

## Guidelines on areas of engineering

### Purpose

These Guidelines describe the areas of engineering listed in the *Professional Engineers Registration Act 2019* (the Act) as a guide to professional engineers on whether, and in which area/s of engineering, they are required to be registered to provide professional engineering services.

### What the Act requires

Section 4 of the Act lists the areas of engineering where a professional engineer must be registered with the Business Licensing Authority (BLA) to provide professional engineering services in or for Victoria. These areas are:

- civil engineering
- structural engineering
- mechanical engineering
- electrical engineering, and
- fire safety engineering.

In addition to being registered in an area/s of engineering, a professional engineer who wishes to provide professional engineering services in the building industry must be endorsed to do so with the BLA. The building industry encompasses work for or in connection with the construction, demolition or removal of all types of buildings. Buildings include all classes of buildings under the National Construction Code, structures, temporary buildings, temporary structures and any part of a building or structure<sup>1</sup>.

Professional engineers working in the building industry play a key role in maintaining and improving the standard of buildings, advising on the design of buildings, and ensuring compliance with the regulatory requirements and standards.

The areas of engineering listed in the Act are described below.

The descriptions are not intended to be comprehensive and exhaustive but to provide a guide to professional engineers about what is covered in an area of engineering for the purposes of the Act. It is the responsibility of a professional engineer to apply the descriptions to the professional engineering services they intend to undertake to determine whether, and in which area/s of engineering, they need to be registered with the BLA to perform those services.

Two areas of engineering not listed in section 4 the Act are chemical or process engineering and software engineering. Therefore, registration and endorsement are not required to provide professional engineering services in these areas of engineering. However, the Act allows for additional areas of engineering to be identified for the purposes of registration over time. Any additional areas of engineering will be listed or prescribed in the regulations made under the Act.

---

<sup>1</sup> The description of the building industry is based on the definitions of 'building work' and 'building' in section 3(1) of the *Building Act 1993*.



## Civil engineering

Civil engineering involves the research, design, construction, and maintenance of the natural and built environment. As a guide, this may include:

- structures (including those made from steel, concrete or timber), for example, roads, railways, bridges, airports, pipelines, dams, canals, harbours, dockyards, towers and buildings
- analysing the likely behaviour of soil and rock when placed under pressure and designing above and below ground natural or built structures or foundations
- environmental impacts, for example, transport, urban development and municipal services, resource protection of building and construction of other infrastructure and service industries, and
- hydraulic supply and waste systems.

Civil engineering has many different areas of focus or speciality areas. As a guide, some of the main areas of focus are:

- structural engineering
- geotechnical engineering, and
- hydrology engineering.

Professional engineers providing professional engineering services in any of the above or main areas of focus must be registered in the area of civil engineering.

A civil engineer who intends to work in the building industry must:

- be registered as a professional engineer in the area of civil engineering, and
- have their registration endorsed to work in the building industry in the area of civil engineering.

Civil engineers working in the building industry can work with foundations and footings systems, construction materials and structural systems, and hydraulic supply and waste systems.

## Structural engineering

Structural engineering is an area of focus of civil engineering.

It primarily deals with the research, design, construction, monitoring, maintenance, rehabilitation and demolition of permanent and temporary structures. Structures include, for example, buildings, bridges, in-ground structures, footings, large tanks, silos, mining structures and various plants, and frameworks and space frames.

A structural engineer who intends to work in the building industry must:


- be registered as a professional engineer in the area of structural engineering, and
- have their registration endorsed to work in the building industry in the area of structural engineering.

As with civil engineers, structural engineers working in the building industry can work with foundations and footings systems, construction materials and structural systems.

Note: As structural engineering is an area of focus of civil engineering, to work in the building industry a professional engineer must be either registered and endorsed as a civil engineer or registered and endorsed as a structural engineer.

## Mechanical engineering

Mechanical engineering is concerned with the research, design, construction, analysis, manufacture and maintenance of devices, machines and mechanical structures and systems that may include mechanical



equipment, cranes, weigh bridges, lifts, conveyors, air conditioning plants, production plants, ventilation systems, lathes, hoppers, pipelines, wind turbines and manufacturing systems.

It also involves the production and usage of heat and mechanical power for the design, production, and operation of systems, machines and tools.

Mechanical engineering has many different areas of focus. As a guide, some of the main areas of focus are:

- acoustic engineering
- aerospace and aeronautical engineering
- equipment engineering (including automotive and manufacturing)
- piping engineering, and
- structural analysis engineering.

Professional engineers providing professional engineering services in any of the above or main areas of focus must be registered in the area of mechanical engineering.

A mechanical engineer who intends to work in the building industry must:

- be registered as a professional engineer in the area of mechanical engineering, and
- have their registration endorsed to work in the building industry in the area of mechanical engineering.

Mechanical engineers working in the building industry can work with mechanical systems for vertical transport, heating ventilation, air conditioning and refrigeration (HVAC-R) and smoke control, thermal and environmental systems and systems to aid the disabled.

## Electrical engineering

Electrical engineering is concerned with the design, application, manufacture and maintenance of equipment, devices, plant and systems which use electricity, electronics, and electromagnetism. These activities can apply to electricity generation, transmission, distribution, electrical installations in buildings and on industrial sites, electrical equipment manufacture, instrumentation and control system applications in industry, communications networks, electronic plan and equipment, and also the integration and control of computer systems.

Electrical engineering has many different areas of focus. As a guide, some of the main areas of focus are:

- power engineering
- control engineering
- electronics engineering, and
- telecommunications engineering (such as signal processing, signalling and communications and radiofrequency engineering).

Professional engineers providing professional engineering services in any of the above or main areas of focus must be registered in the area of electrical engineering.

An electrical engineer who intends to work in the building industry must:

- be registered as a professional engineer in the area of electrical engineering, and
- have their registration endorsed to work in the building industry in the area of electrical engineering.

Electrical engineers working in the building industry can work with electronic data transmission, security and communications systems, lighting systems and control systems for vertical transport, HVAC-R and fire detection.

## Fire safety engineering

Fire safety engineering in the context of the Act relates mainly to the building industry. It involves the application of scientific and engineering principles, rules and expert judgement based on an appreciation of the fire phenomenon, the effects of fire and the reaction and behaviour of people and materials to:

- save life, protect property and preserve the environment and heritage from destructive fire
- assess the hazards and risk of fire and its effects
- mitigate fire damage by proper design, construction, arrangement and use of buildings, materials, structures, industrial processes and transportation systems, and
- evaluate analytically the optimum protective and preventive measures, including high-level fire safety design and strategies, necessary to limit, within prescribed levels, the consequences of fire.

Fire safety engineers working in the building industry develop holistic fire safety strategies and an integrated fire safety design which identify all the fire safety measures required to meet the fire safety related performance requirements of the National Construction Code to save life, protect property and preserve the built environment from destructive fire, through proper design, construction arrangements and use of building materials.

Fire safety engineering is multidisciplinary in nature, having substantial relationships with building services, mechanical, electrical, electronics, chemical, structural and civil engineering and embraces an understanding of human behaviour. However, a fire safety engineer who provides professional engineering services that span multidisciplinary areas is only required to be registered in the area of fire safety engineering.

A fire safety engineer who intends to work in the building industry must:

- registered as a professional engineer in the area of fire safety engineering, and
- endorsed to work in the building industry in the area of fire safety engineering.

## Crossover areas of focus

Several areas of focus span two or more of the areas of engineering listed in section 4 of the Act. For these focus areas the nature of the professional engineering services being provided will determine the area/s of engineering in which a professional engineer must be registered.

---

Environmental engineering	Civil engineering and chemical engineering <ul style="list-style-type: none"><li>• Civil engineering where activities may relate to the design of physical infrastructure such as, roads, bridges, sewerage, water and wastewater treatment infrastructure, to support sustainable buildings and precincts.</li><li>• Chemical engineering where activities may relate to process systems designed for sewerage, water and wastewater treatment.</li></ul> <p><b>Registration requirements</b> – An environmental engineer must be registered in the area of <b>civil engineering</b> to provide professional engineering services in that area but is not required to be registered to provide professional engineering services in chemical engineering.</p>
Biomedical engineering	Electrical engineering and mechanical engineering <ul style="list-style-type: none"><li>• Electrical engineering where activities may relate to the design, construction and development of health and monitoring devices or computers and diagnostic systems.</li><li>• Mechanical engineering where activities may relate to the development of medical devices such as exoskeletons, prosthetics, and orthotics.</li></ul>

---



---

**Registration requirements** – A biomedical engineer must be registered:

- in the area of **electrical engineering** if the professional engineering services they provide are exclusive to that area of engineering, or
- in the area of **mechanical engineering** if the professional engineering services they provide are exclusive to that area of engineering, or
- in the areas of **both electrical and mechanical engineering** if the professional engineering services they provide span both of these areas of engineering.

There are several areas of biomedical engineering that are often conducted by scientists. Registration is not required for these areas.

---

Materials engineering

Civil engineering, electrical engineering, mechanical engineering and chemical engineering

- Civil engineering where activities may relate to advice on the performance of materials in structures and their ability to resist various stresses.
- Electrical engineering where activities may relate to the specification of conductors, semiconductors, insulators and magnetic materials.
- Mechanical engineering where activities may relate to the selection, processing and development of materials to design and make machines and structures.
- Chemical engineering where activities may relate to the chemical properties of engineering materials, including chemical composition, chemical bonding, corrosion resistance and acidity or alkalinity.

**Registration requirements** – A materials engineer must be registered:

- in the area of **civil engineering** if the professional engineering services they provide are exclusive to that area of engineering, or
- in the area of **electrical engineering** if the professional engineering services they provide are exclusive to that area of engineering, or
- in the area of **mechanical engineering** if the professional engineering services they provide are exclusive to that area of engineering, or
- in a **combination of the areas of civil, electrical and mechanical engineering** depending on the areas of engineering in which they provide professional engineering services.

A materials engineer is not required to be registered to provide professional engineering services in the area of chemical engineering.

---