Cross-Laminated Timber Building Systems Project

Summary of Feedback, Responses and Actions

24 August 2018

This project includes 4 new units of competency (common to this project and the Prefabricated Building Systems Project) and 21 revised units of competency within the FWP Forest and Wood Products Training Package.

Draft materials were developed as a result of initial input from industry experts and were made available for broader stakeholder feedback between 9 August and 24 August 2018.

During this time, feedback was received via email, the online feedback hub and telephone.

As a direct result, a number of changes were made to the documents under review. Most notably:

New units

- required frequency and volume of evidence has been amended in the performance evidence for all 4 units in line with feedback received from stakeholders: i.e. 'There must be evidence that, on at least three occasions, the individual has completed the following activities for two or more panelised or modular prefabricated timber building system types:'
- knowledge evidence has been edited to improve readability without modifying the content, e.g. relevant requirements have been grouped under second level dot points
- foundation skills requirements have been completed and aligned with the Standards for Training Package 2012.

Revised units

- terminology has been updated in most units to reflect the current terms used within the industry, particularly for products
- workplace health and safety requirements have been updated in performance criteria and performance evidence of most units for alignment between sections and consistency
- application section has been updated in most units to clarify the intent of the units
- the range of products in some units has been expanded to include cross laminated timber and Glulam
- foundation skills have been revised in all units for compliance with standards for training package
- most units have had a title and code change to reflect current industry terminology and for compliance with the Standards for Training Package.

Attachment 1 lists all the issues raised during the broad industry feedback and how these issues have been addressed. Resolutions have been constructed to take into account the needs and views of stakeholders to the extent possible and to comply with the Standards for Training Package. The resolutions may represent a compromise on one or more stakeholder views with the aim of a functional outcome for industry, State and Territory Training Authorities (STAs) and training providers.

The documents have been updated to reflect this feedback and are now available to view and validate on the Skills Impact website until 14 September 2018.

Please note: additional feedback is being sought regarding the packaging of new units within existing FWP qualifications as part of the Validation process.

Attachment 1: Issues raised and proposed resolution

New units

Stakeholder comments and identified issues		Consideration and proposed resolution
FWPXXX000 Install prefabricated timber building on-site		
Employee representative organisation, national	The terminology used in the on-site installation unit does not reflect what is commonly used in the building and construction industry, e.g. what is meant by '*construction operators"*? Does this refer to construction workers generally or mean plant/crane operators?	Adopted. '*Construction operators'* has been replaced with *'construction workers'*.
Employee representative organisation, national	Regarding the performance criteria for plan and prepare for the task, the wording does not reflect commonly used terms in the construction industry. As an example, refer to the wording commonly used in construction industry competency standards: *'1.1 Review task instructions, seek clarification if necessary, and obtain relevant workplace information.* *1.2 Obtain all information, including safe work method statement (SWMS), required to ensure that activities are performed in compliance with workplace-specific and safe work requirements.* *1.3 Obtain information required to ensure that the inspection, use, maintenance and storage of equipment complies with manufacturers' directions.* *1.4 Identify workplace and task-specific hazards and identify required risk-control and safety measures and equipment, including, among other items, any required signs and barricades, personal protective equipment (PPE), and fall prevention and fall arrest equipment.'*	Adopted. Relevant performance criteria have been amended, and items now read as follows: *1.1 Obtain all workplace health and safety information including safe work method statements (SWMS) and fire prevention and emergency procedures to ensure that activities are performed in compliance with workplace-specific and safe work requirements* *1.2 Identify workplace and task-specific hazards and report accidents, incidents or near misses through on-site installation in line with workplace health and safety requirements to maintain a safe workplace* *1.3 Identify and use required risk-control and safety measures and equipment, including, among other items, any required signs and barricades, personal protective equipment (PPE), and fall prevention and fall arrest equipment in line with workplace health and safety requirements* *2.1 Obtain and review relevant workplace information including task instructions, drawings, design specifications, schedules and manufacturer information and seek clarification if necessary* *2.6 Obtain information required to ensure that the inspection, use, maintenance and storage of equipment complies with manufacturer directions*

Employee representative organisation, national	Why *'occupations'* is included in performance criteria 4.5?	Adopted. The word *'occupations'* has been removed.
Employee representative organisation, national	Current performance evidence limits the assessment to the coordination and installation of at least one prefabricated timber building system. This may not be sufficient to show competency, suggesting that assessment should require the installation on at least three occasions and with at least two different building systems. I note that the different types of building systems are not explicitly identified in the unit.	Adopted. The performance evidence has been amended, and it now reads as follows: *There must be evidence that, on at least three occasions, the individual has completed the following activities for two or more panelised or modular prefabricated timber building system types including:* • *cross laminated timber floor and wall systems* • *post and beam systems (Glulam, laminated veneer lumber)* • *panelised floor cassette systems* • *panelised wall systems (including cladding, insulation, windows and doors)* • *panelised and pre-finished wall system (inclining above, electrical, mechanical, plumbing and lining)* • *pre-finished and fully finished timber-based modules* **Note that a similar requirement has also been included in the design and off-site manufacture units.**
Employee representative organisation, national	In the 2nd dot point of the knowledge evidence *'access and regress'* should be *'access and egress'.* What *'adequate space for working safely with large building'* means?	Adopted. Adopted. *'Adequate space for working safely with large building'* has been removed.
Employee representative organisation, national	In the assessment conditions the dot point under relationships should be: *'team member(s) including licenced crane operator and licenced dogger to lift timber building systems'*	Adopted. The sentence has been amended as suggested.
Industry, NSW and QLD	Does assisting crane operator or dogger require a specific ticket?	The Application specifies that the unit targets construction workers, carpenters or joiners and site supervisors. As a result, it is expected that the learner has an appropriate trade training. The Application also makes the following statement:

		"This unit does not cover or replace trade skills required in construction operations but is to be used in conjunction with construction trade qualifications."
Industry, national	Regarding what types of prefabricated timber building systems should be covered in the installation unit, the following examples of panelised and modular prefabricated timber building systems should be covered: • Cross Laminated Timber floor & wall systems • Post and beam systems (Glulam, LVL) • Panelised Floor Cassette Systems • Panelised Wall Systems (incl. cladding, insulation, windows & doors) • Panelised & Pre-finished Wall System (incl. above + electrical, plumbing & lining) • Pre-finished & Fully finished timber-based modules	Adopted. Please also refer to an item above.
FWPXXX000 Apply critical workplace processes in the offsite manufacture of timber building systems		
Industry, NSW and QLD	In regard to element 3 for checking the quality of building materials before assembly work begins: • provide instructions on ensuring materials used are not non-conforming building products • look to verify product certification and fit for purpose	Adopted. Performance criteria have been amended, and items now read as follows: *3.1 Obtain and ~~R~~review task-specific information including design and production documents to ensure that product quality ~~and quantity requirements~~ and production schedules and targets ~~related to the assembly work~~are met and materials used are conforming building products* *3.2 Receive building materials, elements, components, fixings and sub-assemblies from previous work at the point of storage, check quantity, relevant product certification and quality, including that product is fit-for-purpose, and ~~use~~ assemble as required to meet design specifications, standards, codes, certification and production schedule* *3.3 Ensure partition walls, floor elements and other regulated components are tested and certified for thermal, acoustic and fire properties according to the design, local codes and standards* *3.4 Report any incorrect information, unsuitable and non-conforming building materials or resources ~~or~~ and incoming defects to appropriate*

		personnel for repairing the defect, resolving its root cause and preventing recurrence
FWPXXX000 Design timber building systems for compliance, off-site manufacture and on-site installation		
Industry, NSW and QLD	The prerequisite for this unit is Nil yet item 2.2, 2.3, 2.4 would possibly require an engineering background. The performance criteria should be more around the understanding of the relevant disciplines and capability to discuss and contribute rather than the doing of the designs.	Adopted. Performance criteria have been amended, and items now read as follows: *2.2 Discuss ~~Determine and apply appropriate~~ structural design actions with appropriate engineers to ensure that the timber building system meets the minimum NCC structural requirements and performs without risks when used as intended through its design life* *2.3 ~~Use~~ Obtain experimental and observational data for the strength of materials, structural components, connections or assemblies to determine design values and consult with appropriate engineers to ~~provide a required level of assurance and verifiability for~~indicate the actual robustness and reliability of the physical building system* *2.4 Contribute to the design ~~Vv~~erif~~y~~ication ~~the design~~ for structural compliance and ~~document the~~ process documentation in line with the NCC, standards and codes to facilitate design certification and approvals*
Consultant, national	Regarding knowledge evidence, it is too wordy. Batch knowledge requirements and be less detailed - i.e., safety issues, then second level points.	Adopted. Knowledge evidence has been streamlined in the new units, without modifying the content.
Higher education, VIC	It covers a large range of points for prefabricated timber building construction. It is good to see the highlights on design considerations for transportation, lifting and installation. These considerations should not only be placed to structural members but also non-structural components and connections. The latter appear more vulnerable to the actions during transportation, lifting and installation. It is reasonable and understandable that fire resistance is given much attention and focus here for prefabricated timber buildings. This is obvious and nothing wrong here.	Adopted. The knowledge evidence has been streamlined for this unit, with the following showing the amendments adopted to incorporate this feedback. • *considerations and industry-accepted design solutions for prefabricated timber building systems (including structural and non-structural timber components and connections) as required by NCC, standards and technical design guides for:* • *structural robustness, verification methods and traceability of risks*

	There are other performance aspects of timber structural members and prefabricated buildings that have not been highlighted, such as ductility, durability and waterproofing. Timber is an orthotropic and brittle material and therefore structural design and consideration in terms of ductility and energy dissipation capacity aspect may be reminded for attention. Durability considerations should be given not only to timber members but also their connections (bolted and screw connections in particular). The latter may be more critical for both outdoor and indoor environments due to the penetration of moisture and humidity into timber. This also raises the importance of waterproofing.	• *structural durability with reference to environmental and specific conditions affecting durability of timber components and connections~~timber building systems~~, high risk areas within the building structure (including bathroom and external walls), specific hazards (particularly insect and fungal attack, weathering, moisture exposure and fire) and solutions considering preservative treatments, moisture contents, weatherproofing insulations and cladding* • *fire engineering measures, sound propagation and thermal resistance with reference to structural deflection of fire-rated elements~~,~~ and use of fire, ~~weatherproofing,~~ vibrational/acoustical and thermal insulations~~; and~~ relevant design procedure for joint/connections involving timber structures to retain the integrity of insulation, material and system while~~,~~ considering effects of transport, handling and installation processes on connections ~~and integrity of insulation, material and system~~* • *acceptable tolerances for material quality, off-site manufacture and on-site installation* • *services installation (hydraulic, electrical, mechanical, fire protection and acoustic systems)* • *health and safety risks in relation to off-site manufacture, storage, transportation, on-site installation, use and maintenance of prefabricated timber building system* • *transportation and lifting requirements with reference to different load characteristics and appropriate road trucks and cranes or lifting plants, factors influencing lifting stability, ~~timber~~ behaviour/fatigue of timber and connections to temporary lifting loads, load restraint methods and friction factors affecting on strength resistance and structural response of prefabricated timber building system*
Higher education, VIC	Standards and codes are mentioned in general across these documents. It would be helpful to specify them or give examples for better understanding of requirements etc.	Adopted. The following list of standards and codes will be included in the Implementation Guide with reference to the design unit. **Standards and guides** **Structural design** The National Construction Code (NCC)

		AS 1170.0 – Structural design actions – General Principles AS 1170.1 – Structural design actions – permanent, imposed and other actions provides the basis for determination of appropriate dead, live design loads and loads combinations AS 1170.2 – Structural design actions – wind actions – which provides the basis for wind loads AS 1170.4 – Structural design actions – Earthquake actions in Australia – which provides guidance and design procedures for earthquake forces AS 1720.1 – Timber structures – Design methods AS 2796 Timber - Hardwood - Sawn and milled products AS 2082 Timber - Hardwood - Visually stress-graded for structural purposes AS 4785 Timber - Softwood - Sawn and milled products AS 1810 Timber – Seasoned cypress pine - Milled products #1 Timber-framed Construction for Townhouse Buildings Class 1a #2 Timber-framed Construction for Multi-residential Buildings Class 2 and 3 #3 Timber-framed Construction for Commercial Buildings Class 5, 6, 9a & 9b #4 Building with Timber in Bushfire-prone Areas #5 Timber service life design – Design guide for durability #15 Fire Design #16 Massive Timber Construction Systems: Cross-laminated Timber (CLT) #17 Alternative Solution Fire Compliance, Timber Structures #18 Alternative Solution Compliance Facades Forest and Wood Products Australia Ltd 2015 #20 Fire Precautions during Construction of Large Buildings #38 Fire Safety Engineering Design of Mid-Rise Buildings #39 Robustness in Structures **Test-based design approaches** AS 1170.0 – Structural design actions – General Principles (Appendix B) **Durability** #5 Timber service life design – Design guide for durability AS/NZS 1604.4 – Specification for preservative treatment. Part 4 Laminated veneer lumber (LVL)

		AS/NZS 1604.5 – Specification for preservative treatment. Part 5 Glued laminated timber products AS 5604 – Timber – Natural durability ratings AS 4678 - Earth-Retaining Structures BCA Durability Design Life Guideline **Safety** Work Health and Safety (WHS) Act (2011) Occupational Health and Safety Act (2004) and Regulations (2007) Safe Design of Structures – Code of Practice (2012) National Construction Code of Australia (2016) **Hydraulics** AS/NZS 3500 Plumbing and drainage AS/NZS 5601 Gas installations Plumbing Code of Australia WaterMark™ certification scheme **Electrical** AS/NZS 3000 Electrical installations (also known as the Australian/New Zealand Wiring Rules) Low Voltage Directive **HVAC Mechanical** AS/NZS 1668 The use of ventilation and air conditioning in buildings (particularly Parts 1–2) AS/NZS 3000 Electrical installations (also known as the Australian/New Zealand Wiring Rules) AS/NZS 3013 Electrical installations — Classification of the fire and mechanical performance of wiring system elements AS 3666 Air-handling and water systems of buildings AS 4254 Ductwork for air-handling systems in buildings. **Joint/connections involving timber** AS 1720 Timber Structures Eurocode 5 (EN 1995-1-1:2004). **Transport** Heavy Vehicle National Law (2011) as passed in States and Territories Road Transport Reform (Mass and Loading) Regulations (1995). Code of Practice for Packing of Cargo Transport Units of the International Maritime Organisation Load Restraint Guide of the National Heavy Vehicle Regulator. **Other technical design guides**

		Handbook for the Design of Modular Structures
Higher education, VIC	Are there any pre-knowledge and work experience required as prerequisites for such training packages? It would be better if there were proper ones.	As noted, it is expected that the learner has an appropriate building design qualification before undertaking this training. The Application specifies that the unit targets architects, design engineers, draftspersons, structural engineers, building services engineers and architectural technicians. Like in the installation unit, we could also add a statement such as the below, and will confirm its suitability with relevant training package specialists. We note that units from other training packages include similar statements. *"This unit does not cover or replace the basic design skills required in the architecture and building industry but is to be used in conjunction with building design qualifications."*

Revised units

Stakeholder comments and identified issues		**Consideration and proposed resolution**
FWPCOT6203 Develop engineered timber products to meet energy efficient building design needs		
Industry, NSW and QLD	Regarding performance evidence, terminology needs to be updates as follows: • replace '*laminated beams'* with '*glue laminated timber (GLT)'* • replace '*chipboard*' with '*particle board'*	Adopted. Performance evidence items have been amended as suggested.
FWPTMM4201 Construct prototypes and samples		

RTO, VIC	In regard to performance evidence stating that *'There must be evidence that the individual has constructed at least two prototypes or samples in line with individual work order and construction plan for:*
	• *roof, wall and floor frames/trusses*
	• *Staircases*
	• *door and window frames*
	• *Structural beams*
		Adopted. The statement has been amended, and it now reads as follows:
		There must be evidence that, on at least one occasion, -the individual has:
		• *constructed at least two prototypes or samples~~,~~ in line with an individual work order and construction plan for two or more timber structures ~~each~~ including:*
		  • *roof, wall and floor frames/trusses*
		  • *staircases*

	• *Specialised pallets or crates'* This will be hard to achieve. Some work sites only deal with roof trusses, some only with frames etc. Door and window frames are often specialist manufacturers, ditto for structural beams and pallets/ crates. The performance evidence should be reworded to '*two or more of.....*'	• *door and window frames* • *structural beams* • *specialised pallets or crates*
RTO, VIC	In regard to knowledge evidence, two dot points could be made into one point, e.g. common timber characteristics, products and their uses	Adopted. The dot points have been amended as suggested.
All units		
RTO, QLD	I have reviewed this and happy with the outcome, changes, terminology used and the final product.	Not applicable
RTO, NSW	Regarding updated industry terminology, title changes where 'board' has been changed to 'timber' look fine. There were no comments on the panel products units. However, it was suggested that the term 'panel' is less cumbersome than 'engineered wood panel' in the title and everyone in the industry knows what a panel is.	For consistency reasons across all units and context within the units, the term *'engineered wood panel'* has been adopted.