Title	**Develop and implement a design plan for a mechanical engineering project**		
Level	**6**	**Credits**	**20**

Purpose	People credited with this unit standard are able to: develop a design plan for a given mechanical engineering project; develop a design for a given mechanical engineering project; and evaluate a mechanical engineering design plan outcome.

Classification	Mechanical Engineering > Maintenance and Diagnostics in Mechanical Engineering

Available grade	Achieved

Explanatory notes

1 References
Building Act 2004.
Hazardous Substances and New Organisms Act 1996.
Health and Safety in Employment Act 1992.
Resource Management Act 1991.

2 Definitions
Design plan – documentation used to manage the project and may include but is not limited to: project schedule, workplan, budget.
Mechanical engineering design project – a project requiring the expansion or reconfiguration of existing plant and/or equipment, the design of new plant and/or equipment, or the design of an item for manufacture.
Stakeholders – personnel such as: owner, contract manager, consultant engineer, contractor, internal personnel.
Worksite procedures – operational procedures put in place by the candidate's employer. These include site safety procedures, equipment operating procedures, job procedures, quality assurance, and procedures for the handling and disposal of materials and waste.

3 The following apply to this unit standard:
a All activities must demonstrate safe working practices.
b All activities must be completed independently and reported within agreed timeframes.
c All activities must comply with: any policies, procedures, and requirements of the organisations involved; the ethical codes and standards of relevant professional bodies; the cultural requirements of the organisations and individuals involved; and any relevant legislative and/or regulatory requirements, which can include but are not limited to those listed in the references.

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d Competence is to be demonstrated from the initial identification of a need or problem through to a design project's completion and the evaluation of a design plan's outcome in one of the following:
   – one single mechanical engineering design project where the candidate has cost, delivery, and performance accountability, or
   – a number of mechanical engineering design projects, which combined, show the candidate has cost, delivery, and performance accountability.

e Coordination of the design project stages may include but is not limited to – sketch proposals, feasibility report, design report, design analysis, design checks, review, handover.

Outcomes and evidence requirements

Outcome 1

Develop a design plan for a given mechanical engineering project.

Evidence requirements

1.1 Plan identifies the required project outcomes and customer specifications.

Range may include but is not limited to – performance, cost, completion time.

1.2 Plan identifies the stakeholders responsible for project activities, and specifies the frequency of project activities, recording requirements, reporting requirements, contingency actions, and review requirements.

1.3 Plan meets the worksite requirements for cost-effectiveness and productivity.

1.4 Plan specifies resources required, sources of supply, and timeframes for availability.

1.5 Plan is developed within delegated authority and in consultation with relevant stakeholders.

Outcome 2

Develop a design for a given mechanical engineering project.

Evidence requirements

2.1 Sketch designs are produced to evaluate options.

2.2 Sketch designs are reviewed to determine design risk.

Range may include but is not limited to – complexity, maturity of design solution, consequences.

2.3 Sketch design selected is expanded to a detailed design, is in accordance with worksite procedures and regulatory requirements, and is communicated to all affected stakeholders within agreed timeframe.

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Range design details may include but are not limited to – calculations, design codes and standards, manufacturability/constructability reviews, sketches, detail drawings and specifications, cost of manufacture.

2.4 Where amendments or re-aligned activities are required, they are tracked and recorded, comply with worksite procedures and regulatory requirements, and are communicated to all affected stakeholders within agreed timeframes.

2.5 Where amendments or re-aligned activities are required, the design standards and design risk are reviewed.

Range review processes may include but are not limited to – adhering to a modification control procedure, an independent review of the design calculations.

2.6 Design complies with quality assurance procedures, checks, and inspection requirements in accordance with worksite procedures and/or legislative requirements.

2.7 Progress reports and/or design project updates are completed and communicated to all affected stakeholders within agreed timeframes in accordance with worksite procedures.

Outcome 3

Evaluate a mechanical engineering design plan outcome.

Evidence requirements

3.1 Design outcome is evaluated in terms of meeting the design plan requirements.

3.2 Processes used to develop the design plan are described.

3.3 A record of design plan changes is referred to, and reasons for amendments or re-aligned activities are identified and explained.

3.4 Communication activities with stakeholders are described and are in accordance with worksite procedures.

3.5 Where applicable, improvements to the design plan and/or the planning cycle are recommended in accordance with worksite procedures.

Planned review date	31 December 2016

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Status information and last date for assessment for superseded versions

Process	Version	Date	Last Date for Assessment
Registration	1	27 October 2005	31 December 2014
Review	2	17 November 2011	N/A

Consent and Moderation Requirements (CMR) reference	0013

This CMR can be accessed at http://www.nzqa.govt.nz/framework/search/index.do.

Please note
Providers must be granted consent to assess against standards (accredited) by NZQA, before they can report credits from assessment against unit standards or deliver courses of study leading to that assessment.

Industry Training Organisations must be granted consent to assess against standards by NZQA before they can register credits from assessment against unit standards.

Providers and Industry Training Organisations, which have been granted consent and which are assessing against unit standards must engage with the moderation system that applies to those standards.

Requirements for consent to assess and an outline of the moderation system that applies to this standard are outlined in the Consent and Moderation Requirements (CMR). The CMR also includes useful information about special requirements for organisations wishing to develop education and training programmes, such as minimum qualifications for tutors and assessors, and special resource requirements.

Comments on this unit standard

Please contact Competenz on qualifications@competenz.org.nz if you wish to suggest changes to the content of this unit standard.

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