



Australian Government

Department of Education, Employment and Workplace Relations

PMBTECH406A Diagnose production equipment problems

Revision Number: 1

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Modification History

Not applicable.

Unit Descriptor

Unit descriptor

This competency covers diagnosing the causes of products faults and problems arising from the equipment/plant. These problems may be caused by inappropriate process conditions and/or equipment faults. The competency does not include the rectification of such faults or equipment diagnostic skills more appropriate to maintenance tradespersons, but does include diagnosis to a sufficient level so that identification of faults as equipment or process based can be made and appropriate directions can be given to rectify the problem.

Application of the Unit

Application of this unit

This competency applies to technicians who are required to examine products which have faults, even though they may not be rejects, and determine the likely causes of such faults. The technician might also be required to examine production faults such as where the process as a whole is not performing adequately. The technician would then further investigate the likely equipment, plant and/or process causes of the faults and isolate the most probable cause and recommend the solution. They may then monitor the implementation of the solution and check that the fault has been fixed.

It includes:

- examining products
- identifying faults
- identifying fault causes
- recommending solutions to faults
- checking the fault has been rectified.

While this unit does not require 'hands on competence' for the operation of process equipment, it does require an understanding of the principles of operation of the equipment and the impact of process conditions and equipment faults or changes on the product characteristics/properties. It also requires an understanding of the quality/ inspection/testing regime and the results of this regime and how process conditions and equipment faults or changes impact these results of this regime.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisites

This unit has **no** prerequisites.

Employability Skills Information

Employability Skills

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

ELEMENT	PERFORMANCE CRITERIA
Elements describe the essential outcomes of a unit of competency	Performance criteria describe the required performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge and/or the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT ELEMENT	PERFORMANCE CRITERIA Performance criteria describe the required performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge and/or the range statement. Assessment of performance is to be consistent with the evidence guide.
1. Identify faults in products/production.	1.1 Examine products/production process. 1.2 Identify faults. 1.3 Categorise faults according to type/likely cause. 1.4 Prioritise faults for action.
2. Determine most probable possible cause(s) of fault	2.1 Analyse fault to determine possible causes. 2.2 Investigate possible causes to eliminate less probable causes. 2.3 Shortlist probable causes. 2.4 Check hypothesis of cause(s) is supported by the data available. 2.5 Identify most probable cause.
3. Implement solution to fault	3.1 Develop recommended solution to fault. 3.2 Check HSE implications of solution and modify solution as appropriate. 3.3 Communicate this recommendation as appropriate. 3.4 Check recommendation has been understood and can be implemented. 3.5 Check all hazard controls are in place. 3.6 Monitor progress of implementation. 3.7 Modify recommended solution as required.
4. Check fault solution has worked.	4.1 Monitor product/process for fault. 4.2 Monitor HSE impacts of changes. 4.3 Repeat analysis and solution process if required. 4.4 Update records and procedures to reflect successful solution.

Required Skills and Knowledge

This describes the essential skills and knowledge and their level required for this unit.

This competency requires a detailed understanding of:

- how the process/equipment works
- how raw material changes into product through the process/equipment
- impacts of different process conditions on the product
- impacts of different equipment settings/components on the product
- impacts of equipment failure/change/variation on the product
- product faults and their categories according to causes
- causes of all possible product faults due to process/equipment problems.

Note this is not primarily about faults caused by things outside the process/equipment (eg unspecified changes in feed/raw materials), but the possibility of this cause for a fault should be included as required knowledge.

Language, literacy and numeracy requirements

This unit requires the ability to communicate to operators, tradespeople and other technical experts about technical issues.

Reading is required to the level of being able to interpret and apply procedures, technical manuals and manufacturer manuals. Writing is also required to be able to write maintenance and similar requests/orders, update procedures and write equipment/process condition specifications.

Numeracy is required to interpret test data, technical specifications, instrument readings and measurements. Some calculation may be involved in developing and implementing solutions.

Evidence Guide

The Evidence Guide provides advice on assessment and must be read in conjunction with the Performance Criteria, Required Skills and Knowledge, the Range Statement and the Assessment Guidelines for this Training Package.

Overview of assessment

This competency requires the diagnosis of real product faults and the development and implementation of solutions to these faults. The diagnosis of a number of faults with different types of causes should be required.

A holistic approach should be taken to the assessment.

Assessors must be satisfied that the person can consistently perform the unit as a whole, as defined by the Elements, Performance Criteria and skills and knowledge.

Critical aspects

It is essential that competence is demonstrated in the knowledge and skills defined in this unit.

These may include the ability to:

- recognise defective product
- isolate one or two most likely causes, and justify the selection of those causes
- devise a permanent solution to the problem and justify that solution
- check that the solution works
- work with all the required people to make it happen.

Consistent performance should be demonstrated. For example, look to see that:

- defects with different root causes are analysed
- defects with both process condition and equipment problem causes are solved
- defects across the applicable range of products and processes are solved

Context of assessment

Competence in this unit may be assessed:

- on a processing plant as a routine part of the job
- as special projects on a processing plant
- using a suitable simulation and/or a range of case studies/scenarios
- through a combination of these techniques.

Method of assessment

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and theoretical assessment will be combined with appropriate practical/simulation or similar assessment. Assessors need to be aware of any cultural issues that may affect responses to questions.

Assessment processes and techniques must be culturally appropriate and appropriate to the oracy, language and literacy capacity of the assessee and the work being performed.

Specific resources for assessment

This section should be read in conjunction with the Range Statement for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

Access must be provided to appropriate learning and/or assessment support when required.

Where applicable, physical resources should include equipment modified for people with disabilities.

Range Statement

RANGE STATEMENT

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Add any essential operating conditions that may be present with training and assessment depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts.

Where reference is made to industry codes of practice and/or Australian/international standards, the latest version must be used.

Context

This competency applies to technicians who have a role of problem solving product faults as it relates specifically to equipment/process problems. While the technician will take the lead role in this activity, they will need to liaise with a range of people at all levels in the organisation to obtain information and to implement the solution.

This diagnosis and improvement may take place as a result of a problem where the fault level is causing reject product, or it may occur as part of continuous improvement, or a kaizen blitz or other situation where the products are not faulty, but are being improved.

Fault

A fault is any defect in a product, whether it causes the product to be defective or not.

Typical faults may include:

- colour variation (non-uniform, not to standard hue/intensity/opacity)
- surface blemishes (specs, marks)
- surface finish (gloss level, uneven)
- size/shape (distorted, wrong, variable)
- within specification, but highly variable, forms patterns etc (ie has 'assignable cause')
- strength/stiffness/physical properties (too high/low, variable, uneven)
- chemical properties
- physical/mechanical properties
- biological/biochemical/microbiological properties.

Examine

Examination of products/process may include:

- visual examination
- examination of product quality or other records
- examination of inspection records (if used)
- examination of test results (routine or otherwise)
- specific examination testing undertaken as part of a product improvement activity.

Possible causes

Possible causes include all feasible causes of the problem, before checking to eliminate some.

Investigate

Investigating possible causes includes:

- talking with operators and others
- checking machine histories for prevailing process conditions
- checking current process/equipment conditions
- carrying out small tests to determine the likelihood of a causal link between a condition and a fault.

Health Safety and Environment (HSE)

All operations to which this unit applies are subject to stringent health, safety and environment requirements, which may be imposed through State or Federal legislation, and these must not be compromised at any time. Where there is an apparent conflict between performance criteria and HSE requirements, the HSE requirements take precedence.

Procedures

All operations are performed in accordance with procedures.

Procedures means all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

Tools and equipment

This competency includes use of equipment and tools such as:

- laboratory test facilities for the product (although the conduct of tests is not part of this unit)
- equipment test instruments for checking the condition of plant (although the conduct of these tests may not be part of this unit).

Process/equipment conditions

Process/equipment conditions may include:

- settings such as temperature, pressure
- rates such as feed rate, flow rate
- setting and adjustment of equipment parts
- worn and broken equipment parts.
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Unit Sector(s)

Not applicable.