Title	**Demonstrate and apply knowledge of process or task improvements in mechanical engineering or fabrication**		
Level	**4**	**Credits**	**3**

Purpose	This unit standard is for use in a mechanical engineering or fabrication environment and is one of a series of three unit standards for assessing efficient and effective processes with 29560 and 29561. People credited with this unit standard are able to demonstrate knowledge of RCA tools, continuous improvement in a mechanical engineering or fabrication workplace, and return on investment in relation to a mechanical engineering or fabrication improvement; and apply root cause analysis to a problem and recommend cost effective improvements.

Classification	Mechanical Engineering > Engineering Core Skills

Available grade	Achieved

Recommended skills and knowledge	Unit standard 29560, *Demonstrate knowledge of efficient and effective workplace procedures in mechanical engineering or fabrication* and 29561, *Demonstrate knowledge of efficient and effective processes in mechanical engineering or manufacturing*, or demonstrate equivalent skills and knowledge.

Explanatory notes

1 Definitions

Accepted industry practice refers to approved codes of practice and standardised procedures accepted by the wider mechanical engineering industry sectors as examples of best practice.

Efficient and effective processes refers to processes that add value for customers with fewer resources through optimizing the flow of work, improving quality and reducing waste. This includes but is not limited to what is commonly referred to as Lean Manufacturing.

Root cause analysis (RCA) refers to a systematic process for identifying "root causes" of problems or events and an approach for responding to them.

Workplace procedures refers to procedures used by the organisation carrying out the work and applicable to the tasks being carried out. They may include but are not limited to – standard operating procedures, safety procedures, equipment operating procedures, codes of practice, quality management practices and standards, procedures to comply with legislative and local body requirements.

2 Assessment information
Examples/evidence given must be within the context of mechanical engineering or fabrication and must meet applicable worksite procedures and accepted industry practice. Numerous reference texts and training manuals on lean/process improvement are available and may be used; however no one textbook or source of information is envisaged.

3 For assessment purposes in Outcome 3, the following formula must be used to calculate return on investment (ROI):

$$\frac{gain\ from\ improvement - cost\ of\ improvement}{cost\ of\ improvement}$$

Outcomes and evidence requirements

Outcome 1

Demonstrate knowledge of RCA tools.

Evidence requirements

1.1 RCA tools are described, and their use in identifying the causes of problems is explained.

Range root cause analysis tools include but are not limited to - 5 whys, brainstorming, fishbone diagram, Pareto diagram.

Outcome 2

Demonstrate knowledge of continuous improvement in a mechanical engineering or fabrication workplace.

Evidence requirements

2.1 The principle of continuous improvement is described and the benefits of its implementation to a mechanical engineering or fabrication workplace are stated.

2.2 The stages of the continuous improvement cycle are described.

Range continuous improvement cycle - plan, do, check, adjust.

Outcome 3

Demonstrate knowledge of return on investment (ROI) in relation to a mechanical engineering or fabrication improvement.

Evidence requirements

3.1 ROI is described in terms of how it is used to evaluate the efficiency of an improvement.

3.2 ROI for a given improvement in a mechanical engineering or fabrication workplace is calculated.

Outcome 4

Apply RCA to a given mechanical engineering or fabrication problem and recommend cost effective improvements.

Range examples of the type and level of problem - tracking and ordering consumables or spares, fabricating or producing a simple component, mechanical failure of machinery.

Evidence requirements

4.1 A given problem is analysed using RCA and the root cause or causes are identified.

4.2 Alternative improvements to eliminate or minimise the problem are considered, and a cost effective improvement is recommended and justified in terms of ROI.

Planned review date	31 December 2021

Status information and last date for assessment for superseded versions

Process	Version	Date	Last Date for Assessment
Registration	1	21 July 2016	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 at qualifications@competenz.org.nz if you wish to suggest changes to the content of this unit standard.