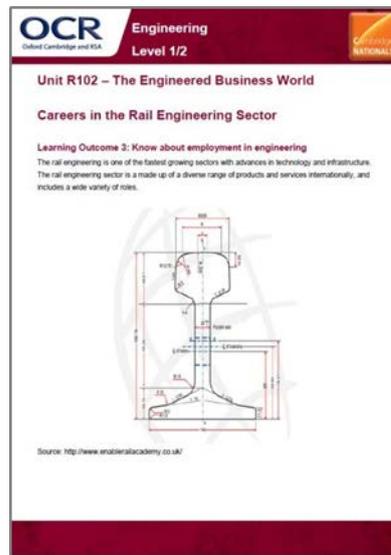


## R102 – The Engineered Business World

### Careers in the Rail Engineering Sector

#### *Instructions and answers for teachers*

*These instructions should accompany the OCR resource ‘Careers in the Rail Engineering Sector’ activity which supports OCR Cambridge Nationals in Engineering.*



#### **The Activity:**

This resource comprises of 3 tasks.



*This activity offers an opportunity for English skills development.*



*This activity offers an opportunity for maths skills development.*

#### **Associated materials:**

‘Careers in the Engineering Sector’ Lesson Element learner activity sheet.

#### **Suggested timings:**

**Task 1:** 45 minutes

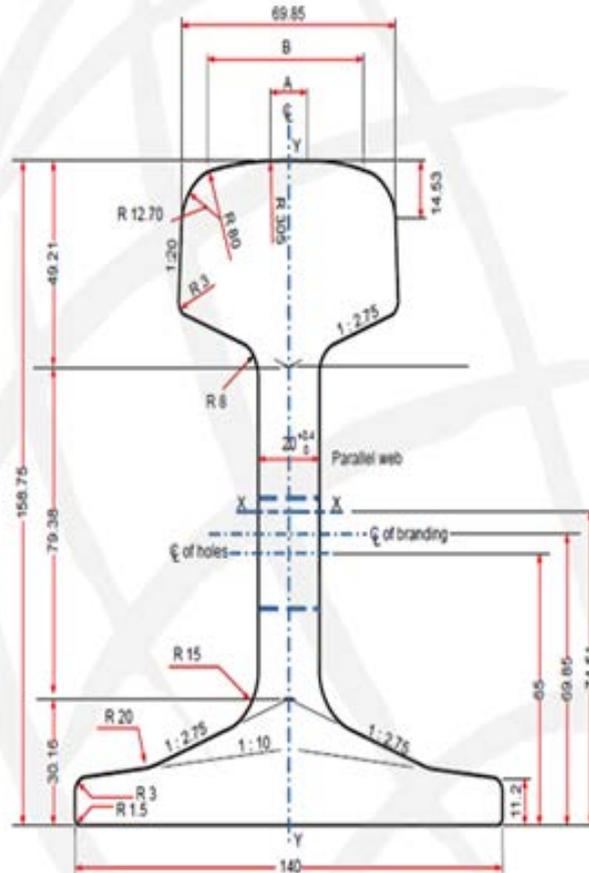
**Task 2:** 45 minutes

**Task 3:** 30 minutes

Learners will need access to the internet to carry out research. The aim of this resource is to support learners’ understanding of the differing engineering disciplines and career opportunities available within engineering sectors, sources of careers information and broadening learners’ understanding of the type of roles available in a growing and expanding sector.

**Learning Outcome 3: Know about employment in engineering**

Rail engineering is one of the fastest growing sectors with advances in technology and infrastructure. The rail engineering sector is a made up of a diverse range of products and services internationally, and includes a wide variety of roles.



Source: <http://www.enablerailacademy.co.uk/>

### **Task 1**

Research 3 different career paths in the rail engineering sector and give a description of the role each career plays.

Learners give answers such as;

Maintenance of rolling stock – This involves maintaining and repairing rail rolling stock (passenger and freight locomotives, passenger carriages and freight wagons). Some of these are electrically powered. An example includes the braking systems. Every piece of rolling stock has air brake systems and brake discs and brake pads that require routine inspection, testing and replacement/repair. Freight and passenger locomotives and passenger carriages have a wide range of mechanical and electrical/electronic equipment that requires inspection, testing servicing and repairs. Jobs available include Electronic, electrical and processor engineering, and Railway mechanical engineering.

Trackwork engineers – The track, and all of its fasteners and the subgrade underneath the track is called the permanent way. The Every length of track must be inspected, maintained and repaired. Points used to change the route of the track and train require regular inspection and serving including lubrication. The points can involve some complex geometry and remote point motors are used to power the points and these also required electrical and mechanical maintenance. Track engineers weld, grind, and secure track sections to the ties and ballast. The track is held in place by ballast which also required replacing at times to maintain the required depth to provide security for the track and drainage. Track engineers are also involved in controlling the growth of weeds and other foliage on the permanent way.

Rolling stock manufacture – Rolling stock manufacture involves a range of production disciplines including a wide range of mechanical and electrical engineering roles from designers, tool and die makers, welders, electrical and electronic engineers. Much of the manufacture is either carried out on the fabrication of the body, fitting out of equipment and furnishing and trims, and operating systems such as brakes, HVAC (heating ventilation and air conditioning) etc.

Civil engineering – Civil engineering in the rail sector involves designing and constructing bridges and structures to carry the permanent way/track, rail facilities (eg cleaning, rail terminals, intermodal, maintenance) new permanent ways including the track engineering. The roles include a range of designers, project and site engineers, structural engineers and construction workers to construct railway structures. Civil engineering usually involves the whole project from concept to completion.

Continued

Signalling and Communications – Signalling involves signal design engineers, signal and telecommunications engineering principles, electronic, electrical and processor engineering, and signal engineering applications, signalling maintenance engineers that maintain signals and the track circuits used in train detection. Most roles include electrical and electronic engineering and some mechanical disciplines.

### **Task 2:**

Having identified a range of engineering career paths within rail engineering, carry out further research to identify the entry routes into rail engineering.

- a) Research 3 companies that recruit Engineering Apprentices and state which engineering disciplines are offered.

Learners give answers such as; (answers will depend on what is being promoted and advertised at the time of research) Example:

Network Rail recruit apprentices to an Advanced Apprenticeship programme in;

- Signalling Maintenance Engineering
- Electrification and Plant
- Telecoms Maintenance Engineering
- Overhead Line Equipment Engineering

Siemens offer Advanced Apprenticeships in Mechanical and Electrical Engineering for rail rolling stock.

NG Bailey (Rail) offer Apprenticeships in HVAC.

- b) Research at least two different companies that offer opportunities for graduates, and the types of opportunities available.

- Hitachi Rail (Europe) offer Graduate places in the UK for;  
Project Management, Engineering, Planning and Production/Maintenance, Fleet Services.
- Balfour Beatty (Rail) offer graduate places in Civil Design Engineer.

## Task 3

The rail sector is supported by a range of professional body organisations.

- a) Identify two membership institutions linked to the rail engineering sector.

Learners give answers such as;

- The Permanent Way Institution [www.thepwi.org](http://www.thepwi.org)
- Institute of Railway Signalling Engineers <http://www.irse.org>
- Railway Civil Engineers Association <http://rcea.org.uk/>
- Institute of rail welders <http://www.iorw.org/>

- b) Research and state the role of National Skills Academy for Rail Engineering

Learners give answers such as;

<http://www.nsare.org/about-us.aspx>

- Promoting the careers available in the rail engineering sector and support skills needs in the rail engineering sector.
- Working with employers
- Establishing a Skills ID/Skills passport to recognise the skills and qualification held by those working in the sector
- Accrediting training for rail engineering

To give us feedback on, or ideas about the OCR resources you have used, email [resourcesfeedback@ocr.org.uk](mailto:resourcesfeedback@ocr.org.uk)

**OCR Resources: *the small print***

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