CITB ANALYSIS AND FORECASTING

# Construction Skills Network

## CSN Explained

**5-year Outlook**
2021-2025

# Contents

This table provides further details and clarification of some of the points covered in the report.


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| **Page 8** | **Definitions** | Explains the sector definitions used within the report and provides examples of what is covered in each. |
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# CSN methodology

The Construction Skills Network has been evolving since its conception in 2005, acting as a vehicle for CITB and CITB Northern Ireland to collect and produce information on the future workforce and training needs of the industry.

**The CSN functions at both a national and regional level. It comprises a National Group, 12 Observatory groups, a forecasting model for each of the regions and countries, and a Technical Reference Group.**

CITB looks to share thoughts on CSN models with stakeholders throughout the year and this includes industry, Government, education and sector bodies, all of whom contribute their local industry knowledge and views on training, skills, recruitment, qualifications and policy. The National Group also includes representatives from industry, Government, education and other SSCs and Sector Bodies.

At the heart of the CSN are several models that generate forecasts of workforce requirements within the industry for a range of occupational groups. The models are designed and managed by Experian under the independent guidance and validation of the Technical Reference Group, which is comprised of statisticians and modelling experts.

The models have evolved over time and will continue to do so, to ensure that they account for new research as it is published as well as new and improved modelling techniques.

Future changes to the model will only be made after consultation with the Technical Reference Group.

# The model approach

The model approach relies on a combination of primary research and views from the CSN to facilitate it. National data is used as the basis for the assumptions that augment the models, which are then adjusted with the assistance of the Observatories and National Group.

**Each English region, Wales, Scotland and Northern Ireland has a separate model (although all models are interrelated due to labour movements).**

In addition, there is one national model that acts as a constraint to the individual models and enables best use to be made of the most robust data (which is available at the national level).

## The models work by forecasting demand and supply of skilled workers separately.

The difference between demand and supply forms the recruitment requirement. The forecast total workforce levels are derived from expectations about construction output and productivity. Essentially, this is based upon the question 'How many people will be needed to produce forecast output, given the assumptions made about productivity?'

The annual recruitment requirement (ARR) is a gross requirement that takes into account workforce flows into and out of construction, due to such factors as movements between industries, migration, sickness and retirement. The ARR values show where extra recruitment is needed to meet forecasted demand; it is over and above existing flows that are occurring.

Estimates of demand are based upon the results of discussion groups comprising industry experts, a view of construction output, and integrated models relating to wider national and regional economic performance. The models are dynamic and reflect the general UK economic climate at any point in time. To generate the labour demand, the models use a set of specific statistics for each major type of work to determine the workforce, by trade, needed to produce the predicted levels of construction output. The labour supply for each type of trade or profession is based upon the previous year's supply (the total stock of the workforce) combined with flows into and out of the labour market.

**The key leakages (outflows) that need to be considered are:**

- Transfers to other industries
- International/domestic out migration
- Permanent retirements (including permanent sickness)
- Outflow to temporary sickness and home duties.

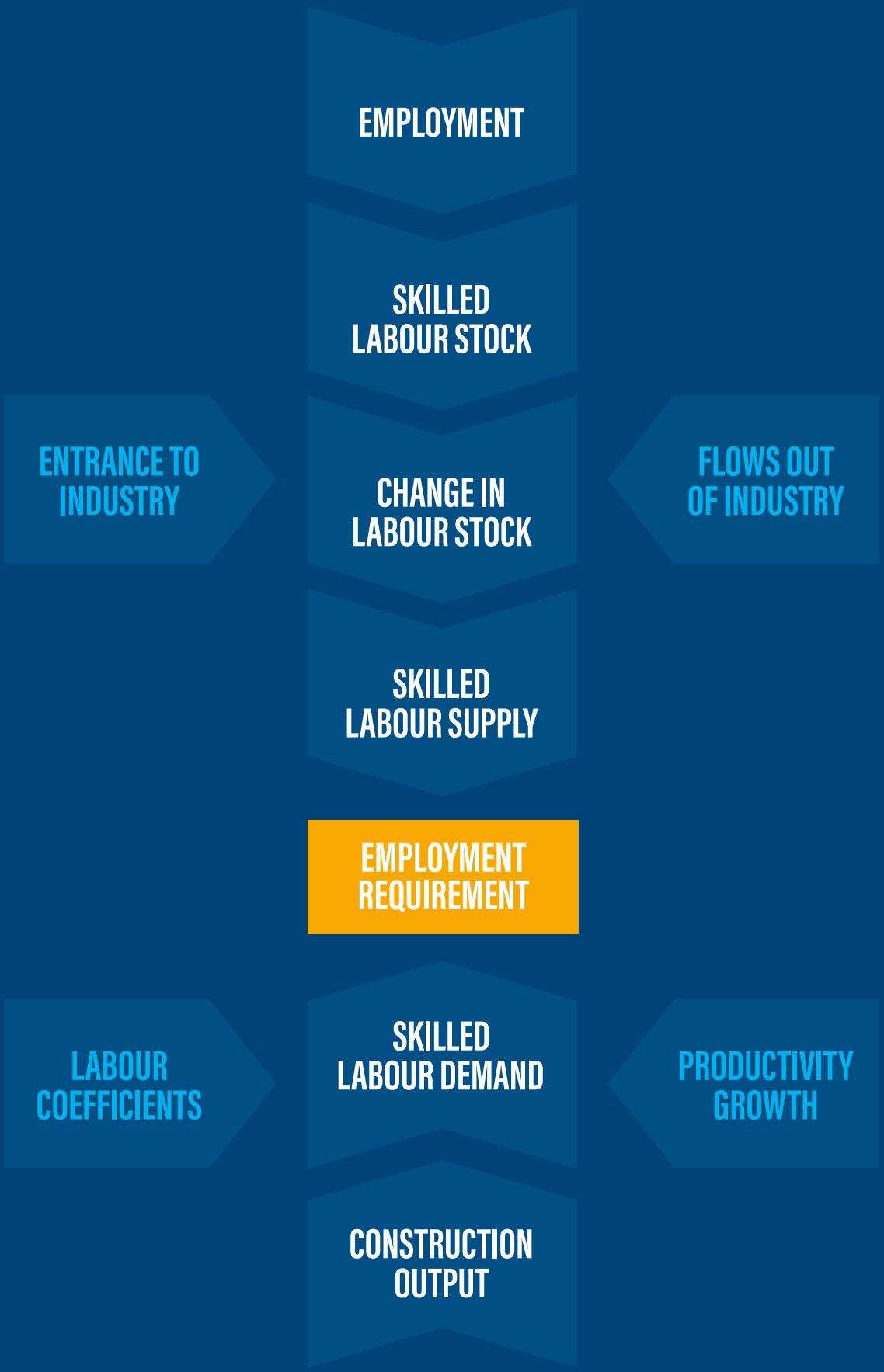
The main reason for outflow is likely to be transfer to other industries.

**Flows into the labour market include:**

- Transfers from other industries
- International/domestic immigration
- Inflow from temporary sickness and home duties.

The most significant inflow is likely to be from other industries. A summary of the model is shown in the graphic on the following page.

# Workforce models



# Glossary of terms

| | |
|---|---|
| **Building envelope specialists** | Any trade involved with the external cladding of a building other than bricklaying, for example, curtain walling. |
| **Coefficients** | To generate the labour demand, the model makes use of a set of specific statistics for each major type of work, to determine workforce by trade or profession, based upon the previous year's supply. In essence, this is the number of workers of each occupation or trade needed to produce £1m of output across each sub-sector. |
| **Demand** | This is calculated using construction output data from the Office for National Statistics (ONS) and the Department of Finance and Personnel Northern Ireland (DFP), along with vacancy data from the National Employer Skills Survey, produced by the Department for Education and Skills. These data sets are translated into labour requirements by trade using a series of coefficients to produce figures for labour demand that relate to forecast output levels. |
| **GDP (gross domestic product)** | Total market value of all final goods and services produced. A measure of national income. GDP = GVA plus taxes on products minus subsidies on products. |
| **GVA (gross value added)** | Total output minus the value of inputs used in the production process. GVA measures the contribution of the economy as a difference between gross output and intermediate outputs. |
| **LFS (Labour Force Survey)** | A UK household sample survey that collects information on employment, unemployment, flows between sectors and training. Information is collected from around 53,000 households each quarter (the sample totals more than 100,000 people). |
| **LMI (labour market intelligence)** | Data that is quantitative (numerical) or qualitative (insights and perceptions) on workers, employers, wages, conditions of work, etc. |
| **Macroeconomics** | The study of an economy at a national level, including total employment, investment, imports, exports, production and consumption. |
| **Nec** | Not elsewhere classified, used as a reference in LFS data. |
| **ONS (Office for National Statistics)** | Organisation producing official statistics on the economy, population and society at both a national and local level. |
| **Output** | Total value of all goods and services produced in an economy. |
| **Productivity** | Output per employee. SIC codes (Standard Industrial Classification codes) – from the United Kingdom Standard Industrial Classification of Economic Activities produced by the ONS. |
| **SOC codes (Standard Occupational Classification codes)** | From the United Kingdom Standard Occupational Classification produced by the ONS. |
| **Supply** | The total stock of the workforce in a period of time, plus the flows into and out of the labour market. Supply is usually calculated from LFS data. |

# Notes

**01** Except for Northern Ireland, output data for the English regions, Scotland and Wales is supplied by the Office for National Statistics (ONS) on a current price basis. Thus, national deflators produced by the ONS have been used to deflate prices to a constant price basis, so that the effects of inflation have been stripped out.

**02** The annual average growth rate of output is a compound average growth rate, i.e. the rate at which output would grow each year if it increased steadily over the forecast period.

**03** Only selected components of gross value added (GVA) are shown in this table and so do not sum to the total.

**04** For new construction orders, comparison is made with Great Britain rather than the UK, owing to the fact that there are no orders data series for Northern Ireland.

**05** Workforce figures are rounded to the nearest 100.

**06** The tables include data relating to plumbers and electricians. As part of SIC 43, plumbers and electricians working in contracting are an integral part of the construction process.

**07** A reporting minimum of 50 is used for the annual recruitment requirement (ARR). As a result some region and devolved nation ARR forecasts do not sum to the total UK requirement.

**08** ARR figures are rounded to the nearest 50.

**09** The workforce and ARR tables show separate totals for SIC41–43 and SIC41–43, 71.1 and 74.9. The total for SIC41–43 covers the first 24 occupational groups on the relevant tables and excludes civil engineers, other construction professionals and technical staff, architects and surveyors. The total for SIC41–43, 71.1 and 74.9 includes all occupations.

## Footprints for the Built Environment Sector

CITB and CITB Northern Ireland are responsible for SIC 41 Construction of buildings, SIC 42 Civil engineering, SIC 43 Specialised construction activities and SIC 71.1 Architectural and engineering activities and related technical consultancy.

The table summarises the SIC codes (2007) covered by CITB and CITB Northern Ireland.

| SIC code | Description |
|---|---|
| 41.1 | Development of building projects |
| 41.2 | Construction of housing and non-housing buildings |
| 42.1 | Construction of roads and railways |
| 42.2 | Construction of utility projects |
| 42.9 | Construction of other civil engineering projects |
| 43.1 | Demolition and site preparation |
| 43.3 | Building completion and finishing |
| 43.9 | Other specialised construction activities nec |
| 71.1 | Architectural and engineering activities and related technical consultancy |

# Definitions

## Types and examples of construction work examples

**Public sector housing**

Local authorities and housing associations, new towns and government departments Housing schemes, care homes for the elderly and the provision within housing sites of roads and services for gas, water, electricity, sewage and drainage.

**Private sector housing**

All privately owned buildings for residential use, such as houses, flats and maisonettes, bungalows, cottages and the provision of services to new developments.

**Infrastructure – public and private**

**Water**
Water Reservoirs, purification plants, dams, water works, pumping stations, water mains, hydraulic works etc.

**Sewerage**
Sewage disposal works, laying of sewers and surface drains.

**Electricity**
Building and civil engineering work for electrical undertakings, such as power stations, dams and other works on hydroelectric schemes, onshore wind farms and decommissioning of nuclear power stations.

**Gas, communications, air transport**
Gas works, gas mains and gas storage; post offices, sorting offices, telephone exchanges, switching centres etc., air terminals, runways, hangars, reception halls, radar installations.

**Railways**
Permanent way, tunnels, bridges, cuttings, stations, engine sheds etc., signalling and other control systems and electrification of both surface and underground railways.

**Harbours**
All works and buildings directly connected with harbours, wharves, docks, piers, jetties, canals and waterways, sea walls, embankments and water defences.

**Roads**
Roads, pavements, bridges, footpaths, lighting, tunnels, flyovers, fencing etc.

**Public non-housing construction**[1]

**Factories and warehouses**
Publicly owned factories, warehouses, skill centres.

**Oil, steel, coal**
Now restricted to remedial works for public sector residual bodies.

**Schools, colleges and universities**
State schools and colleges (including technical colleges and institutes of agriculture); universities including halls of residence, research establishments etc.

**Health**
Hospitals including medical schools, clinics, welfare centres, adult training centres.

**Offices**
Local and central Government offices, including town halls, offices for all public bodies except the armed services, police headquarters.

**Entertainment**
Theatres, restaurants, public swimming baths, caravan sites at holiday resorts, works and buildings at sports grounds, stadiums, racecourses etc. owned by local authorities or other public bodies.

**Garages**
Buildings for storage, repair and maintenance of road vehicles, transport workshops, bus depots, road goods transport depots and car parks.

**Shops**
Municipal shopping developments for which the contract has been let by a Local Authority.

**Agriculture**
Buildings and work on publicly financed horticultural establishments; fen drainage and agricultural drainage, veterinary clinics.

**Miscellaneous**
All work not clearly covered by any other headings, such as fire stations, police stations, prisons, reformatories, remand homes, civil defence work, UK Atomic Energy.

Authority work, council depots, museums, libraries.

**Private industrial work**

Factories, warehouses, wholesale depots, all other works and buildings for the purpose of industrial production or processing, oil refineries, pipelines and terminals, concrete fixed leg oil production platforms (not rigs), private steel work, all new coal mine construction such as sinking shafts, tunnelling, etc.

# Definitions

## Private commercial work[1]

### Schools and universities
Schools and colleges in the private sector, financed wholly from private funds.

### Health
Private hospitals, nursing homes, clinics.

### Offices
Office buildings, banks.

### Entertainment
Privately owned theatres, concert halls, cinemas, hotels, public houses, restaurants, cafés, holiday camps, swimming pools, works and buildings at sports grounds, stadiums and other places of sport or recreation, youth hostels.

### Garages
Repair garages, petrol filling stations, bus depots, goods transport depots and any other works or buildings for the storage, repair or maintenance of road vehicles, car parks.

### Shops
All buildings for retail distribution such as shops, department stores, retail markets, showrooms, etc.

### Agriculture
All buildings and work on farms, horticultural establishments.

### Miscellaneous
All work not clearly covered by any other heading, for example, exhibitions, caravan sites, churches, church halls.

## New work

### New housing
Construction of new houses, flats, bungalows only.

### All other types of work
All new construction work and all work that can be referred to as improvement, renovation or refurbishment and which adds to the value of the property.[2]

## Repair and maintenance

### Housing
Any conversion of, or extension to any existing dwelling and all other work such as improvement, renovation, refurbishment, planned maintenance and any other type of expenditure on repairs or maintenance.

### All other sectors
Repair and maintenance work of all types, including planned and contractual maintenance.[3]

[1] Where contracts for the construction or improvement of non-housing buildings used for public service provision, such as hospitals, are awarded by private sector holders of contracts awarded under the Private Finance Initiative, the work is classified as 'private commercial.'

[2] Contractors reporting work may not always be aware of the distinction between improvement or renovation work and repair and maintenance work in the non-housing sectors.

[3] Except where stated, mixed development schemes are classified to whichever sector provides the largest share of finance.

# Occupational groups

## Types and examples of construction work examples:

| Occupational group<br>Description, SOC (2010) reference. | |
|---|---|
| **Senior, executive, and business process managers** | |
| Chief executives and senior officials | 1115 |
| Financial managers and directors | 1131 |
| Marketing and sales directors | 1132 |
| Purchasing managers and directors | 1133 |
| Human resource managers and directors | 1135 |
| Property, housing and estate managers | 1251 |
| Information technology and telecommunications directors | 1136 |
| Research and development managers | 2150 |
| Managers and directors in storage and warehousing | 1162 |
| Managers and proprietors in other services nec* | 1259 |
| Functional managers and directors nec* | 1139 |
| IT specialist managers | 2133 |
| IT project and programme managers | 2134 |
| Financial accounts managers | 3538 |
| Sales accounts and business development managers | 3545 |
| **Construction project managers** | |
| Construction project managers and related professionals | 2436 |
| **Other construction process managers** | |
| Production managers and directors in manufacturing | 1121 |
| Production managers and directors in construction | 1122 |
| Managers and directors in transport and distribution | 1161 |
| Waste disposal and environmental services managers | 1255 |
| Health and safety officers | 3567 |
| Conservation and environmental associate professionals | 3550 |
| **Non-construction professional, technical, IT, and other office-based staff (excl. managers)** | |
| IT operations technicians | 3131 |
| IT user support technicians | 3132 |
| Finance and investment analysts and advisers | 3534 |
| Taxation experts | 3535 |
| Financial and accounting technicians | 3537 |
| Vocational and industrial trainers and instructors, | 3563 |
| Business and related associate professionals nec* | 3539 |
| Legal associate professionals | 3520 |
| Inspectors of standards and regulations | 3565 |
| Programmers and software development professionals | 2136 |
| IT and telecommunications professionals nec* | 2139 |
| Estate agents and auctioneers | 3544 |
| Solicitors | 2413 |
| Legal professionals nec* | 2419 |
| Chartered and certified accountants | 2421 |
| Business and financial project management professionals | 2424 |
| Management consultants and business analysts | 2423 |
| Receptionists | 4216 |
| Typists and related keyboard occupations | 4217 |
| Business sales executives | 3542 |
| Bookkeepers, payroll managers and wages clerks | 4122 |
| Records clerks and assistants | 4131 |
| Stock control clerks and assistants | 4133 |
| Telephonists | 7213 |
| Communication operators | 7214 |
| Personal assistants and other secretaries | 4215 |
| Sales and retail assistants | 7111 |
| Telephone salespersons | 7113 |
| Buyers and procurement officers | 3541 |
| Human resources and industrial relations officers | 3562 |
| Credit controllers | 4121 |
| Company secretaries | 4214 |
| Sales related occupations nec* | 7129 |
| Call and contact centre occupations | 7211 |
| Customer service occupations nec* | 7219 |
| Elementary administration occupations nec* | 9219 |
| Chemical scientists | 2111 |
| Biological scientists and biochemists | 2112 |
| Physical scientists | 2113 |
| Laboratory technicians | 3111 |
| Graphic designers | 3421 |
| Environmental health professionals | 2463 |
| IT business analysts, architects and systems designers | 2135 |
| Conservation professionals | 2141 |
| Environment professionals | 2142 |

# Occupational groups

| | |
|---|---|
| Actuaries, economists and statisticians | 2425 |
| Business and related research professionals | 2426 |
| Finance officers | 4124 |
| Financial administrative occupations nec* | 4129 |
| Human resources administrative occupations | 4138 |
| Sales administrators | 4151 |
| Other administrative occupations nec* | 4159 |
| Office supervisors | 4162 |
| Sales supervisors | 7130 |
| Customer service managers and supervisors | 7220 |
| Office managers | 4161 |

**Construction trades supervisors**

| | |
|---|---|
| Skilled metal, electrical and electronic trades supervisors | 5250 |
| Construction and building trades supervisors | 5330 |

**Wood trades and interior fit-out**

| | |
|---|---|
| Carpenters and joiners | 5315 |
| Paper and wood machine operatives | 8121 |
| Furniture makers and other craft woodworkers | 5442 |
| Construction and building trades nec* (25%) | 5319 |

**Bricklayers**

| | |
|---|---|
| Bricklayers and masons | 5312 |

**Building envelope specialists**

| | |
|---|---|
| Construction and building trades nec* (50%) | 5319 |

**Painters and decorators**

| | |
|---|---|
| Painters and decorators | 5323 |
| Construction and building trades nec* (5%) | 5319 |

**Plasterers**

| | |
|---|---|
| Plasterers | 5321 |

**Roofers**

| | |
|---|---|
| Roofers, roof tilers and slaters | 5313 |

**Floorers**

| | |
|---|---|
| Floorers and wall tilers | 5322 |

**Glaziers**

| | |
|---|---|
| Glaziers, window fabricators and fitters | 5316 |
| Construction and building trades nec* (5%) | 5319 |

**Specialist building operatives not elsewhere classified (nec*)**

| | |
|---|---|
| Construction operatives nec* (100%) | 8149 |
| Construction and building trades nec* (5%) | 5319 |
| Industrial cleaning process occupations | 9132 |
| Other skilled trades nec* | 5449 |

**Scaffolders**

| | |
|---|---|
| Scaffolders, stagers and riggers | 8141 |

**Plant operatives**

| | |
|---|---|
| Crane drivers | 8221 |
| Plant and machine operatives nec* | 8129 |
| Fork-lift truck drivers | 8222 |
| Mobile machine drivers and operatives nec* | 8229 |

**Plant mechanics/fitters**

| | |
|---|---|
| Metalworking production and maintenance fitters | 5223 |
| Precision instrument makers and repairers | 5224 |
| Vehicle technicians, mechanics and electricians | 5231 |
| Elementary process plant occupations nec* | 9139 |
| Tool makers, tool fitters and markers-out | 5222 |
| Vehicle body builders and repairers | 5232 |

**Steel erectors/structural fabrication**

| | |
|---|---|
| Steel erectors | 5311 |
| Welding trades | 5215 |
| Metal plate workers and riveters | 5214 |
| Construction and building trades nec* (5%) | 5319 |
| Smiths and forge workers | 5211 |
| Metal machining setters and setter-operators | 5221 |

# Occupational groups

| **Labourers nec*** | |
|---|---|
| Elementary construction occupations (100%) | 9120 |

| **Electrical trades and installation** | |
|---|---|
| Electricians and electrical fitters | 5241 |
| Electrical and electronic trades nec* | 5249 |
| Telecommunications engineers | 5242 |

| **Plumbing and heating, ventilation, and air conditioning trades** | |
|---|---|
| Plumbers and heating and ventilating engineers | 5314 |
| Pipe fitters | 5216 |
| Construction and building trades nec* (5%) | 5319 |
| Air-conditioning and refrigeration engineers | 5225 |

***Not elsewhere classified**

| **Logistics** | |
|---|---|
| Large goods vehicle drivers | 8211 |
| Van drivers | 8212 |
| Elementary storage occupations | 9260 |
| Buyers and purchasing officers (50%) | 3541 |
| Transport and distribution clerks and assistants | 4134 |

| **Civil engineering operatives not elsewhere classified (nec*)** | |
|---|---|
| Road construction operatives | 8142 |
| Rail construction and maintenance operatives | 8143 |
| Quarry workers and related operatives | 8123 |

| **Non-construction operatives** | |
|---|---|
| Metal making and treating process operatives | 8117 |
| Process operatives nec* | 8119 |
| Metalworking machine operatives | 8125 |
| Water and sewerage plant operatives | 8126 |
| Assemblers (vehicles and metal goods) | 8132 |
| Routine inspectors and testers | 8133 |
| Assemblers and routine operatives nec* | 8139 |
| Elementary security occupations nec* | 9249 |
| Cleaners and domestics* | 9233 |
| Street cleaners | 9232 |
| Gardeners and landscape gardeners | 5113 |
| Caretakers | 6232 |
| Security guards and related occupations | 9241 |
| Protective service associate professionals nec* | 3319 |

| **Civil engineers** | |
|---|---|
| Civil engineers | 2121 |

| **Other construction professionals and technical staff** | |
|---|---|
| Mechanical engineers | 2122 |
| Electrical engineers | 2123 |
| Design and development engineers | 2126 |
| Production and process engineers | 2127 |
| Quality control and planning engineers | 2461 |
| Engineering professionals nec* | 2129 |
| Electrical and electronics technicians | 3112 |
| Engineering technicians | 3113 |
| Building and civil engineering technicians | 3114 |
| Science, engineering and production technicians nec* | 3119 |
| Architectural and town planning technicians* | 3121 |
| Draughtspersons | 3122 |
| Quality assurance technicians | 3115 |
| Town planning officers | 2432 |
| Electronics engineers | 2124 |
| Chartered architectural technologists | 2435 |
| Estimators, valuers and assessors | 3531 |
| Planning, process and production technicians | 3116 |

| **Architects** | |
|---|---|
| Architects | 2431 |

| **Surveyors** | |
|---|---|
| Quantity surveyors | 2433 |
| Chartered surveyors | 2434 |

***Not elsewhere classified**

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