**NZQA**

**Approved**

Achievement standard: 91365 Version 3

Standard title: Demonstrate understanding of advanced concepts used in manufacturing

Level: 2

Credits: 4

Resource title: Precast building concepts

Resource reference: Generic Technology VP-2.12 v2

Vocational pathway: Construction and Infrastructure

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| Quality assurance status | These materials have been quality assured by NZQA.  NZQA Approved number A-A-02-2015-91365-02-8264 |
| Authenticity of evidence | Assessors/educators must manage authenticity for any assessment from a public source, because learners may have access to the assessment schedule or exemplar material.  Using this assessment resource without modification may mean that learners’ work is not authentic. Assessors/ educators may need to change figures, measurements or data sources or set a different context or topic to be investigated or a different text to read or perform. |

Vocational Pathway Assessment Resource

Achievement standard: 91365

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Vocational pathway: Construction and Infrastructure

Learner instructions

# Introduction

This assessment activity requires you to demonstrate understanding of advanced concepts used in the manufacture of precast building frames.

You are going to be assessed on how comprehensively you demonstrate your understanding of advanced concepts in the manufacturing process of precast building frames.

The following instructions provide you with a way to structure your work so you can demonstrate what you have learnt and achieve success in this standard.

Assessor/educator note: It is expected that the assessor/educator will read the learner instructions and modify them if necessary to suit their learners.

# Task

Research precast building frame manufacturing. Your assessor/educator may arrange a visit to a concrete manufacturing plant that specialises in precast manufacturing or arrange for you to meet with a plant manager. You could interview a plant manager in person or by email. You could also conduct research in a library or on the internet.

You might present your findings as a written report, a portfolio, or an oral or audio-visual presentation. Confirm the format with your assessor/educator before you begin.

You may work individually or in a group to conduct research but you must produce your report or presentation individually.

Gather evidence you could use in your report or presentation. You could include photographs, diagrams, notes you have written, and material from books, magazines, brochures or websites. Make sure you keep a record of the sources of this information.

Create a report or presentation in which you do the following:

* Explain how safety issues associated with precast building frame manufacturing are addressed:
  + Consider safety issues associated with materials (i.e. concrete) and other inputs, the workers, plant and equipment involved in the manufacturing process, how OSH (Occupational Health and Safety) requirements may be addressed in the factory, the environmental implications of production and the final product.
  + Consider how and why quality management techniques (such as Total Quality Management (TQM) or Six Sigma) have been important in changing practices related to safety.
* Identify new technologies and/or techniques and explain their impact on quality control and their suitability for different manufacturing systems used to produce precast building frames:
  + Consider how and why quality management techniques (such as TQM or Six Sigma) have been important in adopting (or not adopting) particular new technologies and/or techniques.
  + Consider how the introduction of data logging technologies has increased the possibility of quality control at the precast building frames factory you studied. Is this technology suitable for the manufacturing system used in this factory? Is it suitable for other precast manufacturing systems (such as one-off custom manufacturing, batch manufacturing, assembly line manufacturing or flexible manufacturing)?
  + Consider how the precast building frame manufacturer approaches quality management to ensure ongoing improvement of their processes and product. You may refer to planning, quality control, quality assurance and quality improvement techniques, and particular approaches such as Lean Manufacturing.
* Identify what influences customer, social and environmental drivers have on priorities in the precast building frames’ manufacturing process:
  + You could find out who the manufacturer’s main customers are and why they purchase the precast building frames.
  + Find out what social trends or values influence people’s choices of precast building frames. For example, is there a preference for locally made products, for carbon-neutral products and/or for batch production? Which of these trends have influenced decisions being made within the manufacturing process?
  + What environmental considerations (such as the management of waste and by-products) have been seen as important by the manufacturer? How have these influenced the decisions about their manufacturing process?
  + Discuss how and why quality management techniques (such as TQM or Six Sigma) have been important in changing (or not changing) manufacturing practices in response to these influences.

Use diagrams, photographs and other visuals to illustrate your discussion, as appropriate.

Make sure you acknowledge all your sources of information. You need to provide references to make it clear where your information has come from.

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Assessor/Educator guidelines

# Introduction

The following guidelines are supplied to enable assessors/educators to carry out valid and consistent assessment using this internal assessment resource.

As with all assessment resources, education providers will need to follow their own quality control processes. Assessors/educators must manage authenticity for any assessment from a public source, because learners may have access to the assessment schedule or exemplar material. Using this assessment resource without modification may mean that learners' work is not authentic. The assessor/educator may need to change figures, measurements or data sources or set a different context or topic. Assessors/educators need to consider the local context in which learning is taking place and its relevance for learners.

Assessors/educators need to be very familiar with the outcome being assessed by the achievement standard. The achievement criteria and the explanatory notes contain information, definitions, and requirements that are crucial when interpreting the standard and assessing learners against it.

# Context/setting

This activity requires learners to produce a report or presentation that demonstrates their comprehensive understanding of advanced concepts used to manufacture precast building frames.

Learners may present their report or presentation in a format that best suits their needs. They should confirm, with you, the format of this prior to presenting their evidence. Ensure that the format selected allows the learner to meet the requirements of the standard.

# Conditions

Learners could gather and analyse their evidence independently or in groups or pairs, but they need to write their reports independently and will be assessed individually.

# Resource requirements

Learners will require access to relevant information about the manufacturing process selected for this assessment activity. You may arrange a site visit or guest speaker or guide learners in approaching a manufacturer for an interview.

Learners may also require access to a library or the internet.

Learners may require access to a camera or to photos taken during a site visit.

Useful websites related to precast concrete manufacturers include:

<http://www.fultonhogan.com/Contact_us/>

<http://www.humes.co.nz/>

<http://www.reids.co.nz/>

<http://en.wikipedia.org/wiki/Precast_concrete>

<http://www.consolis.com/en/Consolis+Group/Benefits/>

<http://www.stresscrete.co.nz/educ/fprecast.html>

# Additional information

None.

# Assessment schedule: Generic Technology 91365 – Precast building concepts

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| Evidence/Judgements for Achievement | Evidence/Judgements for Achievement with Merit | Evidence/Judgements for Achievement with Excellence |
| The learner demonstrates understanding of advanced concepts used in manufacturing by:   * explaining how safety issues are addressed in precast building frame manufacturing   For example:  The learner explains the safety practices followed by a specific precast concrete manufacturer, covering the concrete inputs supply, the manufacturing equipment, plant ‘clean rooms’, processing methods, packaging and storage, and safe delivery of the precast building frames to the retail outlet. The learner explains the associated monitoring, testing and documentation and how this is carried out.   * identifying the impacts of new technologies and/or techniques on the suitability of different types of manufacturing systems and increased possibilities for quality control   For example:  The learner identifies the technologies used in making a specific firm’s precast concrete and the suitability of these for the type of manufacturing system used. The learner identifies the improvements in quality control this has allowed.   * identifying the influences of customer, social and environmental drivers on priorities within the precast building frame manufacturing process   For example:  The learner considered influences, as follows:  *Customers and potential customers influence the production of precast building frames. What is important to these customers and potential customers is high quality and consistency. They need to be able to rely on precast concrete being of a high standard and the same every time they buy them. Alternative decals and types are developed and trialled now and again, but the loyal customers prefer the standard product range.*  *Environmental sustainability is important to customers and the wider community. The precast concrete manufacturer has a system of disposing of waste in order to minimise environmental impact.*  *The above expected learner responses are indicative only and relate to just part of what is required.* | The learner demonstrates in-depth understanding of advanced concepts used in manufacturing by:   * explaining how safety issues are addressed in precast building frame manufacturing   For example:  The learner explains the safety practices followed by a specific precast concrete manufacturer, covering the concrete inputs supply, the manufacturing equipment, plant ‘clean rooms’, processing methods, packaging and storage, and safe delivery of the precast building frames to the retail outlet. The learner explains the associated monitoring, testing and documentation and how this is carried out.   * identifying the impacts of new technologies and/or techniques on the suitability of different types of manufacturing systems and increased possibilities for quality control   For example:  The learner identifies the technologies used in making a specific firm’s precast concrete and the suitability of these for the type of manufacturing system used. The learner identifies the improvements in quality control this has allowed.   * identifying the influences of customer, social and environmental drivers on priorities within the precast building frame manufacturing process   For example:  The learner considered influences, as follows:  *Customers and potential customers influence the production of precast building frames. What is important to these customers and potential customers is high quality and consistency. They need to be able to rely on precast concrete being of a high standard and the same every time they buy them. Alternative decals and types are developed and trialled now and again, but the loyal customers prefer the standard product range.*  *Environmental sustainability is important to customers and the wider community. The precast concrete manufacturer has a system of disposing of waste in order to minimise environmental impact.*   * explaining how quality management techniques have impacted on a precast building frame manufacturing process   For example:  The learner explains what key changes the specific precast concrete firm has made over the years to improve its product and why these changes were made. The learner’s explanation includes how quality management has impacted on safety practices and how the firm has made use of new technologies to improve quality control and why these technologies are suitable for the firm’s particular manufacturing system*.*  *The above expected learner responses are indicative only and relate to just part of what is required.* | The learner demonstrates comprehensive understanding of advanced concepts used in manufacturing by:   * explaining how safety issues are addressed in precast building frame manufacturing   For example:  The learner explains the safety practices followed by a specific precast concrete manufacturer, covering the concrete inputs supply, the manufacturing equipment, plant ‘clean rooms’, processing methods, packaging and storage, and safe delivery of the precast building frames to the retail outlet. The learner explains the associated monitoring, testing and documentation and how this is carried out.   * identifying the impacts of new technologies and/or techniques on the suitability of different types of manufacturing systems and increased possibilities for quality control   For example:  The learner identifies the technologies used in making a specific firm’s precast concrete and the suitability of these for the type of manufacturing system used. The learner identifies the improvements in quality control this has allowed*.*   * identifying the influences of customer, social and environmental drivers on priorities within the precast building frame manufacturing process   For example:  The learner considered influences, as follows:  *Customers and potential customers influence the production of precast building frames. What is important to these customers and potential customers is high quality and consistency. They need to be able to rely on precast concrete being of a high standard and the same every time they buy them. Alternative decals and types are developed and trialled now and again, but the loyal customers prefer the standard product range.*  *Environmental sustainability is important to customers and the wider community. The precast concrete manufacturer has a system of disposing of waste in order to minimise environmental impact.*   * discussing how and why quality management techniques have been important in changing manufacturing practices   For example:  The learner links the branding priorities identified by the precast concrete firm with customer, social and environmental trends and drivers, and with ongoing quality management and improvement, as follows:  *The production manager uses a measurement based strategy (Six Sigma) to focus on process improvement and reducing variations to improve the product. The key strategy is to improve the system for existing processes falling below specification and looking for overall improvement to the product. The firm wishes to remain an iconic precast concrete manufacturer operating in its market. Branding is an important part of the success of the firm. It reflects the history of the family business where they are in control of the whole supply chain up to and including retail sales. What is important for the brand is to produce precast building frames of consistent high quality. The quality must be the same from batch to batch and year to year.*  The learner discusses the rationale for decisions to implement new technologies (or decisions not to implement) and other changes in the manufacturing practices. They discuss changes such as the introduction of factory filters, automated air conditioners and new packaging materials. They discuss the rationale behind the decision to keep the majority of sales in-house, allowing only a limited supply to be sold through other outlets.  The learner discusses the importance of the environment on decisions made at the firm, as follows:  *Environmental impact is a priority in all decisions made at the precast concrete manufacturing firm. This is a value that has been passed down from the previous generation. The firm’s retention of traditional methods and whether they will implement new technologies is influenced by this strong value.*  The learner discusses the impact of the manufacturing system on decisions on the adoption of new technologies and techniques, as follows:  *In this firm, the production manager has responsibility for planning and implementing ongoing quality management and improvement practices. He has the specialist knowledge and skill in all aspects of the manufacture and management and is intimately involved and in control of every stage. Quality management in a larger scale factory involved in mass production would require more complex systems.*  *The above expected learner responses are indicative only and relate to just part of what is required.* |

Final grades will be decided using professional judgement based on an examination of the evidence provided against the criteria in the Achievement Standard. Judgements should be holistic, rather than based on a checklist approach.