**NZQA**

**Approved**

Achievement standard: 91342 Version 3

Standard title: Develop a product design through graphics practice

Level: 2

Credits: 6

Resource title: Ladder safety

Resource reference: Design and Visual Communication VP-2.35 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-02-2015-91342-02-8151 |
| 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

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Learner instructions

# Introduction

This assessment activity requires you to develop a design for a ladder safety bracket or clamp through graphics practice.

You are going to be assessed on how effectively you develop a design for a ladder safety bracket or clamp through graphics practice. You need to review and refine well-considered design ideas that integrate product knowledge of ladders, brackets and clamps throughout your design development.

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

The design brief is that a scaffolding company needs a ladder safety bracket or clamp design to meet the following specifications:

* The bracket or clamp must securely hold the ladder in place against a scaffold or structure.
* One person can deploy the ladder safely from the ground.
* One person on the ground must be able to release the ladder from the scaffold or structure safely.
* The bracket or clamp has to be able to fit to a range of different ladder shapes and profiles that allow it to be held against a 48 mm scaffold tube or structure and not damage the ladder, scaffold or structure.
* The ladder safety bracket or clamp is lightweight, non-perishable and re-usable.

Select and apply drawing and design knowledge and techniques to visually communicate the exploration, refinement and review of your design ideas throughout a development process.

Focus on product and technical considerations associated with ladder bracket/clamp product design, together with relevant design principles.

Compiling your portfolio involves three phases, initial research, initial ideas and ideas development.

Throughout the process evaluate the positive and/or negative aspects of both the functional (i.e. the way it works) and aesthetic (i.e. the way it looks) features of your design ideas in relation to the brief. Consider:

* aesthetic elements, for example style, form, shape and colour as they relate to ladder aesthetics
* functional elements, for example ergonomics, operation, construction, user-friendliness, and ability to be attached and released easily and safely in the workplace.

To show the progression of your design ideas, you could include visual diaries, sketches, mock-ups, drawings, models, photographs, digital media, display boards or installations. You can support these with annotations (notes) as needed. You could also provide evidence of computer modelling or mock-up of the design to validate ergonomics and usability requirements.

## Part 1: Initial research

Collect images (photographs and drawings) of existing methods for connecting and securing a ladder to a scaffold or structure. You can source these from magazines, the internet, books, local company expertise, from existing designs, etc.

Consider and make design judgements on the positive and/or negative aspects of the functional and aesthetic design features of these existing methods.

## Part 2: Initial ideas

Develop a range of initial ideas for your ladder safety bracket or clamp using sketches and/or mock-ups. The inspiration for your ideas can come from any source, for example initial research, other designs you may have seen, or your own creative ideas.

Treat the sketches or models you produce as starting points for possible development. At this stage all ideas are exploratory.

## Part 3: Ideas development

Give careful consideration to your best idea/s and identify a particular idea, or parts or combinations of several ideas for further development. Explain your choices.

In developing, reviewing and refining your well-considered design ideas using graphic practice, you need to do the following:

* Make design judgements that are based on relevant features of the design.
* Integrate product design knowledge into your design ideas throughout the development. This knowledge includes (but is not limited to):
  + design tools and technical knowledge of materials
  + construction and structures
  + mechanisms
  + ergonomics
  + product visual communication techniques, for example prototypes, animations
  + operation.
* Effectively develop design ideas through graphics practice, and show linkages and flow from the exploration, through the refinement (i.e. the detailing of the ideas and how it will solve the design problem posed).
* Refine and conclude the relevant aesthetics and functional design features of the ladder safety bracket or clamp. The development of the ideas should be logical, related to research and linked to the initial ideas.
* Support your judgements with qualitative and/or quantitative data gathered through continuing research, as needed. This may include market research, anthropometrics, ergonomics, models, mock-ups, technical knowledge of materials, product design drawings, prototypes, industry specific information. Judgements may also reflect your own values, tastes, views, and perspectives.
* Make sure the features of your final design outcome are clearly established and identified at the conclusion of your development work.

When you submit your completed portfolio for assessment, make sure it includes all the visual and written work required.

# Resources

Health and safety information [www.osh.govt.nz](http://www.osh.govt.nz)

SARNZ (Scaffolding and Rigging New Zealand) – Best Practice Guidelines for Scaffolding <http://www.sarnz.org.nz/best-pratice.htm>

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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 portfolio of design work using graphics practice that shows the effective development of a design idea for a ladder safety bracket or clamp product.

# Conditions

Learners need to work individually.

# Resource requirements

Learners need access to specialist product design knowledge about ladder brackets and ladder clamps. This could be found in design books, from local tradesmen or experts in this field, company and industry experts and the internet.

The AS/NZ standard for scaffolding is available to purchase [www.techstreet.com](http://www.techstreet.com).

# Additional information

Check learners’ work during the assessment task as they work towards an outcome. These checks could be at key stages of the process or other appropriate points.

Give learners feedback during their portfolio work.

This resource can be used with the Vocational Pathways Construction and Infrastructure resource 91343 *Use visual communication techniques to compose a presentation of a design*, Ladder safety bracket presentation.

## Other possible contexts for this vocational pathway:

* electronic/electrical products
* architectural and building products, for example taps for a specific purpose
* landscape design
* roading product design, i.e. signage or specific products used in roading infrastructure, such as cats’ eyes
* urban product design in an urban landscape.

# Assessment schedule: Design and Visual Communication 91342 – Ladder safety

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| Evidence/Judgements for Achievement | Evidence/Judgements for Achievement with Merit | Evidence/Judgements for Achievement with Excellence |
| The learner develops a design for a ladder safety bracket or clamp through graphics practice by:   * exploring and refining design ideas that draw on product design knowledge * making design judgements on the positive and/or negative aspects of the functional and aesthetic features of the design in response to the brief * supporting design judgements with qualitative and/or quantitative data gathered through research   For example, the learner:   * + shows exploration and refinement of the ladder safety bracket or clamp’s form, function and style, drawing on knowledge of suitable fixtures, fittings and material. This may include details of how the clamp attaches to a structure, i.e. for a scaffold, how the safety clamp is able to be detached remotely from the ground, what physical sizes of tubing are optimal for providing support   + shows understanding of both the positive aesthetic and functional aspects and/or negative aesthetic and functional aspects of their design   + makes design decisions and judgements on the positive and/or negative functional and aesthetic features of the design, e.g. how the clamp looks and how it functions, i.e. no sharp edges, easy to use, safe, fit for purpose.   The product design meets the brief specifications.  *The above expected learner responses are indicative only and relate to just part of what is required.* | The learner clearly develops a design for a ladder safety bracket or clamp through graphics practice by:   * exploring, reviewing and refining design ideas that incorporate product design knowledge * making design judgements on the relevant features of the design, in response to the brief, that inform the progression of the design ideas * supporting design judgements with qualitative and/or quantitative data gathered through research   For example, the learner:   * + shows exploration, review and refinement of the ladder safety bracket or clamp’s form, function and style, incorporating knowledge of suitable fixtures, fittings and material. This may include details of how the safety clamp attaches to a structure, e.g. for a scaffold, how the safety clamp is able to be detached remotely from the ground, what physical sizes of tubing are optimal for providing support. These ideas are reviewed and changed to provide a better solution   + shows understanding of both the positive aesthetic and functional aspects and/or negative aesthetic and functional aspects of their design, e.g. how the safety clamp looks and how it functions, i.e. no sharp edges, easy to use, safe, fit for purpose   + shows understanding of how these aesthetic and functional elements are used in ladder bracket or clamp products   + makes design decisions and judgements on the relevant positive and/or negative functional and aesthetic features of the design, e.g. judgements include comments on the most important aspects of the design   + incorporates product design knowledge in the development of the ideas.   The product design has been reviewed and meets the brief specifications.  *The above expected learner responses are indicative only and relate to just part of what is required.* | The learner effectively develops a design for a ladder safety bracket or clamp through graphics practice by:   * exploring, reviewing and refining well-considered design ideas that integrate product design knowledge throughout the development * making design judgements on the relevant aesthetic and functional design features, in response to the brief, that inform the progression of the design ideas * supporting design judgements with qualitative and/or quantitative data gathered through research   For example, the learner:   * + shows exploration, review and refinement of the ladder bracket or clamp’s form, function and style, integrating knowledge of suitable fixtures, fittings and material. This may include details of how the clamp attaches to a structure, e.g. for a scaffold, how the safety clamp is able to be detached remotely from the ground, what physical sizes of tubing are optimal for providing support. These ideas are reviewed and changed to provide a better solution, there is evidence of the design ideas flowing and linking together to provide the best possible solution   + shows understanding of both the positive aesthetic and functional aspects and/or negative aesthetic and functional aspects of their design   + shows understanding of how these aesthetic and functional elements are used to produce well-considered designs for ladder bracket or clamp products   + makes design decisions and judgements on the relevant positive and/or negative functional and aesthetic aspects of the design, e.g. the judgements include comments on the most important aspects of the design   + integrates product design knowledge in the development of the ideas, i.e. there are more links between product knowledge and the design ideas to develop those ideas.   The product design meets the brief specifications with well-considered design ideas.  *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.