Australian Government
Department of Education, Employment and Workplace Relations

AURM441293A Analyse and repair complex performance driveline systems

Release: 1

INDUSTRY SKILLS COUNCILS
Creating Australia's Future

Modification History

Not applicable.

Unit Descriptor

This unit covers the competence to analyse and repair complex performance transmission, final drive and drivelines including engine to transmission drive couplings. This includes testing, determining repair or performance enhancement strategies, conducting repairs, adjustments and post-repair checks.

Prerequisite Unit(s)

(AURM340550A Conduct non-destructive testing
AURTL306666A Repair transmissions manual (light vehicle)
AURTL312666A Repair final drive assemblies (light vehicle)
AURTL313166A Repair final drive driveline (light vehicle))

Unit Sector

No sector assigned.

ELEMENT	PERFORMANCE CRITERIA
1. Identify and confirm the fault	1.1 Controlling body rules, category rules, supplementary regulations and team requirements are used to determine task specifications including configuration, equipment, quality and quantities 1.2 Benchmark specifications for a correctly functioning transmission/final drive/driveline are accessed and interpreted 1.3 OH&S requirements, including regulatory requirements, equipment and system isolation requirements and personal protection needs are observed throughout the work 1.4 The details of the fault are examined and available preliminary information is documented 1.5 The effects of the fault are identified and confirmed from direct or indirect evidence 1.6 Possible safety impacts of the fault are considered and responded to in accordance with regulatory and team obligations and practices
2. Prepare for fault analysis	2.1 Possible causes of the fault, including intermittent faults are identified from an analysis of technical support information and available on-board diagnostic systems 2.2 The most appropriate analysis process, including sequence, tests and testing equipment are developed and/or identified and selected from the range of available options

	2.3 Test equipment is obtained and prepared for the application in accordance with regulatory, manufacturers and team requirements
	2.4 Tooling and materials required to support the diagnostic process are identified, selected and prepared for use
	2.5 Complex performance driveline system components are prepared for the diagnostic process including isolation and cleaning requirements
3. Diagnose the fault and determine repair/ performance enhancement strategies	3.1 The selected analysis process is followed in accordance with technical specifications and directions and/or the locally authorised method
	3.2 Test and testing equipment are applied in accordance with regulatory requirements and the manufacturer/component supplier specifications
	3.3 Test results and other diagnostic findings are verified, if necessary by using reliable alternative or optional processes
	3.4 Authority is obtained to partly dismantle components, to permit an accurate inspection of analysed faults, if required
	3.5 Valid conclusions are drawn about the cause and the direct and indirect consequences of the fault are drawn from available evidence and documented to team requirements
	3.6 Options for rectifying the fault or enhancing performance are identified from research of technical support information
	3.7 The most appropriate option is selected from an analysis of the options, the prevailing circumstance, regulatory requirements and team policies
	3.8 The selected repairs/modifications or adaptation of equipment are documented and communicated to appropriate persons including the analysis outcome and repair requirements
4. Conduct repairs/ implement performance improvement strategies	4.1 Repairs and adjustments to components/sub-assemblies are carried out in accordance with manufacturer/component supplier specifications for methods, equipment used and tolerances relative to the system
	4.2 Post-repair checks and vehicle start-up are conducted
5. Clean up work area and finalise documentation	5.1 Test equipment and tooling is returned to be cleaned, maintained and prepared ready for further use or stored in accordance with manufacturer/component supplier specifications and team requirements
	5.2 Surplus and unserviceable components are removed in accordance with team procedures

5.3 Problems with the work area or the operation of the equipment are identified and reported to appropriate persons

5.4 Recording of work and vehicle documentation is inspected for completeness including component life records

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

Required skills

Ability to:

investigate the processing characteristics of fruits, vegetables, nuts, herbs and spices.

determine the seasonal availability and demand for fruits, vegetables, nuts, herbs and spices.

implement preparation and processing requirements for fruits, vegetables, nuts, herbs and spices

implement quality and food safety procedures for processing of fruits, vegetables, nuts, herbs and spices

arrange transportation of raw and processed fruits, vegetables, nuts, herbs and spices

determine the procedures and costings for packaging a range of fruit, vegetable, herb and spice products.

implement packaging procedures for fruits, vegetable, nuts, herb and spice products

Required knowledge

Knowledge of:

the physiology of fruits, vegetables, nuts, herbs and spices

the range of available fruits, vegetables, nuts, herbs and spices used in the food industry

the physiological changes that can occur to fruit, vegetables, nuts, herbs and spices during harvest and post-harvest treatment

the various methods of storage which assist to prolong the shelf life of fruits, vegetables, herbs and spices

the physiology of fruits, vegetables, nuts, herbs and spices

methods of cleaning and storage of fruit, vegetable, nuts, herb and spice products for sale as fresh produce or for further processing

manufacturing processes for pickled, canned, dried, and concentrated fruit, frozen and canned vegetables, herb and spice products

processes and inputs for jam and sauce production

REQUIRED SKILLS AND KNOWLEDGE
testing procedures for raw materials through to manufactured product stages of production, CCPs and critical limits packaging procedures quality and continuous improvement processes

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. Bold italicised wording, if used in the performance criteria, is detailed below. 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) may also be included.

Unit scope

- Work includes the analysis and maintenance of complex performance transmission, final drive and drivelines including engine-transmission drive couplings. This includes testing, determining repair or performance improvement strategies, conducting repairs, adjustments and post-repair checks
- A complex performance transmission is defined as one that is a specialised motorsport/performance component integrating two or more systems that use either mechanical, hydraulic, pneumatic or electrical/electronic media
- Driveline systems must cover sub-systems and components including clutches, torque converters, manual and automatic transmissions, drive shafts and final drives
- Diagnosis is to cover that for module and parts replacement in related electrical, electronic, pneumatic or hydraulic control systems
- Driveline system faults include abnormal gear wear, abnormal clutch operations, contamination, hard shifting, harshness, loose mountings, leaks, lubrication, noises, transmission slippage and vibrations.
- Driveline system faults must include indirect faults caused by the influence of external systems which may or may not be faulty in their primary operation

Unit context

- OH&S requirements include State/Territory and Commonwealth legislation, material safety management systems, controlling body requirements, manufacturer specifications and local safe operating procedures
- Work is carried out in accordance with legislative obligations (including environmental requirements), health regulations, manual handling procedures and team insurance requirements
- Work requires individuals to demonstrate analytical and organisational ability, judgement and problem-solving skills in the analysis and maintenance of complex performance driveline systems

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Tooling and equipment

- Tooling and equipment may include, but is not limited to:
  - hand tooling
  - manufacturer/component supplier specialist tooling
  - jacking and lifting equipment
  - measuring devices and test instruments
  - computerised diagnostic systems
  - computers and related software

Personal protective equipment

- Personal protective equipment is to include that prescribed under legislation, regulations and enterprise policies and practices

Information and procedures

- Controlling body rules, category rules and supplementary regulations
- Team procedures relating to applying diagnosing and maintaining complex performance driveline systems
- Team records of life of components
- Task instructions including worksheets, checklists, plans, drawings and designs
- Team procedures relating to reporting and communication
- Team procedures relating to the use of tooling and equipment
- Manufacturer/component supplier specifications and application procedures for test equipment and material
- Australian Design Rules (where applicable)

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.

Critical Aspects of evidence

- Interpret and apply team requirements, controlling body and category rules and supplementary regulations
- Apply safety requirements including the isolation of equipment and the use of personal protective equipment
- Follow task instructions, operating procedures and inspection processes to:
- minimise the risk of injury to self or others
- prevent damage to competition vehicle or equipment
- achieve required outcomes within team time and quality standards
- Correctly analyse, repair and conduct post-repair checks on a minimum of four (4) driveline systems faults (on more than one transmission type) which involves:
- selection, noise, vibration, harshness or slipping faults where:
- at least two have possible combination causes involved in the sub-systems (clutches, torque converters, transmission, drive shafts and final drives) or control systems
- the scope of the faults necessitates the use of a range of testing equipment
- Work effectively with others
- Modify activities to cater for variations in workplace context and environment

Underpinning knowledge

- Types, function, operations and limitations of complex performance transmission, final drive and drivelines including engine-transmission drive couplings such as clutches, torque converters, etc.
- Diagnosis and testing procedures and test instrument application
- Symptom and cause differentiation
- Repair and/or performance improvement strategies
- Removal, replacement and repair, adjustment and post-repair check procedures
- Diagnosis theory including concept, design and planning

- Record keeping procedures
- Procedures for reporting equipment faults and component defects
- Team guidelines regarding acceptable quality and tolerance levels
- Equipment safety requirements
- OH&S policies and procedures

Specific key competencies, underpinning and employability skills required to achieve the performance criteria

These include a number of processes that are learned throughout work and life, which are required in most jobs. Some of these are covered by the national key competencies,

although others may be added. The details below highlight how these competencies are to be applied in the attainment of this unit.

Application of the key competencies in this unit are to satisfy the nominated level in which:

Level 1 - relates to working effectively within set conditions and processes;

Level 2 - relates to the management or facilitation of conditions or processes; and

Level 3 - relates to the design, development and evaluation of conditions or process.

How will the candidate apply the following key competency in this unit? The candidate will need to:

Collect, analyse and organise information

Collect, organise and understand information related to the analysis and repair of complex performance driveline systems including the technical, regulatory, environmental and safety requirements

(Level 2)

Communicate ideas and information

Communicate ideas and information to enable clarification of requirements, coordination of work with supervisors and other workers and the reporting of work outcomes and resolution of problems

(Level 2)

Plan and organise activities	Plan and organise activities including the preparation and layout of the work area and the coordination of equipment, systems and material to avoid backtracking, workflow interruptions or wastage (Level 2)
Work with others and in a team	Work with others to foster the team by recognising dependencies and using cooperative approaches to optimise communication, workflow and productivity (Level 2)
Use mathematical ideas and techniques	Use mathematical ideas and techniques to correctly complete measurements and calculations required during the analysis and repair of complex performance driveline systems (Level 2)
Solve problems	Create and apply systematic diagnostic and problem-solving techniques to anticipate problems, avoid reworking and avoid wastage (Level 2)
Use technology	Use workplace technology related to the analysis and repair of complex performance driveline systems including tooling, measuring devices, test instruments, workshop equipment, calculators and computers (Level 2)
Resource implications	• Access to competition vehicles and associated test instruments in real or simulated situations involving the application of analysis and repair techniques and to the related computing, operational and inventory support systems • Access to real or simulated work areas, material,

	equipment and information on work specifications, team requirements, organisational procedures, safety procedures, regulations and quality standards
Method of assessment	• Assessment methods must confirm consistency of performance over time and in a range of workplace contexts • Assessment should be by direct observation of tasks and questioning on underpinning knowledge • Assessment should be conducted over time and may be in conjunction with assessment of other units of competence
Context of assessment	• Assessment may occur on the job or in a workplace simulated facility with process equipment, material, work instructions and deadlines