



NCFE Level 1/2 Technical Award in Engineering (603/2963/4)

Internal Synoptic Project

Past Paper December 2019

Centre instructions

- To be given to learners on or after **16 December 2019**.
- This internal synoptic project is intended for those learners who will be claiming their certificates in **summer 2020 only**.

Learner instructions

- Read the project brief carefully before you start the work.
- You **must** clearly identify all of the work you produce during the supervised time.
- You **must** hand in all of your work to the supervisor at the end of each session.

Learner information

- This internal synoptic project will assess your knowledge and understanding from across the qualification.
- The completion time for this internal synoptic project is 21 hours.
- All of the work you submit **must** be your own.

Please complete the details below clearly and in BLOCK CAPITALS.

Learner name _____

Centre name _____

Learner number

Centre number

Project Brief

You work as an assistant technician in an engineering design office. The rising levels of water are causing some issues with the pedestrian crossing on a ford within a rural village near the coast. Several times the local community have been unable to cross the ford because of the high water levels.

You have been asked to explore the idea of designing a simple foot bridge that could be installed for the community to use. This will enable walkers to make use of the land along the tidal river for recreation. The supports for the bridge can be cable stay designs so a unique feature can be made of the bridge so people are attracted to use and walk over it.

You are required to produce a **portfolio of evidence** to accompany your design of the simple footbridge.

The portfolio should include:

- CAD **and** hand-drafted engineering drawings of your bridge using the given information in the project brief pack
- evidence of materials, tools and machinery testing - consider the cost and environment when choosing materials
- a production plan – including when will you build and what times of year will you avoid
- an evaluation of the project, making reference to your learner log where appropriate.

Using your **engineering drawings** and **production plan**, manufacture a scale model of your simple footbridge to an appropriate scale of choice, selecting and using the most appropriate materials, tools and techniques.

During the manufacturing process, you should:

- demonstrate that you are able to carry out manufacturing techniques
- evidence how you demonstrated safe and correct use of a variety of tools and/or machinery throughout the manufacturing process.

Due to resource constraints imposed by the client, you will initially produce the scale model using straws.

Design Criteria

- your bridge needs to demonstrate good iconic design that people will want to cross
- the method of jointing you will have to use must be designed and applied by you
- the constructed scale footbridge model will be tested using the following method:
 - your completed bridge will be weighted accurately
 - a weight equal to 5 times the weight of the bridge will be supported at a midpoint.
- you will produce a short report evaluating your bridge and how it performed in testing.

Additional information and similar examples:

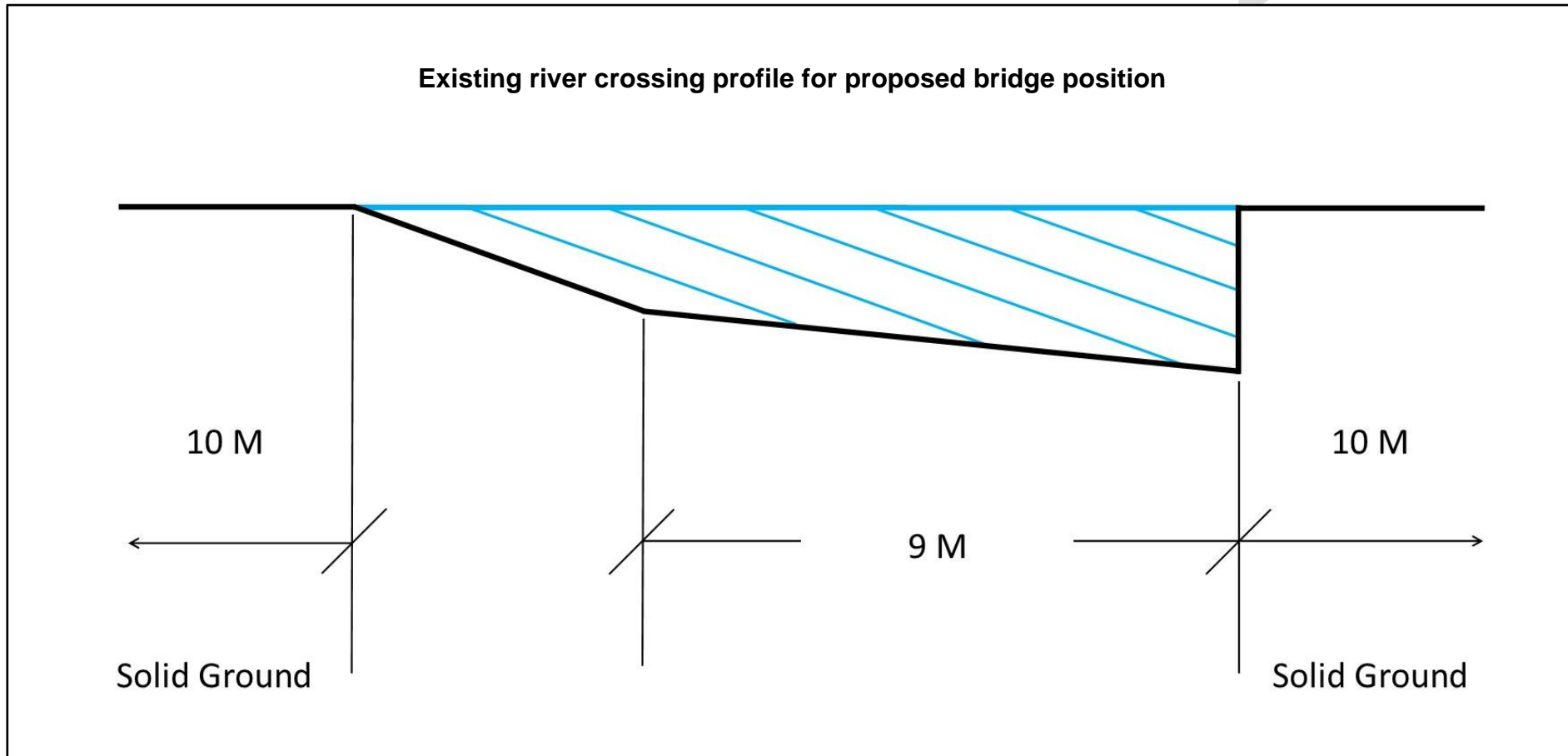
<https://www.architecturaldigest.com/gallery/worlds-best-pedestrian-bridges>

<https://www.pinterest.co.uk/ouoldman/pedestrian-bridge/>

<http://www.bbc.com/culture/story/20150401-eight-amazing-footbridges>

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Background information for the project:



The solid ground on each side of the river is gravel and can support a considerable load or foundation.

Learner log and project evaluation

As you work through the project, you are **required** to keep a learner log to record your approach. You should include:

- how you prepared
- what resources you used
- how you managed your time.

You **must** use your completed learner log to carry out an evaluation of the project.

Evidence

You are required to submit the following for assessment:

- your portfolio of evidence
- your model of the bridge
- your learner log, including your evaluation.

Types of evidence

Below is a list of suggested types of evidence that you could include:

- written/word-processed documents
- presentations
- diagrams
- annotated evidence to include photographs, images and diagrams
- technical drawings
- video/audio evidence
- witness statements (as supporting evidence)
- learner observation records (as supporting evidence).

During the project, you will need to refer to the 'Project Brief' to obtain information.

Assessment objectives

The internal synoptic project is a formal assessment that will contribute 60% towards your overall qualification grade and therefore it is important that you produce work to the highest standard that you can.

You will be assessed on your ability to independently select, apply and bring together the appropriate knowledge, understanding, skills and techniques you have learnt throughout your course of study, in response to a brief set in a real-world situation.

The internal synoptic project will be assessed holistically against five integrated assessment objectives. These assessment objectives and their weightings are shown below.

Assessment Objective	% weighting
AO1 – Recall knowledge and show understanding The emphasis here is for learners to recall and communicate the fundamental elements of knowledge and understanding.	10%
AO2 – Apply knowledge and understanding The emphasis here is for learners to apply their knowledge and understanding to real-world contexts and novel situations, including finding creative solutions.	15%
AO3 – Analyse and evaluate knowledge and understanding The emphasis here is for learners to develop analytical thinking skills to make reasoned judgements and reach conclusions.	20%
AO4 – Demonstrate and apply technical skills and processes The emphasis here is for learners to demonstrate the essential technical skills relevant to the vocational sector, by applying the appropriate processes, tools and techniques.	45%
AO5 – Manage and evaluate the project The emphasis here is for learners to develop the necessary skills of forethought, time management, self-reliance and self-reflection.	10%

Grading descriptors

The assessment for each AO is broken down into bands, with each band having an associated descriptor indicating performance at that band.

Assessors must make a judgement using all of the evidence you produce to determine the assessment decisions for the internal synoptic project.

The internal synoptic project requires effective use of integrated knowledge, understanding and skills from across the full breadth of the qualification content.

AO1 Recall knowledge and show understanding	
Band	Descriptors
3	Learners recall and communicate a wide range of comprehensive engineering knowledge and understanding. Subject-specific terminology is used accurately and consistently throughout the project.
2	Learners recall and communicate a range of engineering knowledge and understanding. Subject-specific terminology is used appropriately on occasion .
1	Learners recall and communicate basic engineering knowledge and understanding. Subject-specific terminology is basic and inconsistent .
NYA	No rewardable material.

AO2 Apply knowledge and understanding	
Band	Descriptors
3	Learners accurately apply knowledge and understanding of maths, science and engineering theory, which is relevant to the context and situation.
2	Learners' application of knowledge and understanding of maths, science and engineering theory is mostly accurate and has some relevance to the context and situation.
1	Learners' application of knowledge and understanding of maths, science and engineering theory is of limited accuracy and relevance to the context and situation.
NYA	No rewardable material.

AO3 Analyse and evaluate knowledge and understanding	
Band	Descriptors
3	Learners critically analyse and evaluate engineering information, systematically judging and reaching reasoned and valid conclusions.
2	Learners appropriately analyse and evaluate engineering information, judging and reaching suitable conclusions.
1	Learners respond simply to engineering information and provide comments .
NYA	No rewardable material.

AO4 Demonstrate and apply technical skills and processes	
Band	Descriptors
3	Learners demonstrate and apply relevant engineering technical skills effectively , by applying and using appropriate engineering processes, tools and techniques. Learners demonstrate and apply engineering technical skills to develop a complete and effective solution/outcome.
2	Learners demonstrate and apply mostly relevant engineering technical skills by applying and using mostly appropriate engineering processes, tools and techniques. Learners demonstrate and apply engineering technical skills to develop a mostly complete and working solution/outcome.
1	Learners demonstrate and apply basic engineering technical skills by applying and using, in a limited way engineering processes, tools and techniques. Learners demonstrate and apply engineering technical skills to develop a partially complete solution/outcome.
NYA	No rewardable material.

AO5 Manage and evaluate the project	
Band	Descriptors
3	Learners manage the project, including preparation and planning of a wide range of project stages, time frames and resources. Learners evaluate a range of their approaches, skills and accomplishments.
2	Learners manage the project, including preparation and planning of a range of project stages, time frames and resources. Learners evaluate some of their approaches, skills and accomplishments.
1	Learners manage the project, including preparation and planning of a limited range of project stages, time frames and resources. Learners provide comments on some of their approaches, skills and accomplishments.
NYA	No rewardable material.

This is the end of the internal synoptic project.