Australian Government

Department of Education, Employment and Workplace Relations

AURB318207B Design and build bicycle wheels

Release: 1

AURB318207B Design and build bicycle wheels

Modification History

Not Applicable

Unit Descriptor

Unit descriptor	This unit of competency describes the skills and knowledge required to design and safely build bicycle wheels with different hub, spoke and rim configurations. It requires the ability to understand specifications and use tools and equipment to inspect, repair and test bicycle wheels. No licensing, legislative, regulatory or certification requirements apply to this unit at the time of publication.

Application of the Unit

Application of the unit	This unit applies to individuals who undertake the design and building of bicycle wheels in a bicycle retail, service and repair environment. The unit requires building of a range of bicycle wheels with different hub, spoke and rim configurations. Build methods include assembly and manual adjustment of wheel components. Work requires individuals to demonstrate some judgement and problem-solving skills in managing own work activities and contributing to a productive team environment.

Licensing/Regulatory Information

Refer to Unit Descriptor

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Pre-Requisites

Prerequisite units		

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Gather information on bicycle wheel	1.1. Check customer requirements and confirm intended use of the unit being designed following workplace procedures 1.2. Research bicycle wheel design requirements and check specifications 1.3. Confirm bicycle wheel design and specifications with customer 1.4. Check tooling and equipment prior to use for conformity with specifications and safe condition
2. Prepare for building of bicycle wheel	2.1. Plan build sequence, including post-build checking process 2.2. Determine availability of tooling and equipment to meet job requirements 2.3. Prepare material list and determine availability 2.4. Prepare tooling and equipment and check to ensure they are in good working order 2.5. Prepare work area and materials
3. Build bicycle wheel	3.1. Perform build operations for bicycle wheel according to plan 3.2. Use personal safety equipment and precautions to protect others in the workplace 3.3. Handle and use tools and equipment safely 3.4. Check customer requirements and bicycle wheel specifications following build procedures
4. Test bicycle wheel and complete work	4.1. Operate built bicycle wheel through full range, noting test results, including non-conformity 4.2. Check built bicycle wheel, complete adjustments and prepare unit for delivery 4.3. Store portable tooling and equipment in approved designated areas 4.4. Clean work area and dispose of waste following workplace procedures 4.5. Update workplace records, customer file and warranty information as required by enterprise

Required Skills and Knowledge

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REQUIRED SKILLS AND KNOWLEDGE

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

Required skills

Required skills include:

- technical skills to the level required to safely use tooling and equipment to design and build a range of bicycle wheels, perform tests and make adjustments
- communication skills to the level required to confirm work requirements and specifications, to communicate effectively regarding work requirements with supervisor, other workers and customers, to report work outcomes and problems, and to relate to people from a range of social, cultural and ethnic backgrounds and of varying physical and mental abilities
- literacy skills to the level required to understand information related to work orders, including common industry terminology, plans and safety procedures, to prepare reports and interpret technical information and specifications related to various types of bicycle wheels, their components and spoke patterns
- numeracy skills to the level required to correctly calculate time, assess tolerances, apply accurate measurements, calculate material requirements and establish quality checks
- problem-solving skills to the level required to establish diagnostic processes which identify potential faults in wheel design, and identify technical and procedural problems to avoid planning and scheduling problems, and time and material wastage
- team skills to the level required to work effectively and cooperatively with others to optimise workflow and productivity

Required knowledge

Required knowledge includes:

- bicycle anatomy and terminology
- application of mechanical principles
- classification of bicycle wheels and identification of components
- purpose and requirements of bicycle wheels and their relationship to suspension, drivetrain, frame and steering systems
- material used in bicycle wheels
- design requirements of bicycle wheels
- use of tooling and equipment
- Australian standards applicable to bicycles
- applicable commonwealth, state or territory legislation, regulations, standards and codes of practice, including occupational health and safety (OHS), personal safety and environment, relevant to designing and building bicycle wheels
- organisational policies and procedures, including quality requirements, reporting and recording procedures, and work organisation and planning processes, related to

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REQUIRED SKILLS AND KNOWLEDGE
designing and building bicycle wheels

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Evidence Guide

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.	
Overview of assessment	
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently: • observe safety procedures and requirements • communicate effectively with others involved in or affected by the work • select methods and techniques appropriate to the circumstances • complete preparatory activity in a systematic manner • design and build a range of bicycle wheels to specification • complete workplace records.

Context of, and specific resources for assessment	• The application of competency is to be assessed in the workplace or a simulated environment that reflects as far as possible the actual working environment.
	• Assessment is to occur using standard and authorised work practices, safety requirements and environmental constraints.
	• Assessment is to comply with relevant regulatory requirements, including specified Australian standards.
	• Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability.
	• The following resources should be made available:
	  • a range of bicycle wheels and components
	  • equipment, hand and power tools appropriate to building wheels
	  • technical specifications and standards
	  • workplace documentation.

Method of assessment	• Assessment must satisfy the endorsed Assessment Guidelines of this Training Package. • Assessment methods must confirm consistency and accuracy of performance (over time and in a range of workplace relevant contexts) together with application of Required Skills and Knowledge. • Assessment methods must be by direct observation of

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EVIDENCE GUIDE	
	tasks and include questioning on Required Skills and Knowledge to ensure its correct interpretation and application. • Assessment may be applied under project-related conditions (real or simulated) and require evidence of process. • Assessment must confirm a reasonable inference that competency is able not only to be satisfied under the particular circumstance, but is able to be transferred to other circumstances. • Competence in this unit may be assessed in conjunction with other functional units which together form part of the holistic work role.
Guidance information for assessment	Assessment processes and techniques must be culturally sensitive and appropriate to the language and literacy capacity of the candidate and the work being performed.

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. 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.	
Wheels and components	Bicycle wheels and components may include: • steel, aluminium, deep dish, aero, composite material and disc type rims • high flange, low flange and integrated brake hubs • metal and composite hub material • steel, aluminium and composite spoke material • straight gauge, double butted and bladed spokes • spoke nipples • spoke lacing patterns • types of adhesives and surface coatings

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RANGE STATEMENT	
Tooling and equipment	Tooling and equipment may include: • hand tooling • hand-held power tooling • floor stands, workbench and wheel jigs
Materials	Materials may include: • a range of wheel components, including rims, spokes and hubs and cleaning materials
Wheel design and build considerations	Wheel design and build considerations may include: • the principles and materials used in wheel building • hubs, spoke and rim selection • lacing a 32 hole 3 cross spoke pattern • other spoke patterns and variations • disc and non-disc brake specific patterns • factory wheel set designs and technology • tieing and soldering spokes • calculating spoke lengths • building a 3 or 4 cross wheel in symmetrical or asymmetrical patterns • truing and tensioning a wheel • wheel design and symmetry • wheel dynamics and loading
Information/documents	Information/documents may include: • verbal or written and graphical instructions, signage, work schedules/plans/specifications, work bulletins, memos, material safety data sheets (MSDS), diagrams or sketches • safe work procedures related to designing and building bicycle wheels • regulatory/legislative requirements pertaining to bicycle safety • engineer's design specifications and instructions • organisation work specifications and requirements • instructions issued by authorised enterprise or external persons • Australian standards

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RANGE STATEMENT	
OHS requirements	OHS requirements are to be in accordance with applicable commonwealth, state or territory legislation and regulations, and organisational safety policies and procedures, and may include: • personal protective equipment and clothing • safety equipment • first aid equipment • hazard and risk control • elimination of hazardous materials and substances • manual handling, including shifting, lifting and carrying • emergency procedures
Legislative requirements	Legislative requirements are to be in accordance with applicable commonwealth, state or territory legislation, regulations, certification requirements and codes of practice, and may include: • award and enterprise agreements • industrial relations • Australian standards • Australian Design Rules • confidentiality and privacy • OHS • the environment • equal opportunity • anti-discrimination • relevant industry codes of practice • duty of care
Environmental requirements	Environmental requirements may include: • waste management • noise • dust • clean-up management
Quality requirements	Quality requirements may include: • regulations, including Australian standards • internal organisational quality policies and procedures • enterprise operations and procedures

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RANGE STATEMENT	
Organisational policies and procedures	Organisational policies and procedures may include: • quality policies and procedures, including Australian standards • OHS, sustainability, environment, equal opportunity and anti-discrimination • manufacturer specifications and industry codes of practice • safe work procedures • reporting and recording procedures

Unit Sector(s)

Unit sector	Bicycle

Co-requisite units

Co-requisite units		

Competency field

Competency field	

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