanding of foundational engineering principles and concepts relevant to engineering discipline » Seeks advice where necessary, to supplement own knowledge and experience.	» Broadens and deepens engineering knowledge and skills in chosen area of practice. » Applies foundational engineering principles and concepts relevant to engineering discipline under supervision.	» Able to independently identify, comprehend and apply appropriate advanced engineering knowledge to complex engineering problems. » Works from first principles to make reliable predictions of outcomes. » Understands assumptions and constructs of mathematical or theoretical models and can determine the relevance of their use in given situations.
	Local knowledge Comprehend and apply knowledge of accepted principles underpinning good practice for professional engineering that is specific to New Zealand	» Foundational awareness of good practice in professional engineering » Develops awareness of industry standards and regulations in New Zealand relevant to area of practice.	» Develops an understanding of local conditions, for example geological, climate, environmental, cultural etc. » Applies New Zealand legislation and regulatory requirements relevant to area of practice, under supervision. » Understands and begins to apply guidance provided by learned societies and technical groups in relevant field, under supervision.	» Understands and operates within legal and regulatory frameworks including special engineering requirements operating within own area of practice in New Zealand. » Understands and applies codified knowledge such as standards, practice notes, codes of practice etc.
	Keeping up to date Maintain the currency of professional engineering knowledge and skills	» Develops an awareness of opportunities for continuous learning and professional development.	» Develops a plan for personal learning and development to meet medium- and long-term career objectives. » Demonstrates a commitment to extending and developing knowledge and skills. » Participating in education, training, mentoring or other programmes contributing to his/her professional development.	» Demonstrates collaborative involvement with professional engineers. » Demonstrates engagement with the wider industry to stay up to date on latest developments, for example engagement with relevant technical group(s). » Awareness and application of recent developments within own area of practice. » Undertake CPD activities to maintain and extend competencies and enhance the ability to adapt to emerging technologies and the ever-changing nature of work.

Managing engineering work

Pillar	Competency Element	Knowledge	Application	Ability
Managing Engineering Work	**Decision-making** Take responsibility for making decisions (all or part of) on one or more complex engineering activities	» Awareness and understanding of the different factors that need to be considered to make a decision. » Awareness and understanding of how to monitor outputs	» Contributes to decision-making processes for engineering activities.	» Takes accountability for own outputs and for those for whom they are responsible. » Accepts responsibility for engineering activities.
	Managing complex activities Manage (all or part of) one or more complex engineering activities in line with good engineering management practice	» Awareness and understanding of quality systems and tools available for managing engineering work in area of practice.	» Contributes to managing engineering activities by following established procedures, under supervision. » Contributes to appropriate quality assurance techniques.	» Plans, schedules, organises and monitors progress of projects or activities for timely delivery. » Managing conflicting demands and expectations » Applies appropriate quality assurance techniques. » Manages resources (personnel, finance and physical) in multi-disciplinary and multi-cultural environments. » Recognise complexity and assess alternatives in light of competing requirements and incomplete knowledge. Exercise sound judgement in the course of all complex activities. » Business acumen and an understanding of the key elements of business fundamentals.
	Professional judgement Make sound professional engineering judgement	» Demonstrates a growing ability to assess engineering problems critically and apply foundational engineering knowledge to propose potential solutions. » Seeks guidance when faced with complex engineering problems and demonstrates an eagerness to learn from experienced engineers. » Begins to contribute to discussions on alternative options for solving engineering challenges and shows an interest in understanding the rationale behind decisions made by more experienced engineers.	» Contributes to the identification of alternative options in the resolution of complex engineering problems. » Exercises professional judgment within the scope of assigned tasks and projects.	» Able to identify alternative options; choose between options and justify decisions. » Peer recognition of ability to exercise sound professional engineering judgement.

	Risk identification and management Identify, assess, and manage engineering risk	» Demonstrates a growing awareness of the importance of identifying potential risks in engineering projects. » Shows a basic understanding of common engineering risks within area of practice, and their potential impact on project outcomes, demonstrating an ability to raise concerns when appropriate. » Growing awareness and understanding of key stakeholders involved in engineering work within own area of practice. » Shows a willingness to learn about different risk management techniques and procedures, seeking guidance from more experienced colleagues when needed.	» Contributes to the identification and reporting of potential risks and assists in their management. » Contributes to the communication of risks with stakeholders. » Contributes to the continuous monitoring and review of identified risks throughout the project lifecycle, showing an understanding of the dynamic nature of risk management in engineering projects.	» Identifies risks which impact on people, property and the environment. » Communicates the potential risks and benefits of engineering projects to clients, stakeholders, and the public. » Develops/follows/contributes to risk management policies, procedures and protocols to manage safety and hazards during construction/ fabrication and product life cycles » Manages risks through 'elimination, minimisation and avoidance' techniques. » Designs for safety during construction/fabrication, operation, maintenance and de-construction/ decommissioning. » Informs decision makers of significant consequences from not following advice (e.g., relating to risks, safety etc).

Professional Acumen

Pillar	Competency Element	Knowledge	Application	Ability
Professional Acumen	**Ethics** Conduct your professional engineering activities to an ethical standard at least equivalent to the code of ethical conduct	» Developing awareness of the CPEng code of ethical conduct.	Understands the CPEng code of ethical conduct. Adheres to ethical standards and demonstrates professional behaviour, including integrity and accountability. Works under supervision to develop an understanding of the limits of own knowledge and skills, and when to seek advice.	» Behaves in accordance with the CPEng code of ethical conduct even in difficult circumstances (this includes demonstrating an awareness of limits of capability; acting with integrity and honesty and demonstrating self-management) » Understands the limits of own knowledge and skills, and able to identify engineering activities that are beyond those limits.
	Social, Cultural, Environmental and Economic impacts Recognise the reasonably foreseeable social, cultural, environmental and economic effects of professional engineering activities generally	» Demonstrates awareness of social, cultural, environmental and economic impacts of engineering activities. » Aware of Te Tiriti o Waitangi.	» Contributes to the consideration of social cultural, environmental and economic effects, risks, and innovations within the scope of assigned tasks and projects. » Proactively seeks advice to reduce adverse risks. » Develops an understanding of Te Tiriti o Waitangi, how it applies to assigned tasks and projects, and key principles for consideration.	Considers and takes into account possible social, cultural and environmental impacts and consulting with stakeholders where appropriate. Recognises foreseeable effects and where practicable seeks advice to reduce adverse effects. **Social** » Demonstrates awareness of potential social impact of engineering activities e.g. human rights, sustainability, health, etc. » Demonstrates personal and social skills and awareness of diversity and inclusion issues. **Cultural** » Gives special consideration of Te Tiriti o Waitangi—and the consequent responsibilities. » Ability to recognise other cultures and be socially responsible. **Environmental** » Recognises the impact and long-term effects of engineering activities on the environment. » Understands the scope, principles, norms, accountabilities and bounds of sustainable engineering practice and applies them in their work.

				» Creates a shared understanding of climate change impacts with clients and works to transition to zero carbon. » Understands and applies longer-term resilience and adaptation considerations in engineering practice » Considers long term issues and impact(s) of own engineering activities, such as use of materials, waste during fabrication/ construction, energy efficiency during use, obsolescence and end-of-life issues. **Economic** » Recognises foreseeable economic effects of complex engineering activities and seeks to achieve sustainable and resilient outcomes.
	Communication, interpersonal skills Communicate clearly to other engineers and others that you are likely to deal with in the course of your professional engineering activities	» Develops awareness and understanding of different communication tools and how they may apply to different stakeholders and situations. » Exhibits empathy and active listening. » Shows respectful interactions.	» Contributes to delivering appropriate and effective messages to different people and groups, within scope of assigned projects. » Ensures communication is clearly understood and seeks advice where required. » Collaborates effectively as a team member, contributing to group projects and demonstrating interpersonal skills. » Is respectful and professional when receiving constructive feedback from seniors.	» Uses oral and written communication to meet the needs and expectations of their audience » Communicates and collaborates using multiple media clearly and inclusively with a broad range of stakeholders in the course of all activities. » Communicates effectively in multi-disciplinary and multi-cultural settings » Treats people with respect » Develops empathy and using active listening skills when communicating with others » Operates effectively as a team member.

Developing Technical Solutions

Pillar	Competency Element	Knowledge	Application	Ability
Developing Technical Solutions	**Defining, investigating, and analysing engineering problems** Define, investigate, and analyse complex engineering problems in accordance with good practice for professional engineering	» Developing the ability to identify and analyse problems. » Understands the tools available and good practice process to follow when defining, investigating and analysing engineering problems.	» Assists in the identification of key information that is required for investigation/analysis in scoping a problem. » Contributes to the research and analysis process in defining the scope of a problem. » Assists with testing the validity of the outcomes of the analysis/ investigation.	» Identifying and defining the scope of the complex problem using data and information technologies where applicable » Investigating and analysing relevant information using quantitative and qualitative techniques » Testing analysis for correctness of results » Conducting any necessary research » Reaching substantiated conclusions using evidence-based and theoretical principles—including those derived by mātauranga Māori
	Developing solutions Design or develop solutions to complex engineering problems in accordance with good practice for professional engineering	» Proactively develops knowledge of good practice for engineering solutions in own area of practice. » Learns from others by participating in design or development of solutions under guidance, and in doing so developing an understanding of good practice for this process.	» Applies engineering principles to solve problems in line with good practice, within scope of assigned projects. » Contributes to identification of needs, consideration of different stakeholder needs, development of options, stakeholder consultation, and evaluation of outcomes within scope of assigned projects.	» Developing technical solutions that are safe, resilient and sustainable. » Consideration of a variety of perspectives and taking account of stakeholder views. » Identifying needs, requirements, constraints and performance criteria, including as appropriate the need to design for safety, constructability, maintainability etc. » Developing concepts and recommendations that have been tested against engineering principles » Consulting with stakeholders including Mana Whenua and Tangata Whenua » Evaluating options and selecting solutions that are best matched to needs, requirements and criteria » Planning and implementing effective, efficient and practical systems or solutions » Evaluating outcomes against original specification or design brief » Developing solutions that are informed by appropriate consideration for societal, health, safety, legal and cultural issues, the rights of Tangata Whenua, and environmental factors.

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