



Australian Government

Department of Education, Employment and Workplace Relations

CPPBDN8001A Research and evaluate construction materials and methods for complex building design projects

Release: 1

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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 building design projects, including construction Type A buildings.

The selection of materials and construction methods significantly affects the cost and construction time for completion of a building. Interaction with the client and other related professionals who participate in the development of projects is essential for effective outcomes. The need to have or acquire up-to-date information about the relative performance, cost and application of a range of current and emerging materials and methodologies is essential.

Application of the Unit

This unit of competency supports building designers who recommend construction materials and methods to clients for building design projects for construction Type A buildings as defined within the Building Code of Australia (BCA).

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	Determine parameters for the building design project	1.1	Client is consulted to determine key business requirements of the proposed project that will impact on building materials and methods.
		1.2	Size, breadth and complexity of the building project and the impact on building materials and methods are discussed and clarified with the client and with planning authorities.
		1.3	Impact of building site characteristics on the potential materials and methods of construction is discussed and clarified with the client, planning authorities and other project professionals .
2	Research alternative solutions	2.1	BCA requirements for use of alternative and deemed-to-satisfy-solutions are researched and evaluated in relation to the development of design options for the project.
		2.2	Benefits and options for the use of alternative solutions in the development of designs are researched and evaluated.
		2.3	Comparative analysis is undertaken of alternative and deemed-to-satisfy design solutions.
3	Research materials and methods for structural elements	3.1	Characteristics and applications of materials used for structural elements are researched and evaluated in relation to different types of large and complex projects .
		3.2	Compliance requirements for materials used for structural elements are researched and interpreted.
		3.3	Construction methods and systems for structural elements are researched and evaluated in relation to

- different types of materials and large and complex building design projects.
- 3.4 Research is recorded, filed and regularly updated according to workplace procedures.
- 4 Research materials and methods for enclosures
- 4.1 Characteristics and ***applications of materials used for enclosures*** are researched and evaluated.
- 4.2 Compliance requirements for ***materials used for enclosures*** are researched and interpreted for different types of large and complex building design projects.
- 4.3 Construction methods and systems for enclosures are researched and evaluated.
- 4.4 Research is recorded, filed and regularly updated according to workplace procedures.
- 5 Research systems and components for services
- 5.1 Components and systems for ***services*** are researched and evaluated.
- 5.2 Broad compliance requirements for services are researched and interpreted for different types.
- 5.3 Installation methods for services are researched in relation to different types of components, systems and design projects.
- 5.4 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
- analytical and problem-solving skills to:
 - evaluate cost-effectiveness of construction materials and methods
 - research construction materials and methods
 - evaluate alternative building materials and methods and recommend approaches
- interpersonal skills to:
 - interact with builders; manufacturers; related professionals including architects, surveyors and structural engineers; representatives of regulatory authorities; and suppliers
 - network with other professionals
- language, literacy and numeracy skills to:
 - communicate with colleagues and contacts, including writing reports
 - interpret complex information
- technical skills to ensure compliance with BCA and related standards
- technology skills to use information technology and relevant software

Required knowledge

- compliance requirements relating to construction materials and methods, including:
 - Australian standards
 - BCA deemed-to-satisfy requirements for construction Type A buildings
 - BCA alternative solution requirements for construction Type A buildings
 - Building Acts
- environmental and sustainability requirements, including:
 - Australian standards
 - techniques for carbon dioxide reduction, including specification of materials, glue and paint
 - energy efficiency
 - fire resistance levels
 - legislation

- town planning and other planning body requirements
- hazards of construction materials and methods
- planning authority compliance requirements for the use of building materials and methods related to large and complex buildings and including alternative solutions
- organisational scope of business and client demographics, including:
 - geographic areas of operation
 - trends in client 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	A person should demonstrate the ability to: • develop a body of current research findings suitable for application to a range of construction Type A buildings, including: • characteristics and applications of materials suitable for structural elements and building envelope • construction methods and systems applicable to structural elements and building envelope • components and systems for services • evaluate suitability of materials, construction methods and services for at least two specific construction Type A building projects covering different types of buildings • systematically document and store research findings.
Context of and specific resources for assessment	Assessment of this unit: • must be in the context of the work environment • 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 • must meet relevant compliance requirements. Resource implications for assessment include:

	• access to: • suitable assessment venue and equipment • suitable simulated or real opportunities and resources to demonstrate competence • assessment instruments.
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Method of assessment	Assessment for this unit must verify the practical application of the required skills and knowledge, using one or more of the following methods: - written and/or oral assessment of the candidates required knowledge for the unit - observed, documented and/or firsthand testimonial evidence of the candidates - implementation of appropriate procedures and techniques for the safe, effective and efficient achievement of the required outcomes - identification of the relevant information and scope of the work required to meet the required outcomes - identification of viable options and the selection of options that best meet the required outcomes - consistently achieving the required outcomes.
Guidance information for assessment	This unit could be assessed on its own or in combination with other units relevant to the job function. Where applicable, physical resources should include equipment modified for people with disabilities. Access must be provided to appropriate learning and/or assessment support when required. Assessment processes and techniques must be culturally appropriate, and appropriate to the language and literacy capacity of the candidate and the work being performed.

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.

Key business requirements of the project may include:	- characteristics and needs of the occupants of the proposed building - cost constraints - purpose for building development project, including whether the usage (classification) of the building is to be changed - timeframe for project commencement and completion.
Other project professionals may include:	- access consultants - acoustics engineers and professionals - bushfire management professionals

	• construction contractors • civil engineers • energy efficiency experts • fire systems designers and engineers • hydraulic engineers • landscape designers • lighting specialists • mechanical services engineers • OHS experts • plumbing and drainage professionals • quantity surveyors • service contractors • soil testing or geo-technical engineers and experts • structural engineers • surveyors.
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Characteristics of materials may include:	• acoustic properties • aesthetic properties • availability • carbon dioxide reduction, including materials, glues and paints • cost • defects • durability • fire resistance properties • green roofs • health and safety issues • interaction with other materials • limitations due to manufacturing process • structural safety • sustainability features, such as energy efficiency • thermal properties • tolerance • transport, storage and handling requirements.
Applications of materials used for structural elements may include:	• aesthetic properties • coatings required • compatibility with other elements • fixings required • structural application • substructural application • use in specific construction methods or systems.
Large and complex projects include:	• construction Type A buildings defined by the BCA, which are projects that are: • of 3 storeys for Class 2, 3 and 9 buildings • of 4 or more storeys for Class 5, 6, 7 and 8 buildings • construction projects, which may be: • new buildings • renovations • conversions • residential • commercial • industrial • public buildings. Note: It is essential to refer to current BCA documentation to ensure accuracy of definitions and scopes.
Compliance requirements may	• Australian standards • BCA

include:	• legislation • performance requirements specified by client • quality standards specified by client.
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<i>Materials used for structural elements</i> may include:	• bricks • clay • composite materials • concrete • glass • masonry • metals • new and emerging materials • stone • tilt up concrete panels • timber and timber products.
<i>Structural elements</i> may include:	• footings, including: • concrete pad • piles • post and concrete strip • floors, including: • bearers and joists • pier and beam • slabs, including: • raft • suspended • waffle • walls, including: • concrete • frame • post and beam • solid masonry • roofs, including: • conventional • truss.
<i>Applications of materials used for enclosures</i> may include:	• cladding • flashing • lining • roofing • waterproofing.
<i>Materials used for enclosures</i> may include:	• composite materials • new and emerging materials • plaster and plasterboard • slate

	• terracotta • timber and timber products.
Services may include:	• electricity • fire suppression • gas • heating, ventilation and cooling • telecommunications • water.

Unit Sector(s)

Building design

Custom Content Section

Not applicable.