



**Australian Government**

**Department of Education, Employment and Workplace Relations**

# **CPPBDN5002A Research construction materials and methods for small-scale non-residential building design projects**

Release: 1

## **CPPBDN5002A Research construction materials and methods for small-scale non-residential building design projects**

### **Modification History**

New unit

### **Unit Descriptor**

This unit of competency specifies the outcomes required to research and evaluate existing, new and emerging construction materials and methods for all commercial and industrial building design projects covered by the Building Code of Australia (BCA), except construction Type A buildings.

It also covers the development of an understanding of the range of construction materials and methods available and their application, performance and interaction.

### **Application of the Unit**

This unit of competency supports building designers and other personnel, such as home sustainability assessors, who recommend construction materials and methods to clients for small-scale commercial and industrial building design projects.

### **Licensing/Regulatory Information**

Work in this area must be completed according to relevant legislative, industry and organisational requirements, including occupational health and safety (OHS) policies and procedures.

Different states and territories may have regulatory mechanisms that apply to this unit. Users are advised to check for regulatory limitations.

### **Pre-Requisites**

Not applicable.

### **Employability Skills Information**

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. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

## Elements and Performance Criteria

- |   |  |     |   |
|---|--|-----|---|
| 1 | Research materials and methods for structural elements | 1.1 | <i>Characteristics and applications of materials used for structural elements</i> are <b><i>researched</i></b> and evaluated in relation to different types of <b><i>small-scale commercial and industrial building design projects</i></b> . |
|   |  | 1.2 | <b><i>Compliance requirements</i></b> for materials used for structural elements are researched and interpreted.  |
|   |  | 1.3 | Construction methods and systems for structural elements are researched and evaluated.  |
|   |  | 1.4 | Research is recorded, filed and regularly updated according to workplace procedures.  |
| 2 | Research materials and methods for building envelope   | 2.1 | Characteristics and <b><i>applications of materials used for building envelope</i></b> are researched and evaluated.  |
|   |  | 2.2 | Compliance requirements for materials used for building envelope are researched and interpreted.  |
|   |  | 2.3 | Construction methods and systems for building envelope are researched and evaluated in relation to different types of materials and commercial and industrial building design projects.   |
|   |  | 2.4 | Research is recorded, filed and regularly updated according to workplace procedures.  |
| 3 | Research systems and components for services.          | 3.1 | Components and systems for <b><i>services</i></b> are researched and evaluated.   |
|   |  | 3.2 | Broad compliance requirements for services are researched and interpreted for different types of commercial and industrial building design projects.  |

- 3.3 Installation methods for services are researched in relation to different types of components, systems, and commercial and industrial building design projects.
- 3.4 Research is recorded, filed and regularly updated according to workplace procedures.

## Required Skills and Knowledge

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

### Required skills

- administration and management skills to:
  - manage documents
  - manage time, including planning and prioritising work
  - plan and arrange professional development activities to update own knowledge base
- analytical and problem-solving skills to:
  - evaluate cost-effectiveness of construction materials and methods
  - research construction materials and methods
- interpersonal skills to:
  - interact with builders, manufacturers, representatives of regulatory authorities, and suppliers
  - network with other professionals
- language, literacy and numeracy skills to:
  - assess cost-effectiveness of materials and components
  - communicate with colleagues and contacts, including writing reports
  - interpret complex information
- technology skills to use information technology and relevant software

### Required knowledge

- building designers' duty of care to ensure quality and safety of designs
- basic principles of structural engineering
- compliance requirements, including:
  - Australian standards applicable to construction materials and methods
  - BCA deemed-to-satisfy requirements
  - environmental and sustainability requirements, including:
    - energy efficiency
    - fire resistance, including resistance to bushfire attack
    - legislation applicable to construction materials and methods
- hazards of construction materials and methods
- organisational scope of business and client demographics, including:
  - geographic areas of operation
  - trends in clients' design preferences
  - types of building design projects that form the core business of the organisation

- sources of reliable information on past, current and emerging uses of construction materials and methods
- sustainable construction materials and methods

## 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 for assessment and evidence required to demonstrate competency in this unit	<p>A person should demonstrate the ability to:</p> <ul style="list-style-type: none"> <li>• develop a body of current research findings suitable for application to a range of small-scale commercial and industrial buildings, including: <ul style="list-style-type: none"> <li>• characteristics and applications of materials suitable for structural elements and building envelope</li> <li>• construction methods and systems applicable to structural elements and building envelope</li> <li>• components and systems for services, including: <ul style="list-style-type: none"> <li>• compliance requirements</li> <li>• installation methods</li> </ul> </li> </ul> </li> <li>• evaluate suitability of materials, construction methods and services for at least three specific projects, covering different types of buildings</li> <li>• systematically document and store research findings.</li> </ul>
Context of and specific resources for assessment	<p>Assessment of this unit:</p> <ul style="list-style-type: none"> <li>• must be in the context of the work environment</li> <li>• may be conducted in an off-site context, provided it is realistic and sufficiently rigorous to cover all aspects of workplace performance, including task skills, task management skills, contingency management skills and job role environment skills</li> <li>• must meet relevant compliance requirements.</li> </ul> <p>Resource implications for assessment include:</p> <ul style="list-style-type: none"> <li>• access to: <ul style="list-style-type: none"> <li>• suitable assessment venue and equipment</li> <li>• suitable simulated or real opportunities and resources to demonstrate competence</li> </ul> </li> <li>• assessment instruments.</li> </ul>
Method of assessment	<p>Assessment for this unit must verify the practical application of the required skills and knowledge, using one or more of the</p>

	<p>following methods:</p> <ul style="list-style-type: none"><li>• written and/or oral assessment of the candidates required knowledge for the unit</li><li>• observed, documented and/or firsthand testimonial evidence of the candidates</li><li>• implementation of appropriate procedures and techniques for the safe, effective and efficient achievement of the required outcomes</li><li>• identification of the relevant information and scope of the work required to meet the required outcomes</li><li>• identification of viable options and the selection of options that best meet the required outcomes</li><li>• consistently achieving the required outcomes.</li></ul>
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Guidance information for assessment	<p>This unit could be assessed on its own or in combination with other units relevant to the job function.</p> <p>Where applicable, physical resources should include equipment modified for people with disabilities.</p> <p>Access must be provided to appropriate learning and/or assessment support when required.</p> <p>Assessment processes and techniques must be culturally appropriate, and appropriate to the language and literacy capacity of the candidate and the work being performed.</p>
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## 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.

<b><i>Characteristics of materials</i></b> may include:	<ul style="list-style-type: none"> <li>• acoustic properties</li> <li>• aesthetic properties</li> <li>• availability</li> <li>• cost</li> <li>• defects</li> <li>• durability</li> <li>• fire resistance properties</li> <li>• health and safety issues</li> <li>• interaction with other materials</li> <li>• limitations due to manufacturing process</li> <li>• structural safety</li> <li>• sustainability features, such as energy efficiency</li> <li>• thermal properties</li> <li>• tolerance</li> <li>• transport, storage and handling requirements.</li> </ul>
<b><i>Applications of materials used for structural elements</i></b> may include:	<ul style="list-style-type: none"> <li>• aesthetic properties</li> <li>• coatings required</li> <li>• compatibility with other elements</li> <li>• fixings required</li> <li>• structural application</li> <li>• substructural application</li> <li>• use in specific construction methods or systems.</li> </ul>
<b><i>Materials used for</i></b>	<ul style="list-style-type: none"> <li>• bricks</li> </ul>

*structural elements* may include:

- clay
- composite materials
- concrete
- glass
- masonry
- metals
- new and emerging materials
- stone
- timber and timber products.

<b><i>Structural elements</i></b> may include:	<ul style="list-style-type: none"> <li>• floors</li> <li>• footings</li> <li>• roof structures and roofing</li> <li>• slabs</li> <li>• walls.</li> </ul>
<b><i>Research</i></b> may be:	<ul style="list-style-type: none"> <li>• consultation with: <ul style="list-style-type: none"> <li>• builders</li> <li>• clients</li> <li>• manufacturers</li> <li>• representatives of regulatory authorities</li> <li>• suppliers</li> </ul> </li> <li>• data analysis and comparison, including: <ul style="list-style-type: none"> <li>• manufacturer specifications</li> <li>• performance test information</li> </ul> </li> <li>• literature review, including peer assessments.</li> </ul>
<b><i>Small-scale commercial and industrial building design projects:</i></b>	<ul style="list-style-type: none"> <li>• include all commercial and industrial building design projects covered by the BCA, except construction Type A buildings</li> <li>• may be: <ul style="list-style-type: none"> <li>• factories</li> <li>• motels</li> <li>• offices</li> <li>• restaurants</li> <li>• retail and service outlets</li> <li>• warehouses.</li> </ul> </li> </ul>
<b><i>Compliance requirements</i></b> may include:	<ul style="list-style-type: none"> <li>• Australian standards (AS)</li> <li>• BCA</li> <li>• legislation</li> <li>• performance requirements specified by client</li> <li>• quality standards specified by client.</li> </ul>
<b><i>Applications of materials used for building envelope</i></b> may include:	<ul style="list-style-type: none"> <li>• cladding</li> <li>• flashing</li> <li>• lining</li> <li>• roofing</li> <li>• waterproofing.</li> </ul>
<b><i>Materials used for building envelope</i></b> may include:	<ul style="list-style-type: none"> <li>• composite materials</li> <li>• masonry, such as: <ul style="list-style-type: none"> <li>• bricks</li> <li>• clay</li> <li>• concrete</li> <li>• glass blocks</li> </ul> </li> </ul>

	<ul style="list-style-type: none"><li>• slate</li><li>• stone</li><li>• terracotta</li><li>• new and emerging materials</li><li>• plaster and plasterboard</li><li>• timber and timber products.</li></ul>
<i>Services</i> may include:	<ul style="list-style-type: none"><li>• electricity</li><li>• environmentally sustainable design (ESD) energy systems</li><li>• fire suppression</li><li>• gas, including:<ul style="list-style-type: none"><li>• natural gas</li><li>• liquefied petroleum gas (LPG)</li></ul></li><li>• heating, ventilation and cooling (HVAC)</li><li>• telecommunications</li><li>• water.</li></ul>

## Unit Sector(s)

Building design

## Custom Content Section

Not applicable.