

Guidelines on providing professional engineering services

Purpose

These Guidelines provide an explanation of the meaning of professional engineering services as used in the *Professional Engineers Registration Act 2019* (the Act).

They cover:

- the requirements under the Act for professional engineering services
- the difference between professional engineering services and other services
- the elements of a professional engineering service, and
- examples of activities that are, and are not, professional engineering services.

These Guidelines also include a checklist for determining whether a service is a professional engineering service.

What the Act requires

A professional engineering service is defined in section 3(1) of the Act as –

“an engineering service that requires, or is based on, the application of engineering principles and data –

- *to a design relating to engineering, or*
- *to a construction, production, operation or maintenance activity relating to engineering*

other than an engineering service that is provided only in accordance with a prescriptive standard;”.

The five areas of professional engineering listed in section 4(1) of the Act are structural, civil, mechanical, electrical and fire safety engineering.

As an engineering service that is provided only in accordance with a prescriptive standard is not a professional engineering service, a person who provides such a service is exempt from the requirement to be registered as a professional engineer.


It is an offence under section 67(1) of the Act for a person to provide ‘professional engineering services’ in or for Victoria¹ in any of the five areas of engineering listed in the Act unless they are:

- registered as a practising professional engineer² in that area of engineering, or
- providing the professional engineering services under the ‘direct supervision’ of a professional engineer who is registered to practise in that area of engineering.

Further, it is an offence under section 68(4) of the Act for a person who is not a registered professional engineer to use the title ‘professional engineer’.

¹ The extraterritorial application is set out in section 5 of the Act.

² A professional engineer may register with the Business Licensing Authority (BLA) as either ‘practising’ or ‘non-practising’. A professional engineer who registers with the BLA as ‘non-practising’ cannot provide professional engineering services.



Providing a professional engineering service involves giving advice or assistance and/or undertaking work for a client or an employer.

The Act requires a person to be registered to provide a professional engineering service regardless of the type of organisation in which they work, for example, sole trader, partnership, company, engineering consultancy, government department or agency or non-engineering business.

For guidance on the meaning of a prescriptive standard, direct supervision and the extraterritorial application of the Act see the “Practice Note – What is a prescriptive standard?”, the “Guidelines on direct supervision” and the “Guidelines on the extraterritorial application of the Act” at consumer.vic.gov.au/engineers.

Distinguishing professional engineering services from other services

The Act distinguishes professional engineering services from other services, including those other services that may be provided by engineers, by the specialised nature of the service. In the context of the Act, professional engineering services are a narrowly defined subset of engineering services and are characterised by the application of mathematics and scientific principles, judgement, knowledge and skill required to provide those services.

This distinction is consistent with practice in the engineering profession where different categories of practitioners, such as professional engineers and engineering technologists, provide different types of engineering services. The different focus of the services these practitioners provide gives a context to the definition of professional engineering services in the Act.

Comparison of some professional engineering services with other engineering services:

A professional engineering service includes the design, development and analysis of systems, applications and equipment relating to construction, production, operation or maintenance. A person who performs a professional engineering service for a client or an employer is responsible for applying engineering principles, data and specialist knowledge of mathematical and natural sciences to their work, consistent with the attributes and competency profile as referenced in the International Professional Engineers Agreement (Washington Accord)³.

Other engineering services includes the adoption and application of technologies or development of related technologies to create, operate, maintain and improve the systems, applications and equipment.

Other engineering services may also include carrying out the analysis of project plans, development of product designs, maintenance of equipment, closely following specifications and procedures, and writing reports.

These services do not fall within the definition of *professional engineering services* for the purposes of the Act.

While the Act requires professional engineers to be registered to provide professional engineering services, it does not require those providing other engineering services to be registered.

³ International Engineering Alliance Attributes & Professional Competencies, <https://www.ieagrements.org/assets/Uploads/Documents/IEA-Graduate-Attributes-and-Professional-Competencies-2021.1-Sept-2021.pdf>

Activities that are, and are not, professional engineering services

Examples of activities that ARE professional engineering services	Examples of activities that ARE NOT professional engineering services
<ul style="list-style-type: none">• Offering expert opinion on professional engineering services in legal proceedings• Providing documentation relating to a professional engineering design• Making alterations to an existing professional engineering design or advice	<ul style="list-style-type: none">• Engineering research that is not part of a particular project or that feeds into project development• Teaching engineering• Advocacy on engineering aspects of public and private projects• Manufacturing of products• Software development• Maintenance and repair services• The work of architects, drafts people and scientists• Scientific (not engineering) data collection and interpretation• Receiving professional engineering advice• Engineering leadership and management roles

Professional engineers and other engineers frequently work together across a range of industries and functions, including design, construction, manufacturing, and product improvement.

Some examples of these different roles and how they work together.

*In a **production** setting ...*

A professional engineer designs the tools, processes and equipment required to turn raw materials into a desired product in the most efficient and economic manner.

A technician executes the designs and specifications set by the professional engineer to implement and monitor the final production process.

*In a **maintenance** setting ...*

A professional engineer is responsible for analysing the failure mode of the component or structure requiring maintenance, assessing a range of viable maintenance pathways to address the issue, providing a risk assessment of potential hazards and designing the proposed maintenance activity, e.g. design documentation to repair and strengthen a bridge which is subject to load bearing restrictions.


A technician, technical officer or specialist contractor undertakes the repair, replacement or modification required to achieve the design parameters set by the professional engineer.

*In a **construction** setting ...*

A professional engineer is responsible for designing the building services required to achieve a specified function; services include electrical infrastructure, air handling plant and fire detection and suppression.

A project manager or site supervisor coordinates and directs the various technical specialists as they install and commission components with respect to the design set by the professional engineer.

For the purposes of the Act, professional engineering services include any service that requires engineering judgement, knowledge and skill to provide professional and fit-for-purpose engineering



services. These services may include but are not limited to:

- providing consultation, evaluation, engineering studies, design of engineering works and systems, design drawings, specifications, modelling, simulations, reviews and advice and other technical submissions
- reviewing for the purposes of informing engineering decisions for the use or modification of design or construction products such as drawings and specifications related to engineered works, and
- assessing proposed modifications that may impact the basis of design.

Professional engineering services do not include responsibility for **supervising** site conditions, equipment, personnel or safety in the workplace, however, a professional engineer may undertake these activities. Where the role of a professional engineer includes these activities, other laws and legislation set out the obligations for workplace and occupational health and safety obligations that must be met when providing professional engineering services.

Similarly, a professional engineer may have obligations under other legislation such as the *Corporations Act 2001* (Cth) which will need to be complied with during the course of providing professional engineering services.

Responsibility for deciding whether a particular engineering service is a professional engineering service lies with the person responsible for undertaking that activity.

The elements of a professional engineering service

The definition of a professional engineering service in the Act can be broken down into four elements. Each of these elements must be met for an engineering service to be a professional engineering service for the purposes of the Act.

The four elements of a professional engineering service are that the service:

- (i) is an engineering service
- (ii) requires or is based on the application of engineering principles and data
- (iii) is an engineering related design, construction, production, operation or maintenance activity, and
- (iv) is not provided only in accordance with a prescriptive standard.

These elements are described in detail below.

(i) The service is an engineering service

As the Act does not define an 'engineering service' its meaning relies on the terms engineering and service.

Drawing on its ordinary meaning 'engineering' is the art or science of practically applying knowledge of natural sciences, such as physics or chemistry, and mathematics. Similarly, the work of an engineer is to use scientific principles in the design, construction, repair or control of engines, machines, electrical equipment or structures such as roads, railways, or bridges in any of the various areas of engineering.⁴

A 'service' is commonly understood to be a particular type of help, work, activity or skills that someone can offer to others or performs for another, the supply of activities required or demanded and/or business activities that involve doing things rather than producing goods.⁵

⁴ See the definitions of 'engineering' and 'engineer' in the Macquarie Dictionary and the Cambridge Dictionary.

⁵ See the definitions of 'service' and 'services' in the Macquarie Dictionary and the Cambridge Dictionary.



Therefore, for the purposes of the Act an engineering service is an activity or work that:

- is performed for, or a skill provided to, another person
- requires, or is based on, the application of engineering principles, and data (see (ii) below), and
- is 'engineering' because it is typically performed by an engineer and comprises or applies to the design, construction, repair or control of engines, machines, electrical equipment, roads, railways, bridges or otherwise to one of the five prescribed areas of engineering.

Where an engineering service is a professional engineering service, the person providing the service must be registered because the service, activity or work, is provided to another person, that is a client or employer. Although this means that a person is not required to be registered to provide professional engineering services to themselves, they will need to be registered to provide professional engineering services internally within an organisation as an employee to an employer, including where the organisation is the owner of the property or assets concerned.

(ii) The service requires, or is based on the application of engineering principles and data

A professional engineering service under the Act is a service that either:

- 'requires' the application of engineering principles and data – this means that the description of the service is such that it must involve the application of engineering principles and data to meet that description, or
- 'is based' on the application of engineering principles and data – this means that the application of engineering principles and data are the basis on which the service is provided.

Engineering principles are the ideas, judgements, rules, or concepts used to solve an engineering problem and that are required to design, develop and analyse systems, applications and equipment. As engineering is concerned with design, construction, production, operation and maintenance, the principles are based on applied science, such as physics and chemistry, and involve advanced scientifically based calculations.

Advanced scientifically based calculations include the science and mathematics calculations that are required for real world engineering applications and include:

- modelling – translating given physical or other information and data into mathematical form, into a mathematical model (a system of equations including differential equations or some other algebraic expression)
- solving – obtaining the solution by selecting and applying suitable mathematical methods and/or models (including computational), and in most cases doing computational analysis on a computer, and
- interpreting – understanding the meaning and the implications of the mathematical solution for the original problem in terms of physics – or wherever the problem comes from.

Engineering data is the data used in the application of engineering principles and includes, for example, design drawings, manufacturer's specifications, standards, application of standards and codes and other information used to design and build end-products. The use of engineering data may require calculations to be made, and where this is the case, the outcomes of those calculations should be interpreted in the context of the particular system, application or equipment concerned.

Therefore, to be a professional engineering service, a service must require or be based on the application of specialist knowledge of applied science and mathematical principles and the interpretation of engineering data. The purpose is to facilitate the design, construction, production, operation or maintenance activity relating to engineering including but not limited to structures, engines, machines, electrical equipment, roads, railways, bridges, systems and processes in one of the areas of engineering listed in the Act.

(iii) The service is an engineering related design, construction, production, operation or maintenance activity

The engineering activities which the Act captures under the definition of a professional engineering service are limited to design, construction, production, operation and maintenance.

- Engineering design is an iterative process informed by the application of engineering principles and data in order to devise a component, process or system to meet desired needs or a stated objective.
- Engineering construction and production are the respective processes of designing structures or components, reviewing designs and co-ordinating construction (including testing, commissioning, where applicable) and production consistent with the agreed design/s.
- Engineering operation and maintenance involves designing or modifying systems and developing advice to ensure the ongoing operation and standard of performance of devices, equipment, machinery, structures and infrastructure, and decommissioning.

If any one of these activities is present, and it is an engineering service as described in (i) and it is a service that requires or is based on the application of engineering principles and data as described in (ii), the service is a professional engineering service for the purposes of the Act.

(iv) The service is not provided only in accordance with a prescriptive standard

Where an engineering service has met each of the three elements above, it is not a professional engineering service for the purposes of the Act if it is “provided only in accordance with a prescriptive standard”.

A prescriptive standard is defined in section 3(1) of the Act as “a document that states procedures or criteria –

- (a) for carrying out a design, or a construction or production activity, relating to engineering; and
- (b) the application of which, to the carrying out of the design, or the construction or production activity, does not require advanced scientifically based calculations;”.


For a description of the criteria for determining whether a document is a prescriptive standard see the “Practice Note – What is a prescriptive standard?” on consumer.vic.gov.au/engineers.

Certification

The Act does not require a registered practising professional engineer to ‘sign off’ or ‘certify’ a professional engineering service. However, a registered practising professional engineer may be required to provide certification by:

- a term in a contract with a client
- an internal organisational requirement or quality assurance requirement, for example, ISO 9001:2015, or
- a requirement in other legislation, for example:
 - certification by an endorsed building engineer may be required under section 238 of the *Building Act 1993* if requested by a registered building surveyor, or
 - verification required under section 27 of the *Occupational Health and Safety Act 2004* for the design of plant.⁶

⁶ Under section 5 of the *Occupational Health and Safety Act 2004* plant includes—(a) any machinery, equipment, appliance, implement and tool; and (b) any component of any of those things; and (c) anything fitted, connected or related to any of those things.



Where clients, third parties or other legislation require a professional engineering service to be certified, this must be done by a registered practising professional engineer. If several areas of engineering are involved in the service, more than one registered practising professional engineer may be involved in providing certification across those areas of engineering.

A registered practising professional engineer certifying a professional engineering service must:

- undertake appropriate investigations to be satisfied that the overall service meets appropriate standards, and
- take responsibility for the professional engineering service being certified.

To do this they:

- may rely on work performed by other registered practising professional engineers who practise in the relevant area/s of engineering, and
- must be able to identify all the registered practising professional engineers who they have relied on to provide the certification.

In addition, where the certification is required by other legislation, a registered professional engineer must comply with the requirements for certification set out in that legislation.

Checklist for determining professional engineering services

It is a professional engineering service if it:

- involves performing an activity such as giving engineering advice or assistance, and/or undertaking work regardless of whether sign-off or certification is required, and
- is an activity or work that is typically performed by a professional engineer and is related to one of the five areas of engineering listed in the Act, and
- is based on or requires the application of engineering principles and data to the development or analysis of a design, construction, production, operation or maintenance activity, and
- is not provided only in accordance with a prescriptive standard.