

Career Profile: Engineer



As an Engineer you have the opportunity to create profound changes and innovative improvements in society across a range of diverse and interesting careers. The work of engineers can be seen everywhere in the world around us and impacts and improves the way we live, work, travel and communicate and as new technologies emerge the demand for engineering professionals increases. Engineering encompasses technology, maths and science and may involve designing, planning, building and overseeing large scale projects within the civil, residential, commercial and resource sectors.

Types of engineering

The major branches of engineering include civil, mechanical, chemical, and electrical, and under each branch there are hundreds of different subcategories.

Skills and personal qualities

- ▶ Critical thinking, analytical skills and excellent problem solving
- ▶ Strong communication and interpersonal skills
- ▶ Natural curiosity, willingness to learn and have a creative mind
- ▶ Methodical and pay close attention to detail
- ▶ Excellent literacy and numeracy skills
- ▶ Excellent technical knowledge with an interest in new technologies and trends
- ▶ Be safety conscious with a mature responsible approach to your work and colleagues
- ▶ Be a team player and be able to work unsupervised

How to get started

To become a qualified engineer, you can complete Year 12 to enable entry into a degree in Engineering. Contact individual University Engineering schools to check if they have any pre-requisites before selecting your Year 11 subjects before applying to a program. Your school careers advisor can help you with information on how to enrol at university.

It is important to know many construction engineers in Western Australia choose to complete an apprenticeship first, so they can identify exactly which field they would like to specialise in while earning an income along the way.

Engineering Careers in Construction

▶ Civil Engineer

Much of the physical infrastructure of our modern society is provided by civil engineers. With a growing population in Western Australia, there is a need for more and more civil infrastructure. There will always be a need for qualified Civil Engineers to work on the design, planning and management of large construction projects through planning, designing, constructing, operating and maintaining things like roads, bridges, dams, pipelines, sewerage systems, transportation, harbours, dockyard facilities, airports, railways, factories, towers and large buildings. Specialisations may include Structural Engineer, Materials and Testing Engineer, Highway Engineer, Airport Engineer, Geotechnical / Soil Engineer, Water Resources Engineer and Harbour Engineer.

▶ Civil Site Engineer

Site Engineers direct and oversee the on-site flow of work, materials and equipment on civil engineering projects. They coordinate and direct the on-site activities of construction projects including roads, bridges, dams, pipelines, airports and other structures, and gas, water and sewer systems. They are skilled in engineering project management, cost estimation and interpreting complex plans and specifications and employed by government departments, engineering consultancies, construction contractors and mining companies.

▶ Highway Engineer

Roads play a vital part in the function of almost every society and efficient road systems are needed to transport everything from food for supermarket shelves, ore from mine sites, agricultural goods from farms, and people to and from work and leisure activities.

Highway engineers plan, design and maintain safe, efficient roads, highways and public transit systems. They specialise in analysing population and growth statistics, traffic patterns and volume to project future requirements. Highway engineers work closely with government officials and other specialists to help design efficient and safe traffic systems. Highway engineers also study roadway and embankment design, the geometry of highway interchanges and the maintenance of facilities such as culverts and overpasses.

▶ Irrigation/Drainage Engineer

Irrigation/drainage engineers use tests and measurement tools to ascertain soil characteristics – such as soil type, salinity, water table level, plant growth, surface profile – to calculate or estimate rates of water flow and other factors that may influence the methods and types of drainage required to support structures to be built on particular sites. They report on findings, design and supervise the preparation of plans showing channels, conduits, mains and ditches. Irrigation and drainage engineers may divide their time between office work, building sites and laboratories, creating and studying models to analyse construction and flow issues.

▶ Geotechnical/ Soil Engineer

Geotechnical/soil engineers investigate the soil and bedrock below proposed building sites to determine their engineering properties and how they will interact with the planned construction. They determine and design the type of foundations, earthworks and pavements required to withstand the pressures resulting from the man-made structures to be built. They design foundations for such structures as high-rise buildings, bridges and medium to large commercial buildings and may also work on smaller structures where soil conditions present challenges. They design structures to be built in soil or rock, including tunnels, embankments, earth dams, channels, reservoirs, and hazardous waste landfills.

Next Steps

Further information can be found at:

- ▶ Jobs and Skills WA – www.jobsandskills.wa.gov.au
- ▶ The Good Universities Guide – www.gooduniversitiesguide.com.au
- ▶ Job Outlook – www.joboutlook.gov.au
- ▶ Engineers Australia – www.engineersaustralia.org.au/

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► Structural Engineer

Structural Engineers design and supervise the construction of all types of structures including framework for buildings, towers, bridges, tunnels and other structures to ensure strength and rigidity. Factors which must be considered include tolerable stress within given safety margins, vibration allowances, size, shape, appearance and economy. They also study developments of new materials and methods and their impact on design and construction. Specialisations include Building Information Modelling (BIM) Coordinator / Manager and BIM Specialist.

► Mechanical Engineer

Mechanical engineers oversee all aspects of the design, development, installation, operation and maintenance of machinery. They are involved in a wide range of building and construction industry sectors including power generation and refrigeration and air-conditioning. They may specialise in areas such as engineering design, production, and plant maintenance, and frequently work closely with other professionals, pooling expertise on particular projects, e.g. with architects in designing air-conditioning plants.

► Electrical Engineer

The handiwork of electrical engineers is evident in the lighting and wiring design of buildings all the way through to the giant

systems that generate and distribute power for entire cities.

Electrical engineers design ways to generate, distribute and manage electricity for projects such as power stations, commercial and residential buildings, factories and even the street lights for your suburb. They write reports and instruction manuals for the installation of new electricity systems and equipment as well as oversee the testing and fault corrections of new electricity systems.

Electrical Engineering Associates (Electrical Engineering Technicians) are involved in the planning, design, selection, installation, commissioning and maintenance of electrical equipment, facilities, power-plant installations, parts and distribution systems. They usually work on a range of duties that lie between the trade and technologist levels. Specialisations include Electrical Engineering Design Drafters, Test Officers and Power Systems Controllers.

► Environmental Engineer

Environmental engineers assess and manage the effects of human and other activity on the natural and built environment. They apply their engineering knowledge and skills to such things as environmental impact assessment, natural resources management and pollution control. In the construction industry, they investigate and find solutions to the impact of construction materials and projects as they relate to drainage into oceans, rivers and wetlands; airborne emissions and noise issues. As community expectations lead to more stringent legislation, more environmental engineers will be employed within the construction industry. Currently many positions are filled by civil, chemical, and mechanical engineers who have undertaken extra, specialist studies.

► Railway Engineer

Railway Engineers study design proposals and advise on the construction, maintenance and repair of railway systems including tracks, terminals, tunnels and train stations. They study the natural features of proposed routes and plan the types of rail beds, rail size and curves to meet train speed and load requirements.



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