SESSION 3
Monday 23rd June 2025
4pm to 5:30pm

Session No.	Session Topic	Abstract Topic	Submission Title	Summary	First Name	Last Name	Company
3A	TESP - Architectural	Session Chair: PROFESSOR GREGORY NOLAN / UNIVERSITY OF TASMANIA					
3A	TESP - Architectural	Timber Engineering & Structural Performance - Architectural Focus	ASO KUMAMOTO AIRPORT: WOODEN TRUSS ROOF USING METAL PLATE CONNECTORS AND WOOD SCREWS	During the April 2016 earthquakes in Kumamoto prefecture, Japan, the Kumamoto airport, along with several other buildings, suffered damage. Due to the aging infrastructure of the airport and the importance of symbolizing the recovery of Kumamoto prefecture, it was decided to construct a new airport with enhanced earthquake resistance, incorporating local timber into the design. Japanese cedar dimensional lumber from Kumamoto prefecture was selected as a primary structural material to form the box-shaped beams supporting the airport's roof. These beams consist of two parallel wooden double-layer trusses connected at the bottom with plywood and at the top by the roof, creating a sturdy box-shaped structure capable of integrating mechanical, electrical, and plumbing systems. Depending on the required strength at each connection, metal plate connectors (for lower strength) and wood screws with LVL gussets (for higher strength) were utilized. Structural computations were performed, and testing for wood screw connections and the full-scale box-shaped beam was conducted to evaluate safety measures and gather data for future research or projects.	Azusa	Mimatsu	NIKKEN SEKKEI LTD
3A	TESP - Architectural	Timber Engineering & Structural Performance - Architectural Focus	COMPRESSIVE LOADING TEST AND BURNING TEST OF STEEL BAR-TIMBER COMPOSITE COLUMNS	We have been developing a frame system consisting of steel bar-timber composite members which can perform better than those of reinforced concrete structure. The steel bar is deformed bar, which is embedded near outer in cross-section of the composite member and bonded with epoxy resin adhesive. Bending stiffness of the composite member is estimated to be approximately five times as much as conventional glulam timber for beam and approximately twice for column. Also, the bending capacity of the composite member is estimated to be approximately three times for beam and approximately twice for column. Compression tests were conducted to determine the compression capacity of columns, including buckling capacity, and 90-minute heat test under loading. This paper presents the experimental tests, their results, and estimations of the capacities.	RIN	KAMIMAKISE	Kagoshima University
3A	TESP - Architectural	Timber Engineering & Structural Performance - Architectural Focus	The Duality of the Protruding Joint Member in Korean Traditional Wooden Architecture	One of the main characteristics of post-and-beam construction in wooden architecture is that structure and decoration are not separated. By assembling large and small wooden members, the structure of wooden buildings can be achieved, and the exposed structure often serves as a design in itself. In Korean traditional wooden buildings, there are members that have protruding joints, including lintels (changbang), purlins (dori), and beams (bo). Their ends usually play an important role in showing visual details of monumental buildings. However, there has been no research yet on whether these parts are purely decorative or what structural role it plays, and it is also unclear which parts can be included in the protruding joint member. Therefore, this paper will examine traditional wooden buildings in South Korea to clarify the definition and scope of the protruding joint members, and to categorize them. Also, the purpose of this paper is to track the process in which the protruding joints were created and gradually became decorative. In addition, by comparing to wooden buildings found in areas other than Northeast Asia, it will reveal the general characteristics of the protruding joints and the special characteristics that only appear in Korean traditional architecture.	Woohee	Kim	Seoul National University Department of Architecture & Architectural Engineering
3A	TESP - Architectural	Timber Engineering & Structural Performance - Architectural Focus	MOCKUP OF PREFABRICATED CLT MODULES FOR SMALL SOCIAL CONDOS: EVALUATION OF MACHINING, MANUFACTURING, ASSEMBLY, AND PERFORMANCE FOR STANDARDIZATION IN CHILE.	Due to the growing housing deficit, Chile developed an initiative to densify well-located 9x18 meter lots through "small social housing condominiums." So, the question arises: What can we improve from industrialization to make this opportunity more efficient, better, and more massive? This work arises from the observation that the main gaps in the awarding of subsidies in this country are the speed of response from the executors, construction times, insecurity in the neighborhoods, access to qualified labor, quality of construction, and flexibility in design. In response to these gaps, the "Industrialized Building 4 CLT modules" proposes a permanent stock of prefabricated housing, more than 90% prefabrication of the works, zero storage on site, maximum productivity in manufacturing lines, quality control in the factory and flexible modular design.	Juan José	Ugarte Gurruchaga	Centro Nacional de Excelencia para la Industria de la Madera (CENAMAD)
3A	TESP - Architectural	Timber Engineering & Structural Performance - Architectural Focus	TYPOLOGICAL OPTIMIZATION FOR REAL ESTATE DEVELOPMENTS: 8-9 STORY MASS-TIMBER BUILDINGS FOR SEISMIC ZONES.	In recent decades, different types of mass timber construction have been developed. These can be grouped according to materials -all timber, timber-concrete, timber-steel, timber-concrete-steel- and types -panels, posts-beams, and 3D modules-. After a process based on research and specific projects developed by the authors of this work, through the design with the post-and-beam typology, CLT slabs, and reinforced concrete cores and a methodology that included interviews with different real estate developers, this work resulted in a building of between 8 and 9 floors that is efficient from the point of view of the industry, that responds to seismic, cost and architectural program requirements.	Gerardo	Armanet	Centro Nacional de Excelencia para la Industria de la Madera (CENAMAD)
3A	TESP - Architectural	Timber Engineering & Structural Performance - Architectural Focus	Possibilities for Timber Structure in Stadia – Fire Engineering Approach	The demand for mass timber in construction is increasing as society seeks to build with more sustainable materials. As a result, there has been an increase in the number of mass timber buildings with these largely being commercial (office), education, and residential use. Although a few examples exist globally, an area where timber is yet to be used at scale is in stadia design. Stadia are typically large-scale structures where utilizing mass timber construction could provide sustainability and aesthetic benefits for designers. There is a perception that timber construction represents an unmanageable fire risk due to its combustible nature. In the context of stadia this is driven by catastrophic historic fires, such as the Bradford City Stadium Fire in the United Kingdom. As a result of such events, current safety and design standards introduce additional constraints for stadia where combustible structure is used which is inhibiting the uptake of timber in designs. This paper will explore the possibilities for timber in stadia and proposes a design methodology to allow mass timber construction to be used while still satisfying the intent of the globally recognized design guidance (Guide to Safety at Sports Ground, Sixth Edition - commonly known as the 'Green Guide').	Cameron	Creamer	Arup
3B	TESP - Engineering - Protective Design	Session Chair: DR CHRISTIAN VIAU / CARLETON UNIVERSITY					

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3B	TESP - Engineering - Protective Design	Timber Engineering & Structural Performance - Engineering Focus	Blast Test of a Mass Timber Facade for Diplomatic Facilities	The U.S. Department of State's (DOS) Bureau of Overseas Buildings Operations (OBO), in collaboration with DOS' Bureau of Diplomatic Security, initiated a multi-phase applied research effort to assess the feasibility of incorporating mass timber into U.S. diplomatic facilities. As diplomatic facilities have stringent blast, ballistic, and forced entry resistance requirements, a primary objective of this effort was to demonstrate that mass timber systems can meet these requirements while still complying with the operations and logistics considerations inherent with DOS facilities. As a capstone to this effort, a full-scale two-story mock-up of a mass timber façade comprised of cross-laminated timber (CLT) panels, a ribbon window, a punched window, and a door was constructed at Tyndall Air Force Base. This mock-up was exposed to a large blast load to demonstrate its blast resistance and ability to maintain its forced entry and ballistic resistance envelope following a blast event. The results of this test indicated that the mock-up façade did indeed accomplish this objective. While the CLT panels exhibited various levels of rupture, they were shown capable of resisting the applied blast load without generating hazardous debris on the protected side of the façade. Furthermore, the self-drilling screw connections tying the panels, windows, and door elements together performed well, which serves to validate the analytical methods utilized to design the test article and its connections. The successful demonstration of this mock-up highlights the ability of CLT systems to effectively resist significant blast loads.	Mark	Weaver	Karagozian & Case
3B	TESP - Engineering - Protective Design	Timber Engineering & Structural Performance - Engineering Focus	COMPRESSIVE MECHANICAL PROPERTIES OF RADIATA PINE GRADED SAWN TIMBER CONSIDERING STRAIN RATE EFFECTS IN PROGRESSIVE COLLAPSE AND EARTHQUAKE EVENTS	The mechanical properties of timber were shown to be sensitive to the loading rate. Understanding the loading rate effects are essential to design safe timber structures with robust beam-to-column connections against dynamic loads. Consequently, this study experimentally examines the influence of the strain rate on the compressive and tensile mechanical properties of Machine Graded Pine (MGP) radiata pine (Pinus radiata) MGP10 boards, considering strain rates experienced during progressive collapse and earthquake events. In compression, the compressive strength, Modulus of Elasticity (MOE) and ductility were recorded. In tension, only the tensile strength was measured. All tests were performed both parallel and perpendicular to the grain, and under four different loading rates, with failure reached between 200 s and 0.2 s. In total 320 tests were performed. The variation of the compressive and tensile mechanical properties with the strain rates are reported and discussed in the paper.	Ayon	Das	Griffith University
3B	TESP - Engineering - Protective Design	Timber Engineering & Structural Performance - Engineering Focus	PROGRESSIVE COLLAPSE AND EARTHQUAKE STRAIN RATE EFFECT ON THE EMBEDMENT PROPERTIES OF DOWEL TYPE FASTENERS IN LAMINATED VENEER LUMBER (LVL)	Embedment strength refers to the capacity of wood to withstand deformation under the pressure exerted by a fastener and it is one of the key values in determining the design capacity of timber connections in the Eurocode 5. As this property has been shown to be sensitive to the loading rate, this study experimentally investigates the influence of the strain rate typically exhibited during earthquake and progressive collapse events on the embedment mechanical properties of dowel type fasteners inserted into softwood laminated veneer lumber (LVL) elements. Embedment tests parallel and perpendicular to the grain, with two distinct dowel diameters and using the full-hole test method outlined in the European standard EN 383 (2007), were performed under four different loading rates, with failure reached between 200 s and0.4 s. In total 320 embedment tests were carried out. The embedment strength, stiffness and ductility were calculated, and are reported and discussed in this paper.	Ayon	Das	Griffith University
3B	TESP - Engineering - Protective Design	Timber Engineering & Structural Performance - Engineering Focus	SEISMIC AND PROGRESSIVE COLLAPSE STRAIN RATE EFFECTS ON THE WITHDRAWAL STRENGTH OF SCREWS IN GLUED LAMINATED TIMBER	This study explores how the mechanical properties of timber change under varying strain rates, focusing on the dynamic behavior of screwed connections in Glued Laminated Timber (glulam) during events like seismic and progressive collapse incidents. Beam-to-column connections are crucial for the robustness of mass timber buildings, making it essential to understand their response to dynamic loads. The research examines the pull-through and pull-out strengths of screws under four strain rates, ranging from failure occurring in 200 seconds to 0.2 seconds. The paper first describes the experimental test setup and then discusses the results. While many studies have examined other effective parameters on withdrawal strength of timber under quasi-static loads, the impact of strain rates on withdrawal strength has not been previously considered. This study provides preliminary insights into the effects of dynamic loads on the pull-through and pull-out strengths of screws in glulam.	Nasim	Ghasemi	Griffith University
3B	TESP - Engineering - Protective Design	Timber Engineering & Structural Performance - Engineering Focus	SEISMIC AND PROGRESSIVE COLLAPSE STRAIN RATE EFFECTS ON THE COMPRESSIVE AND TENSILE MECHANICAL PROPERTIES OF SOFTWOOD LAMINATED VENEER LUMBERS (LVL)	This study investigates how intermediate strain rates, encountered during seismic and progressive collapse events, affect the compressive and tensile properties of softwood laminated veneer lumbers (LVL). Experimental tests were performed in both parallel and perpendicular directions to the grain at four different strain rate levels. The findings reveal that the mechanical properties of LVL change with varying strain rates. Understanding these changes is essential for designing safe and reliable timber structures with strong beam-to-column connections. The research specifically examines the influence of intermediate strain rates on the compressive strength, ductility, modulus of elasticity, and tensile strength of LVL, a material commonly used in residential and commercial timber buildings.	Nasim	Ghasemi	Griffith University
3B	TESP - Engineering - Protective Design	Timber Engineering & Structural Performance - Engineering Focus	Proposed Approach for the Design of Timber Connections Subjected to Blast Loading	A near-decade-long comprehensive test program on timber connections subjected to shock tube simulated blast loads has been undertaken. A generalized capacity-based blast design methodology is presented, based on the experimental test results, aimed at promoting ductility in connections and a sequence of failure that seeks to minimize occupant harm during extreme load events. Key results on connection behaviour, typical failure modes observed, as well as overstrength factors for capacity-protected structural elements will be discussed, and a generalized design approach for the design of timber connections will be presented. The proposed generalized design methodology is also evaluated using pressure-impulse diagrams, in which the potential enhancement in the performance and energy dissipation of timber assemblies, designed with proper failure hierarchy in the connections and load-bearing timber elements, is demonstrated. The main outcome of this research program will guide the development and paradigm shift in blast design guidelines for timber connections.	Antoine	Bérubé	University of Ottawa
3C	TESP / MPD - Engineering - CLT Walls	Session Chair: HARALD KRENN / KLH Massivholz GmbH					
3C	TESP / MPD - Engineering - CLT Walls	Material Performance & Durability - Engineering Focus, Timber Engineering & Structural Performance - Engineering Focus	FIRE BEHAVIOUR OF CLT FLOOR TO WALL CONNECTIONS: FINDINGS FROM THE WOODWISE PROJECT	Mass timber floor-to-wall connections provide stability to the building throughout a fire condition. These connections often are often constructed with steel plates and screws thereby making the thermal penetration and heat transfer through the connection complicated due to the mixed materials. Previous research on these connections has demonstrated that there is a potential for smouldering hotspots in these connections during the decay phase of the fire. This study will investigate the fire behaviour of Cross-Laminated Timber (CLT) floor-to-wall connections as part of the WOODWISE project (Wood Optimization for Occupant Safety, Design Innovation, Wood Engineering, Smouldering, and Emissions). The research will focus on the performance of these connections during the heating and decay phases of large-scale compartment fires. Two types of connections will be tested in four fire scenarios, each with varying levels of encapsulation and fuel loads. Key findings will include the temperature profiles, the potential smouldering hotspots during the decay phase, and the impact on structural integrity.	Erica	Fischer	Oregon State University

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3C	TESP / MPD - Engineering - CLT Walls	Timber Engineering & Structural Performance - Engineering Focus	CROSS-LAMINATED TIMBER WITH GAPS FOR WALL ELEMENTS	CLT as a building material is one of the most relevant modern mass-timber products with continuous growth in worldwide market share. The increased demand of CLT products, however, goes hand in hand with an increasing use of raw material. Among various approaches to minimize the use of timber, the reduction of material within the CLT lay-up is pursued in the work presented here. It is targeted to decrease structural overperformances of standard CLT elements, which is evident within CLT walls, where fire resistance is the decisive design factor and an underutilization of the load-bearing capacity is present. Towards this aim, an experimental study was performed to examine the effects of CLT lay-ups with gaps on mechanical properties such as strength and stiffness. Focussing on structural wall components, tests of bending and buckling behavior as well as in-plane shear properties were performed. A variation of lay-ups with different gap widths and board dimensions was investigated. It was shown that the material reduction led to an disproportionate decrease of strength capacities and element stiffness. From a certain extent of gaps in the cross-layers, shear deformations have an impact on the buckling capacity. In bending tests, rolling shear was the predominant failure mode, despite analytical calculations estimating a bending failure in some cases. Concluding, gaps in a CLT lay-up lead to a significant reduction of material, while at the same time satisfying structural requirements for load-bearing wall elements.	Philipp	Dietsch	Karlsruhe Institute of Technology (KIT)
3C	TESP / MPD - Engineering - CLT Walls	Timber Engineering & Structural Performance - Engineering Focus	Experimental Testing of an In-Situ Strengthening Process for CLT Panels	During construction or the in-service stage of a building's life, it is possible for CLT panels to be damaged. This could result from a mechanical impact during transportation or installation, damage caused by long-term exposure to moisture resulting from failed waterproofing or building envelope or damage due to fire. If damage to CLT panels does occur, the strength or stiffness of the panel may be reduced in the region of damage and may need to be repaired using a validated process. The strength of the repaired panel will need to be determined relative to the original manufactured specification so the panel may be assessed by the structural engineer. This study presents testing of a repair process that has been developed by XLam for use with CLT wall and floor panels. The goal is to develop a general repair process that can be effectively carried out on site to achieve stiffness and strength equivalent to the original panel. The structural and glue line integrity testing indicate that a site-based repair process with an appropriately controlled process for applying the adhesive has the potential to achieve effective replacement of the outer lamellas and restore capacity of CLT panels should damage occur. Development of robust panel repair methodologies may assist building owners/managers and structural engineers to expand the use of CLT in projects.	Tom	Watts	XLam
3C	TESP / MPD - Engineering - CLT Walls	Timber Engineering & Structural Performance - Engineering Focus	Evaluation of CLT Seismic Resistant Walls with Arbitrary Arranged GIR Joints	GIR joints with steel bars are a relatively inexpensive method of joining high strength and rigidity to wood materials, and can be used to join CLT seismic walls to surrounding framing to achieve high strength CLT walls. In a previous report[1], cyclic loading test results of CLT walls with GIR joints were presented, showing that high bearing capacity and energy absorption can be obtained and that the performance under cyclic loading can be predicted by numerical calculations. In this paper, an evaluation formula is proposed to predict the stiffness and bearing capacity at the wall footings for an arbitrary GIR joint arrangement by hand calculations, and the results are compared with previous experimental results. In past experiments, GIR joints close to the surface of the CLT sometimes failed to exhibit the expected bearing capacity because of crack failure when large tensile forces due to rocking of the wall legs were applied to the GIR joints. We have developed a cracking reinforcement method for GIR joints using steel tubes and long screws, which can exhibit the designed bearing capacity and toughness.	Daisuke	Kadono	NIKKEN SEKKEI LTD
3C	TESP / MPD - Engineering - CLT Walls	Material Performance & Durability - Engineering Focus, Timber Engineering & Structural Performance - Engineering Focus	PUSH-OUT TESTING OF ADHESIVELY BONDED LIGHT GAUGE STEEL AND FRP TO TIMBER CONNECTIONS: AN EXPERIMENTAL STUDY	This study investigates the cyclic behaviour of STC connections with mechanical shear connectors. Twelve STC joints were fabricated by connecting the cross-laminated timber (CLT) panels to the flanges of a steel profile and the joints were subjected to low-cycle high-amplitude loading regime. Effects of the shear connector type (i.e. screw, high strength bolt), shear connector size and the orientation of CLT panels (outer lamellas parallel and/or perpendicular) with respect to the direction of the load were considered in the experimental program. The ductility, strength impairment and equivalent viscous damping which characterise the performance of a mechanical shear connector under cyclic loading conditions in steel-timber composite connections were assessed. The results of the cyclic tests demonstrated the high ductility and energy dissipating capacity of the steel-timber composite connections. A simple hysteretic model was proposed for steel-to-CLT composite connections with bolt and screw shear connectors and the model was calibrated against the results of laboratory experiments.	Alireza	Chiniforush	University of Melbourne
3C	TESP / MPD - Engineering - CLT Walls	Timber Engineering & Structural Performance - Engineering Focus	Ribbed CLT Elements with cut-backs	The use of cross laminated timber (CLT) in combination with glulam ribs has become increasingly popular in timber construction. Especially in cases with relatively large spans or higher loads, this solution is even necessary to compete with oder building materials. To simplify the process in platform frame type constructions, the ribs may be cut-back so the wall-floor-wall interface is still easily manageable on site. The described cut-back is causing additional stresses in the CLT-element wich can quickly become of high relevance. To bring this potentially critical situation to the attention of the designing engineer and to evaluate the magnitude of these stresses (mainly rolling-shear), using a simplified engineering model, are the aims of this paper.	Harald	Krenn	KLH Massivholz GmbH
3D	TESP - Engineering - Numerical Investigations	Session Chair: PROFESSOR MASSIMO FRAGIACOMO / UNIVERSITY OF L'AQUILA					
3D	TESP - Engineering - Numerical Investigations	Timber Engineering & Structural Performance - Engineering Focus	SHEAR FORCE CAPACITY OF CROSS LAMINATED TIMBER BEAMS – NUMERICAL INVESTIGATIONS OF FRACTURE BEHAVIOUR	This paper deals with numerical investigations of cross laminated timber (CLT) beams. Previous investigations have revealed discrepancies between experimental test results and suggested design methods regarding shear force capacity of such beams. To gain further understanding of the failure behaviour and the shear force capacity of CLT beams, nonlinear finite element analyses using a cohesive zone approach for representation of the fracture behaviour of the bonding between laminations have been performed. Numerical results, analytical model predictions and findings from experimental tests will be compared regarding the influence of different beam geometry parameters. The aim of the present work is to gain further understanding of the failure behaviour and shear force capacity. Such knowledge is needed for development of rationally based and reliable design methods for CLT beams.	Erik	Serrano	Lund University

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3D	TESP - Engineering - Numerical Investigations	Timber Engineering & Structural Performance - Engineering Focus	SHEAR PERFORMANCE INVESTIGATION ON THE NOTCH-SCREW CONNECTIONS FOR TIMBER-UHPC COMPOSITE STRUCTURES	This paper presents the shear behavior of notch-screw shear connectors used in glulam-UHPC composite (GUCC) structures. Seven groups of push-out specimens with different notch length, notch depth and the shear length in front of the notch were prepared and tested in direct shear under monotonic loading conditions. The experimental determination of the strength, the slip modulus and the failure modes were made by push-out tests. Subsequently, a numerical modeling using ABAQUS was carried out in order to develop a three-dimensional numerical model that represented the connection. The results indicated that direct UHPC shear failure was the main failure mode for the notched connections. The notch length and notch depth significantly influenced the load-carrying capacity and slip stiffness of the specimens combining a notch and two screws. Comparing numerical and experimental results demonstrated that the numerical model could accurately predict the failure load and the slip modulus of the connection.	Jiajia	Ou	China Southwest Architectural Design and Research Institute Corp. Ltd.
3D	TESP - Engineering - Numerical Investigations	Timber Engineering & Structural Performance - Engineering Focus	NUMERICAL ANALYSIS OF THE GAP BETWEEN SHEATHING PANELS AND FRAMES FOR SHEAR WALL SYSTEMS	A basic wood-frame shear wall consists of a wood-frame, a sheathing panel and fasteners connecting the frame and the panel. Traditionally, there is no gap required between sheathing panels from adjacent shear walls for structural purposes. There is no issue if adjacent walls move in the same direction or at the same magnitude. However, if adjacent walls do not move in the same direction or at the same magnitude, sheathing may pond each other, resulting in performance different from that of a single wall or breakage around corners of the panels. This study aims to provide a solution about the distance between the corners of the frame and the corners of the sheathing when the frame deforms under lateral loads. Five different wall aspect ratios are studied for the distances. The results are summarized in a table. The results of the distance can be used to guide engineering practice of wood-frame shear walls about the gap between sheathing panels of wood frame shear walls and other wall systems. Moreover, the results can be used to examine other configurations of new wall systems.	James	Gu	TRU
3D	TESP - Engineering - Numerical Investigations	Timber Engineering & Structural Performance - Engineering Focus	NUMERICAL MODELING OF CROSS-LAMINATED TIMBER SHEAR WALLS	This paper reviews and proposes improvements to numerical models predicting the seismic response of Cross-Laminated Timber (CLT) shear walls. Current models, which focus on individual components, fail to account for global phenomena and second-order effects like friction forces and shear-axial interactions in connections. The enhanced model uses Bayesian methods to select the most suitable constitutive material model and optimize parameters for commonly used hysteretic models such as Pinching4, Bilinear, and SAWS. The study emphasizes the importance of considering both component responses and global effects to improve seismic behavior predictions for mass timber buildings. By incorporating friction forces and axial-shear stress interactions, the proposed model significantly enhances the accuracy of seismic performance assessments.	Ramin	Sarange	University of California, San Diego
3D	TESP - Engineering - Numerical Investigations	Timber Engineering & Structural Performance - Engineering Focus	LATERAL TORSIONAL BUCKLING TESTS AND NUMERICAL SIMULATION OF GLUED LAMINATED TIMBER BEAMS	The out-of-plane stability of slender timber beams under flexural bending is a key aspect in their structural design. The effects of lateral torsional buckling can be verified either using the equivalent member method or by determining the internal forces according to second order theory and considering equivalent imperfections. As in some cases the results of the two approaches leads to different results, experimental investigations were performed to deepen our understanding of the phenomenon. This paper presents tests investigating lateral torsional buckling effects on glued laminated timber beams leveraging well known material properties. During fabrication of the glued laminated timber beams, the material properties of the timber boards as well as the position of the boards in the beam were meticulously documented. The experimental sequence included assessment of bending and torsional stiffness, geometrical imperfection measurements, bending strength evaluation and lateral torsional buckling test on glued laminated timber beams. The boundary and loading conditions were very close to the idealized assumptions. Based on the experimental results, numerical models were calibrated and validated. In addition, preliminary values for equivalent imperfections crucial for designing according to second order theory were derived by this study.	Vera	Wilden	RWTH Aachen University, Institute of Steel Construction
3D	TESP - Engineering - Numerical Investigations	Timber Engineering & Structural Performance - Engineering Focus	EFFECT OF CONNECTION NONLINEARITY ON WIND PERFORMANCE OF TALL MASS TIMBER BUILDINGS	Mass timber products have gained significant recognition in the construction of tall buildings, providing a sustainable solution for urban development. As those products have shown high in-plane strength and stiffness, energy dissipation and ductility of lightweight and flexible tall mass timber structures under lateral loads rely on metal connectors. Those connectors are commonly treated as nonlinear in conventional seismic analysis but are often simplified as linear in wind assessment. However, under extreme wind hazards, excessive wind-induced vibrations may push the mass timber building beyond serviceability level and drive connections into nonlinear stage. This paper investigates the impact of nonlinear connections on wind performance of tall mass timber buildings. To improve the efficiency of traditional discrete connectors modelling in cross-laminated timber (CLT) wall panels, a novel nonlinear “continuous zone” modelling approach is proposed to integrate all connectors, including hold-downs, shear brackets, and spline joints. The modelling is calibrated and validated with full-scale shake table test data from a 3-story CLT building and is applied for wind assessment of a 30-story mass timber building using numerical fluid-structure interaction technology at different wind intensities.	Chi	ZHANG	The Hong Kong University of Science and Technology
3E	TESP / MPD - Engineering use of Hardwoods	Session Chair: PROFESSOR ROBERT JOCKWER / TU DRESDEN					
3E	TESP / MPD - Engineering use of Hardwoods	Material Performance & Durability - Engineering Focus	MECHANICAL PROPERTIES OF HIGH-PERFORMANCE LVL MADE FROM EUCALYPTUS GLOBULUS L.	Eucalyptus globulus Labill. is a fast-growing hardwood with excellent mechanical properties and natural durability. Despite these qualities, the use of solid wood-based products from this species is constrained by challenges associated with sawing and drying processes, making it primarily intended for the paper and pulp industry. This study focuses on the experimental evaluation of laminated veneer lumber (LVL) made from E. globulus from Spain, a promising product that significantly reduces these processing hurdles. The main mechanical properties in bending, tension, compression and shear have been determined, taking into account the influence of different lay-ups. The results are quite encouraging, revealing a very high-performing structural timber product of great potential.	Almudena	Majano-Majano	Technical University of Madrid
3E	TESP / MPD - Engineering use of Hardwoods	Material Performance & Durability - Engineering Focus	Potential for high-stiffness engineered wood products from Eucalyptus fastigata	Utilizing a novel resource, such as fast grown hardwoods, for engineered wood products may provide an opportunity to utilize existing manufacturing capability produce greater volumes of high stiffness wood products. Here laminated veneer lumber was produced from 23-year-old Eucalyptus fastigata in a commercial radiata pine mill. Mechanical properties were very promising (e.g. average stiffness 14 GPa compared to 10 GPa for typical radiata pine production). Property testing showed boards met or exceeded the New Zealand LVL13 grade for most of the properties tested. While the results are promising, there is scope to improve the manufacturing process, and to understand the performance of LVL manufactured under production conditions, rather than in a scientific trial which involved delays and frequent manual handling of veneers, both of which are known to degrade the veneers and affect gluing performance.	Rosie	Sargent	Scion

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3E	TESP / MPD - Engineering use of Hardwoods	Material Performance & Durability - Engineering Focus	IDENTIFICATION OF MATERIALS AND BONDING PARAMETERS FOR CROSS-LAMINATED PANELS MADE IN ASIA	This study investigates adhesive bond performance in cross-laminated panels (CLT) made from timber, bamboo, and palm, addressing the rising demand for sustainable construction materials in Asia. It expands on previous research by including eucalyptus, acacia, rubber wood, and coconut tree fibers, all sourced from the Asian region. Specimens were bonded using polyurethane (PUR), melamine-urea-formaldehyde (MUF), and phenol-resorcinol-formaldehyde (PRF) adhesives and tested for shear strength and bending under clamping pressures of 0.6 to 1.0 MPa. The Multi-Criteria Decision Making (MCDM) method identified the best solutions based on mechanical properties, adhesive performance, and production costs. Eucalyptus and acacia fibers showed strong bonding and mechanical performance, especially with PUR and PRF at 0.8 to 1.0 MPa. Bamboo, particularly in laminated and scrimber forms, demonstrated high strength with MUF and PRF at 0.6 to 0.8 MPa. Rubber wood and coconut fibers showed moderate performance, with coconut facing compatibility issues. Optimal bonding generally occurred at 0.8 MPa. The findings suggest these wood species have significant potential for sustainable CLT production in Asia, particularly in regions lacking traditional timber. This study emphasizes the big potential for Asia-made CLT panels, providing a crucial foundation for developing high-performance, eco-friendly construction materials. The results highlight the importance of selecting appropriate adhesives and bonding conditions to optimize performance, offering a valuable resource for advancing sustainable construction practices in the region.	Karol	Sikora	Neacemka
3E	TESP / MPD - Engineering use of Hardwoods	Material Performance & Durability - Engineering Focus, Timber Engineering & Structural Performance - Engineering Focus	Study of the slip performance of screws in Eucalyptus nitens (E. nitens) from Tasmanian fibre-managed plantations	This study focuses on the slip performance of screws in E. nitens products, a critical factor for their application in timber-based composite constructions. By examining the influence of screw geometry, timber properties and effective penetration length on slip performance, this research aims to optimise their application in engineering and timber-based composite constructions such as Timber-Concrete Composite (TCC) systems. Experiments conducted on E. nitens sawn boards (535 valid samples) and E. nitens GLTs (199 valid samples) using six types of screws revealed that screw nominal diameter, flank distance, effective penetration length, screw material and timber density can affect screw slip performance. These findings provide valuable insights into the mechanical properties of E. nitens products, informing the design and application of fastening systems in sustainable construction materials. Preliminary findings revealed significant insights into the relationship between screw geometry and axial slip resistance in E. nitens products. The analysis showed that a larger flank distance (P) allows more movement between the screw and timber. Furthermore, a larger thread geometry ratio (a/r), defined as the ratio of thread height (a) to thread depth (r), was found to reduce axial slip resistance (Kser,ax). Additionally, the results indicated a positive effect of timber density (ρ12) at 12% MC on screw axial slip resistance. However, this positive effect diminished as the screw nominal diameter (do) increased.	Zhiqian	Zhong	University of Tasmania
3E	TESP / MPD - Engineering use of Hardwoods	Timber Engineering & Structural Performance - Engineering Focus	GLULAM AND LAMINATED VENEER LUMBER STRUCTURAL PRODUCTS MANUFACTURED FROM AUSTRALIAN SOUTHERN BLUE GUM GROWN FOR WOODCHIPS	Demand for wood products is growing internationally, and new initiatives are necessary to sustainably meet this demand. This paper presents such an initiative investigating the possibility of manufacturing glued laminated timber (glulam) and laminated veneer lumber (LVL) structural products from Australian southern blue gum (Eucalyptus globulus) plantation logs traditionally grown for woodchips purposes. 120 logs were harvested from two different plantations (15-year-old and 19-year-old) and processed at the Salisbury Research Facility into rotary peeled veneers (80 logs) and sawn boards (40 logs). The modulus of elasticity and visual grade distributions of the recovered veneers were assessed, as well as the compressive, tensile, shear, and bending strengths, density and modulus of elasticity of 240 sawn boards. The characteristic data were then used to assess the product grades which could be manufactured from the resources using different construction scenarios. Glulam and LVL were finally manufactured and experimentally tested to confirm the potential of the resources in the production of suitable engineered wood products. This conference paper focusses on presenting the key data on the raw material, specifically the modulus of elasticity distribution of the veneers, and the tensile and compressive strengths of the sawn boards. The results from selected manufactured glulam and LVL are also presented and discussed.	Benoit	Gilbert	Griffith University
3F	TESP - Engineering - Automation / Software	Session Chair: A/PROF JOE GATTAS / THE UNIVERSITY OF QUEENSLAND					
3F	TESP - Engineering - Automation / Software	Timber Engineering & Structural Performance - Engineering Focus	NET-ZERO TIMBER BUILDING DESIGN TYPOLOGIES	Digital transformation is not only changing business models, working methods, production, and construction processes but also impacts automation-compatible designs and material systems. The project seeks to establish collaboration between architects, engineers, and software specialists to enable sustainable buildings. It aims to facilitate early-stage decision-making by providing validated and informed building typologies and material systems, supported by statistical analysis. DBF has created an easy-to-use, online software for architects and city planners to explore and validate building design concepts. Alongside its enterprise software business, DBF regularly conducts and publishes research activities; with a specific focus on innovative generative design methodologies and approaches to improve project sustainability outcomes. The Bern University of Applied Sciences (AHB/BFH) engages in innovative scientific R&D in multi-storey timber and hybrid construction, focusing on typologies for grids, floor / wall / roof, and general construction systems. The collaboration aims to create algorithms for generating site-specific typologies for multi-storey wood buildings and identify timber construction use cases at various scales. The DBF platform will integrate static concepts for vertical and horizontal load transfer and constructive solutions to specify suitable bracing systems for tall buildings, assign structural elements and floor systems to address structural design issues. Additionally, the project aims to specify the most suitable materials and combinations for fire safety, energy efficiency and sustainability at the predesign stage, thereby aiding decision-making processes.	Christophe	Sigrist	BFH
3F	TESP - Engineering - Automation / Software	Timber Engineering & Structural Performance - Engineering Focus	RECLAIMED TIMBER ASSESSMENT SUPPORTED BY LIDAR SCANNING	A pipeline for predicting mechanical properties of reclaimed timber based on element scans acquired through LIDAR scans and combined with photogrammetry, image analysis, and structural analysis with numerical model generated for finite element method is proposed and tested on a set of historical timber beams from Norway. Automation of the process is prioritized for efficiency of deployment on building site and real time feedback for decision-making on reuse potential of the timber building components.	Jan	Pelczynski	Warsaw University of Technology

Session No.	Session Topic	Abstract Topic	Submission Title	Summary	First Name	Last Name	Company
3F	TESP - Engineering - Automation / Software	Timber Engineering & Structural Performance - Engineering Focus	PREFABRICATED MASS TIMBER HYBRID SYSTEMS: INVESTIGATION ON ADOPTING CNC-MADE CARPENTRY JOINTS TO INDUSTRIALIZED LONG-SPAN FLOORS	Automation in Construction 4.0 encompasses the use of robotics, machinery and automated processes to enhance production efficiency and manufacturing accuracy. While automation in the design and assembly of timber structures has been extensively discussed in the field of architecture, most implementations are limited to small-scale demonstration projects. Modularized prefabricated timber assemblies can benefit greatly from automation; however, challenges persist in the proper design of connection systems, especially for large-scale structural systems. Despite current manufacturer capabilities in producing prefabricated wall assemblies, there remains an opportunity to develop higher-level prefabricated assemblies in factory settings. CNC-made carpentry joints are optimal candidates for assessing this design problem. Integrated design is needed to meet structural demands in modern constructions and manufacturing restraints in CNC machinery. However, most discoursed designs fail to use a standardized digital environment. This paper addresses these gaps by proposing a workflow for the development of innovative CNC-made carpentry joints for use in long-span CLT-glulam composite flooring systems, testing such a digital environment via the structural design and fabrication of full-scale bamboo tenon-type shear connectors. This innovation highlights the potential for integrating automation in the future mass production of carpentry joints for prefabricated mass timber assemblies.	Cristiano	Loss	The University of British Columbia
3F	TESP - Engineering - Automation / Software	Material Performance & Durability - Engineering Focus, Timber Engineering & Structural Performance - Engineering Focus	STRUCTURAL PERFORMANCE ANALYSIS OF HOLLOW GLUE-LAMINATED TIMBER	Recently, innovative systems for the construction of prefabricated timber houses have been developed worldwide. The aim of most manufacturers is to develop elements that simplify construction, i.e. achieve maximum speed and economy. The cavities significantly reduce the weight of the GLT elements, making them easy to transport, which not only eliminates the need for cranes and machinery, but also makes construction cheaper. An experimental and numerical analysis of the effects of perforation on the behavior of the GLT elements (softwood and hardwood) under ambient conditions was carried out. In addition, a parametric FEM analysis was carried out by varying the number and arrangement of holes in the cross-section of the timber element. Hollow GLT elements made of softwood (degree of perforation 28%), achieved 69.65% of the load-bearing capacity of the solid cross-section specimens. Hollow GLT elements made of hardwood achieved an average of 72.63% of the load-bearing capacity of the solid cross-section samples. Furthermore, it was shown that the degree of cavity formation is proportional to the CSPG regardless of the type of wood. The experimental investigations (bending and compression perpendicular to the grain) were confirmed by the FEM analysis.	Nikola	Perković	Faculty of Civil Engineering, University of Zagreb
3F	TESP - Engineering - Automation / Software	Timber Engineering & Structural Performance - Engineering Focus	EQUIVALENT SHELL MODEL FOR CLT SHEAR WALLS	A proposal for a numerical model of low computational cost using an orthotropic material on a shell element is presented to model CLT Shear Walls. The model was developed taking in consideration a theoretical model to predict CLT shear walls displacements, which takes into account the influence of the overturning on the horizontal displacement, and was compared with other commonly used simplified models, which neglect this effect. A FEA software was used to model a simple building to compare three different models, where the overall displacement and the deformation is presented.	Sebastian	Carcamo	Centro Nacional de Excelencia para la Industria de la Madera (CENAMAD-CIM UC)
3G	ECCS - Practitioner / Engineering	Session Chair: PROFESSOR KEITH CREWS / THE UNIVERSITY OF QUEENSLAND					
3G	ECCS - Practitioner / Engineering	Timber Engineering & Structural Performance - Engineering Focus	ANALYTICAL EVALUATION OF PLATFORM-TYPE MULTI-STOREY CLT SHEAR WALLS	Many preceding studies have focused on investigating the seismic behaviour of platform-type single-storey cross-laminated timber (CLT) shear walls, encompassing both experimental investigations and analytical developments. However, no experimental validation has been conducted for analytical expressions related to lateral resistance, deflection of multi-storey shear walls, and the associated capacity-based design procedure. In this study, two examples of two-storey experimental tests are compared with analytical solutions. Subsequently two six-storey shear wall case studies were analytically examined to study the contribution of various components, i.e. the different connections, to the lateral behaviour. A recently proposed capacity-based design procedure was used to verify the yielding sequence and ensure protected elements remain elastic. The significant influence of aspect ratio of shear wall panels was also observed. With an appropriate connection design, rocking deformation was dominant, while bending deformation accounted for less than 30% of the total deflection, meeting the requirements of the Canadian Wood Engineering Design Standard.	Mohammad	Masroor	University of Northern British Columbia
3G	ECCS - Practitioner / Engineering	Timber Engineering & Structural Performance - Practitioner Focus, Exemplars & Construction Case Studies - Practitioner Focus	A VERTICAL INSTALLATION METHOD OF CROSS LAMINATED TIMBER (CLT) FOR REINFORCING SOFT GROUND	In order to expand the use of CLT in civil engineering, the vertical installation of CLT into the ground for soft ground reinforcement was considered. A full-scale experiment was carried out in the field to study the workability of a construction method for CLT installation into the ground. The results show that the vertical installation of CLT was possible by applying a mid-depth slurry ground improvement method called the WILL method, in combination with the setting of a special frame on the surface as a countermeasure against CLT uplift.	Hong Son	NGUYEN	Hazama Ando Corporation
3G	ECCS - Practitioner / Engineering	Timber Engineering & Structural Performance - Practitioner Focus, Exemplars & Construction Case Studies - Practitioner Focus	From Lab to Field: Implementing Adhesive Bonded Timber-Concrete-Composites Ceilings - A Pilot Project	The global need for sustainable solutions, particularly in the field of building construction, presents a significant challenge that has to be addressed in near future. A promising solution are timber-concrete-composite (TCC) ceiling systems. The company fischerwerke GmbH & Co. KG and the Institute of Green Civil Engineering are currently together developing a new system focusing on a glued bond line. The system is based at a dry prefabrication process which allows the preproduction of the concrete and timber parts independently before they are joined together either just before the ceiling elements are delivered or directly on site. This paper focuses on the transitioning from laboratory conditions to a first practical application within a prototype construction project. The objective is to assess the system's suitability in a real-world production and installation scenario and identify the challenges associated with its implementation. Within the project 153m² ceiling (solid slab glued together with timber beams) could be successfully produced and installed. The large-scale pilot project demonstrated the feasibility and advantages of adhesive bonded TCC elements. Furthermore, the developed prefabrication process likely resulted in reduction of production time and labor costs. These findings indicate a promising future for the broader application of bonded TCC elements in both the renovation of existing buildings and the construction of new structures.	Florian	Brosch	BOKU University
3G	ECCS - Practitioner / Engineering	Exemplars & Construction Case Studies - Engineering Focus	NEW PERFORMING ARTS VENUE CROSS-LAMINATED TIMBER AUDITORIUM	The New Performing Arts Venue (NPAV) adopts Cross Laminated Timber (CLT) for all of its 1500 seats. Timber offered unique benefits to the project, allowing improved control of sightlines, reduced weight of cantilever balconies, and a construction sequence that took placement of tiered seating off the critical path. The project demonstrates that there is a use for timber on many projects, including large scale public buildings and is not confined to multi-storey mass timber structures. The adoption of the material on this major project brought many lessons and experience presented here.	Carsten	Moeller	ARUP PTY LIMITED

Session No.	Session Topic	Abstract Topic	Submission Title	Summary	First Name	Last Name	Company
3G	ECCS - Practitioner / Engineering	Exemplars & Construction Case Studies - Engineering Focus	IMPLEMENTATION OF ADAPTABLE DESIGN PRINCIPLES FOR HIGH-PERFORMANCE LIGHT TIMBER FRAMED PANELISED BUILDINGS: AN AUSTRALIAN CASE STUDY	Australia faces a housing crisis marked by high mortgages for oversized, underperforming homes, making home ownership increasingly inaccessible for younger generations. Adaptable housing allows homes to evolve with household needs and incorporates future-proof design principles. This paper present findings of research aimed to explore the technical feasibility of adaptable housing in Southeast Queensland using a modular, reconfigurable, and relocatable light timber framed design that can respond to changing occupant needs. Design considerations, technical challenges and corresponding solutions, are presented with focus on structural and hygrothermal design.	Zidi	Yan	The University of Queensland
3H	EIC - Practitioner	Session Chair: TOBY HODSDON / ARUP					
3H	EIC - Practitioner	Education, Innovation & Challengers - Practitioner Focus	Innovation Diffusion of Mass Engineered Timber (MET) Construction: Assessing Key Parameters through a Survey of Building Industry Professionals	Mass Engineered Timber (MET) has emerged as an innovative strategy for sustainable construction. However, more built examples are found in Europe and North America, with far fewer in Asia. This research explores the reasons by measuring building industry practitioners' perceptions across three regions with different levels of MET adoption: Europe and North America (early adopters), Australia and New Zealand (early developing) and South-east Asia (under developed). Based on literature review, a parameter framework composed of comprehensive attributes grouped into four "Enabling Parameters" and four "Decision-making Parameters" were formulated. A detailed survey (comprising of 27 questions with a total of 81 attributes) was then completed by 186 individuals showing that building practitioners' perception, knowledge and experience of MET are the lowest in South-east Asia (most responses from Hong Kong and Singapore). Protection against fire and water damage, ease of repair and maintenance, and doubt of its suitability for high-rise building types are primary concerns in the region. This research identifies specific needs to improve perception and adoption of MET, considered in the context of the region's market acceptance, and its climate and built environment. Further research is on-going by the authors for focused interviews and case studies of prominent projects to examine the parameters at city and project levels. This survey and the case studies form part of the PhD thesis of the first author in the University of New South Wales.	Florence	Wong	UNSW Australia
3H	EIC - Practitioner	Education, Innovation & Challengers - Practitioner Focus	MOVING TOWARDS THE MAINSTREAM MARKET ADOPTION OF MASS TIMBER IN THE UNITED STATES	Over the past decade in the United States (U.S.) there has been a consistent and sustained effort to significantly increase wood product's share of the multi-family, commercial, and institutional segments. New building systems utilizing mass timber have begun to shift the market to wood solutions. This paper examines the current state of wood construction in these markets, the growth of mass timber projects, and successes and challenges of adoption. Key to the mainstream adoption of mass timber is the education of not only engineers and architects but also contractors and developers. All project decision makers must be educated and understand their role in creating a successful mass timber building solution.	Bill	Parsons	WoodWorks - Wood Products Council
3H	EIC - Practitioner	Timber Engineering & Structural Performance - Practitioner Focus, Education, Innovation & Challengers - Engineering Focus, Education, Innovation & Challengers - Practitioner Focus	Product Development for a Range of Innovative Mass Timber Connectors	This paper describes the development of a range of innovative mass timber connection products by Holmes Solutions LP in New Zealand. Extensive research of Key Customer Requirements identified opportunities for connection systems to deliver both high levels of structural performance and more efficient assembly. Speed and complexity of on-site connector installation were identified as a key factor driving the total cost of ownership (TCO) of state-of-the-art mass timber buildings. Laboratory testing of various typical connection products in realistic assembly situations generated data to quantify evidence-based requirements for the new family of products driven by Design for Manufacture and Assembly (DfMA). A lack of globally applicable technical data for fire protection and seismic compatibility was also identified, restricting the suitability of currently available connectors in certain key markets. In partnership with a major global construction systems supplier, Holmes Solutions has developed a novel range of beam and column connections which address these opportunities. Part of this technology family has been successfully installed in a four storey commercial building currently under construction in New Zealand, establishing confidence for further pilot projects and worldwide market launch.	Jon	Roebuck	Holmes Solutions Lp
3H	EIC - Practitioner	Education, Innovation & Challengers - Practitioner Focus	ADVANCING TALL WOOD BUILDINGS WITHIN CANADIAN PROVINCIAL BUILDING CODES	The National Building Code of Canada (NBC) has historically limited residential and office buildings of combustible construction up to 6 storeys and required noncombustible construction for structures exceeding this limit. The 2020 NBC introduced a new construction type, encapsulated mass timber construction (EMTC), which enabled the design and construction of tall wood buildings up to 12 storeys. Since then, there has been an increased demand from the Canadian industry professionals to expand the applicability of EMTC to allow greater design flexibility and provide more options for achieving sustainability goals. While new editions of the NBC are published every 5 years, the expansion of prescriptive EMTC Code provisions was deferred to 2030 due to resource constraints during the 2020-2025 Code development cycle. As provincial governments in Canada have the authority to regulate building design and construction within their jurisdictions, several provinces agreed to jointly expedite the development of expanded EMTC Code provisions to meet pressing provincial needs, ahead of and outside the national framework. This paper summarizes expedited Code changes (e.g., permitted occupancies, building heights and areas, new encapsulation requirements etc.) accepted by participating provinces as of April 2024, and discusses the underlying justification used to support them.	Marc	Alam	Canadian Wood Council
3H	EIC - Practitioner	Sustainability and Timber in a Circular Economy - Practitioner Focus, Education, Innovation & Challengers - Practitioner Focus, Exemplars & Construction Case Studies - Practitioner Focus	Opportunities and Barriers Associated with the Use of Timber Products in Commercial Buildings in Tasmania, Australia	The forest poduct sector is a key contributor to regional Tasmanian economy. Although opportunities have been identified for the production and supply of structural and appearance timber products from forest resources in the state, many of these markets are highly competitive. Many questions are faced by the forest and timber product sector with changes in access and resource supply. This necessitates the requirement to better understand the holistic nature of the projects and the factors concerning the selection of contruction materials. Extensive research exists on the opportunities and barriers of using timber products in buildings. However, most of these studies are based on online questionnaire surveys with large sample sizes and provide only general conclusions. In contrast, this study is specifically focused on several key commercial buildings recently developed in Tasmania, with a view of capturing the experiences of the stakeholders when using timber products. This paper evaluates the feedback from interviews associated with six commercial buildings, conducted with clients, builders, project managers, architects, engineers, quantity surveyors, researchers and suppliers. An improved understanding of the timber source and use, availability and challenges in supply will be invaluable in understanding future opportunities for supply chain, infrastructure planning and policy development.	Kuluni	Millaniyage	UTAS

SESSION 3
Monday 23rd June 2025
4pm to 5:30pm

Session No.	Session Topic	Abstract Topic	Submission Title	Summary	First Name	Last Name	Company
3H	EIC - Practitioner	Timber Engineering & Structural Performance - Practitioner Focus, Education, Innovation & Challengers - Practitioner Focus, Exemplars & Construction Case Studies - Practitioner Focus	Implementation of a prefabricated timber-hybrid building system showcased with four case studies	In the face of climate crises and urbanization, the construction industry has to provide regenerative multistorey building solutions at a rapid pace. Timber as a building material, clever designs, and prefabrication address these challenges effectively and seem like the obvious solution. However, given the lethargy of the construction industry, several factors create obstacles on this path. These include limited production capacities, international availability, price disparities, existing standards, and the openness and willingness of designers and constructors to adopt new solutions. Consequently, designs for prefabricated timber solutions rarely win out against traditional concrete and steel designs. In this context, CREE has developed a prefabricated timber-hybrid building system that leverages the benefits of prefabrication and the sustainability of timber while integrating traditional concrete and steel to meet existing performance standards to bridge the gap towards sustainable building solutions. This paper presents four case studies that were designed using this timber-hybrid system. The entire process, from design to the use of the buildings, is critically analyzed and compared to traditional building methods and mass-engineered timber solutions.	Julia	Köhler	CREE GmbH