Title	**Undertake cause and effect analysis for heavy vehicle or machine component metal fatigue failure**		
Level	**5**	**Credits**	**10**

Purpose	People credited with this unit standard are able to: analyse component failure caused by metal fatigue; and reflect on learning experience in response to analysing component failure caused by metal fatigue.

Classification	Motor Industry > Automotive Workshop Engineering

Available grade	Achieved

Guidance Information

1 Evidence presented for assessment against this unit standard must be consistent with safe working practices and be in accordance with applicable service information, and company and legislative requirements. This includes the knowledge and use of suitable tools and equipment.

2 Legislation, regulations and industry standards relevant to this unit standard include but are not limited to the:
Health and Safety at Work Act 2015.

Any new, amended or replacement Acts, regulations, standards, codes of practice, guidelines, or authority requirements or conditions affecting this unit standard will take precedence for assessment purposes, pending review of this unit standard.

3 Definitions
Analyse refers to explaining the causes and effects of the failure/s. This may also involve establishing underlying and immediate causes, as well as short and long term consequences.
Company requirements refer to instructions to staff on policy and procedures that are available in the workplace. These requirements may include – company policies and procedures, work instructions, product quality specifications and legislative requirements.
Heavy vehicle refers to a motor vehicle that is of Class MD3, MD4, ME, NB, NC, TC or TD; or has a gross vehicle mass that exceeds 3500 kg and is not of a class specified in the Table of vehicle classes as listed from Waka Kotahi NZ Transport Agency website table Vehicle classes | Waka Kotahi NZ Transport Agency (nzta.govt.nz).
Service information refers to technical information for a vehicle, machine, or product detailing operation; installation and servicing procedures; manufacturer instructions; technical terms and descriptions; and detailed illustrations.

4 Range
Learning experience involves a reflection on the overall process to form a holistic viewpoint. This may refer to one or more learning experiences.
Machines may include – forklifts, earth moving equipment, grader equipment, loaders, dozers, tractors, agricultural equipment, dump trucks, prime movers; electric machines including – forklift, walk-behind pallet, ride-on pallet, reach truck, order picker, counterbalance truck, turret truck.

Outcomes and performance criteria

Outcome 1

Analyse component failure caused by metal fatigue.

Range may include – overheating, incorrectly specified coolant, lack of oil, incorrect oil pressure, faulty filtration, incorrectly specified oil, oil contamination, incorrect component clearances (excessive, minimal), misalignment, corrosion, over-speeding, wear (abrasive, scuffing, hammering, erosion, cavitation, electrolysis), seal failure, unbalanced components, distortion (mechanical and thermal), faulty assembly procedure, general wear and tear, abuse and lack of service, parts fitment; incorrect, damaged, or defective;
evidence of three different component failures, each on a different heavy vehicle or machine is required.

Performance criteria

1.1 Component failure is determined.

1.2 Component failure caused by metal fatigue is analysed.

Range analysis may include – operator description, diagnostic testing.

Outcome 2

Reflect on learning experience in response to analysing component failure caused by metal fatigue.

Performance criteria

2.1 Experience of analysing component failure caused by metal fatigue is reflected on and described in relation to the knowledge and analytical skills acquired.

2.2 Improvements to future cause and effect analysis procedures are identified based on own reflection.

Planned review date	31 December 2027

Status information and last date for assessment for superseded versions

Process	Version	Date	Last Date for Assessment
Registration	1	26 January 2023	N/A

Consent and Moderation Requirements (CMR) reference	0014

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

Comments on this unit standard

Please contact Hanga-Aro-Rau Manufacturing, Engineering, and Logistics Workforce Development Council qualifications@hangaarorau.nz if you wish to suggest changes to the content of this unit standard.