

T Level Technical Qualification in Design and Development for Engineering and Manufacturing

**Employer-Set Project
(8714-033)**

Sample Tasks

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Version 1.0

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Task 1 – Research

You have been asked to respond to the client Trains Express Limited's design specification. You will research some technologies for the new bollard and confirm the client requirements.

You must conduct research to determine:

- suitable recycled or sustainable material options for the bollard casing
- suitable technology to
 - count human presence
 - power the bollard
 - light the bollard
- aesthetic design features, bollard base connection detail and foundation.

Using this research, you must write a technical brief detailing:

- an evaluation of potential bollard materials, technology and aesthetic design features
- key requirements for a suitable bollard
- your initial concept ideas for the bollard based on the client's design specification.

At this stage you do not need to recommend which of your ideas is your preferred. You will develop your ideas further in later tasks.

The technical brief will typically be 1500 words (not including references/sources). The document can include pictures, images, specifications, and diagrams. You must also provide any notes made as part of your research, including details of your research approach and how you planned your research.

Timing of assessment

- You will have **three hours** to carry out the research and complete the technical brief.

Conditions of assessment

- Your technical brief should be completed working alone under supervised conditions.
- You must not share or discuss your work with other candidates.
- You will have access to the Internet to conduct your research.
- Assessment evidence must be handed in at the end of each session for secure storage which cannot be accessed.

What you must submit on completion of this task

- Technical brief (typically 1500 words) hard copy or file saved securely (e.g. in a secure online location or on memory stick to be handed in).
- List of references/sources.
- Research notes.

Additional evidence of your performance that will be captured for marking

- N/A

Marks available

- 15

Task 2 – Design

The technical brief you worked on in Task 1 has been submitted to Trains Express Limited. You have now been asked to develop your designs and prepare drawings and calculations for the new bollard.

Part A

You are to prepare fully annotated sketches (3D, plan, elevation, section and detail) of **at least two** bollard designs. The annotated sketches should use standard engineering conventions and clearly illustrate the:

- bollard base connection detail
- materials from which the bollard is to be constructed
- internal lighting details
- shape and ergonomic features of the bollard
- full dimensions
- count human presence technology
- anti-vandalism features.

You must:

- annotate your bollard sketches with a safe working horizontal impact force for the bollard
- prepare a supporting calculation determining the maximum horizontal vehicle force that the bollard should be designed to resist
- include all your assumptions in the calculations.

When preparing your sketches, you will need to use the information provided in the project brief, design specification, as well as a copy of the technical brief that you prepared as part of Task 1. Include notes detailing how your designs meets the brief requirements which will typically be 500 words.

Part B

Once you have developed the sketches of your bollard designs you should then prepare a final fully dimension scaled CAD drawing of your **one preferred** chosen bollard design.

The submission for this task will typically be four A3 drawings and two A4 sides of supporting calculations. You should submit your initial sketch design ideas (minimum two) and one fully dimensioned CAD drawing of your final preferred chosen design.

Timing of assessment

- You will have **eight hours** to complete your sketches, calculations and dimensioned CAD drawing. You will have access to relevant software to complete your CAD drawings.

Conditions of assessment

- Your sketches and calculations should be completed working alone under supervised conditions.
- You must not share or discuss your work with other candidates.
- You will have access to a copy of your response to the previous task (for review purposes only).
- You will **not** have access to the Internet for the completion of this task.
- Assessment evidence must be handed in at the end of each session for secure storage which cannot be accessed.

What you must submit on completion of this task

- Drawings, including sketches and CAD drawing (typically four A3 size drawings).
- Supporting calculations (typically two sides of A4) – hard copy or file saved securely (e.g. in a secure online location or on memory stick to be handed in).
- Notes detailing how your design meets the brief requirements (typically 500 words).

Additional evidence of your performance that will be captured for marking

- N/A

Marks available

- 24

Task 3 – Plan

You have been asked to produce a programme of work detailing the stages and considerations required to complete the design, development and manufacture of your final bollard design. You can assume a manufacturing capacity of 40 bollards per week and a required overall timeline of 62 weeks to complete design, prototype development and manufacturing.

The programme of work will need to include:

- key stages of the project
- technology and resources required to manufacture the bollards
- duration and sequence of activities
- the critical path.

Provide a supporting statement to justify your programme taking into consideration:

- health and safety including risk assessment requirements
- manufacturing standards
- specialist equipment
- waste management.
- all assumptions relating to in-house manufacturing capabilities and resources.

The programme of work plan will typically be **one** side of A4.

The supporting statement will typically be 1000 words.

Timing of assessment

- You will have **five hours** to complete your programme of work plan and supporting statement.

Conditions of assessment

- Your programme of work plan and supporting statement should be completed working alone under supervised conditions.
- You must not share or discuss your work with other candidates.
- You will have access to software that may be required to create the programme of work (e.g. word processing software, spreadsheets etc.).
- You will have access to copies of your responses to the previous tasks (for review purposes only).
- You will **not** have access to the Internet for the completion of this task.
- Assessment evidence must be handed in at the end of each session for secure storage which cannot be accessed.

What you must submit on completion of this task

- Programme of work plan (one side of A4).
- Supporting statement (typically 1000 words) – copy of file saved securely (e.g. in a secure online location or on memory stick to be handed in).

Additional evidence of your performance that will be captured for marking

- N/A

Marks available

- 18

Task 4 – Present

The designs for the bollard have been completed and you are now required to present them to the client Trains Express Limited, at a meeting attended by the company's sales team. The company's sale team is made up of members with a technical background.

You are to prepare and deliver a presentation to outline the key features of the new bollard design and analysis, including the manufacturing proposal.

You must use digital technology for the presentation.

You must cover:

- challenges presented by the brief and how these have been overcome
- how well your design proposal addresses the requirements of the brief.

Your assessor will take on the role of a manager from Trains Express Limited. They will ask questions relating to your presentation from the client's perspective.

Timing of assessment

- You will have **two hours** to prepare your presentation.
- You will have **30 minutes** to present your findings and respond to questions (typically split with 20 minutes for presenting your findings and ten minutes for responding to questions).

Conditions of assessment

- Your presentation should be developed and delivered working alone under supervised conditions.
- You must not share or discuss your work with other candidates.
- You will have access to copies of your responses to the previous tasks (for review purposes only) as well as any presentation materials/notes (e.g. PowerPoint slides).
- You will have access to digital technology for the presentation of your findings - you can choose the format/program and program features you wish to use (e.g. PowerPoint).
- You will have access to the Internet for the completion of this task.
- Assessment evidence must be handed in at the end of each session for secure storage which cannot be accessed.

What you must submit on completion of this task

- Presentation materials – e.g. slides, handouts etc. hard copy or digital file saved securely (e.g. in a secure online location or on memory stick to be handed in).

Additional evidence of your performance that will be captured for marking

- Video recording of presentation.

Marks available

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