

Session No.	Session Topic	Abstract Topic	Submission Title	Summary	First Name	Last Name	Company
6A	TESP - Engineering - Resilient solutions for Mid-rise mass timber building in high seismic regions	Session Chair: PROFESSOR MASSIMO FRAGIACOMO / UNIVERSITY OF L'AQUILA					
6A	TESP - Engineering - Resilient solutions for Mid-rise mass timber building in high seismic regions	Timber Engineering & Structural Performance - Engineering Focus	Experimental Characterisation of Lateral Performance of a 3-storey Mass Timber Building Constructed with Veneer Based Products	This paper presents an overview of a multi-phase experimental study, in which a three-storey mass timber (MT) building structure was designed, constructed, and tested at Oregon State University (OSU) under quasi-static cyclic loading. The gravity system of the building structure included laminated veneer lumber (LVL) beams and columns and Mass Ply Panel (MPP) diaphragms. Three different veneer-based MT lateral force-resisting systems (LFRSs) were tested: (1) an MPP pivoting wall with steel buckling-restrained boundary elements (BRB) as energy dissipators; (2) an MPP self-centering rocking wall with U-shaped flexural plates (UFPs) and steel bounding columns; and (3) veneer laminated timber (VLT) coupled self-centering rocking wall with UFPs. There was a total of five testing phases. These included two sub-phases of testing of gravity system only before the LFRS was engaged with the gravity system. Subsequently, each phase entailed testing of the building for Phase 1 with the MPP-BRB pivoting wall, Phase 2 with the UFP-MPP rocking wall with bounding columns, and Phase 3 with the VLT-UFP coupled rocking wall. In all five phases the building was subjected to quasi-static cyclic tests following the CUREE protocol up to maximum 4% roof drift ratio. A summary of building design, experimental setup, and key results will be presented at the conference.	Arijit	Sinha	Oregon State University
6A	TESP - Engineering - Resilient solutions for Mid-rise mass timber building in high seismic regions	Timber Engineering & Structural Performance - Engineering Focus	Glued-in Rod Splice Connection for Mass Timber Shear Walls in a Six-Story Shake-Table Test Structure	Mass Timber (MT) shear walls are a viable option for resisting lateral forces from hazards such as earthquakes and wind. When implemented in buildings over four stories, a single MT panel may be too long to ship without special costly transportation requirements. This leads to the need for stacking multiple panels vertically to achieve a design intention of a continuous walls over the height of the building, such as in balloon-type construction of self-centering rocking walls. For these tall balloon-type shear walls, a strong, ductile wall splice connection is critical. One promising solution for this connection involves installing Glued-in Rods (GIRs) vertically along the axis of the panel. However, the existing body of experimental research is limited, and no testing is available to evaluate this connection's performance under earthquake loads. This paper presents an implementation of a GIR connection for balloon-type mass ply panel shear walls installed in a full-scale, six-story shake-table test building. Utilizing results from component testing, a procedure for designing GIR wall splice connections is proposed and lessons learned from construction of this splice connection on a full-scale, six-story mass timber shake-table specimen are described. The response of the connection is then presented based on observations from a series of shake-table tests. Results show that the design approach of the GIR splice connection led to a safe and resilient design solution for vertically splicing MT shear walls.	Steven	Kontra	Oregon State University
6A	TESP - Engineering - Resilient solutions for Mid-rise mass timber building in high seismic regions	Timber Engineering & Structural Performance - Engineering Focus, Exemplars & Construction Case Studies - Engineering Focus	Response of Mass Ply Panel, Self-centering Rocking Walls with Buckling Restrained Boundary Elements as Energy Dissipators in Shake Table Testing	To target both sustainability and seismic resilience, the design of buildings needs to be customized to meet targeted objectives able to account for multiple performance metrics. By combining the stable energy dissipation properties of steel with the environmental and aesthetic advantages of wood, mass timber self-centering rocking walls with buckling-restrained boundary elements (BRBs) can begin to address both sustainable and seismic performance goals. A full-scale, six-story, mass timber building including mass ply panel (MPP) self-centering rocking walls with BRBs was tested at the Large High-Performance Outdoor Shake Table (LHPOST) at the University of California, San Diego. Measured sensor and derived data included global responses, such as floor displacements and accelerations, along with local responses, such as BRB deformation, estimates of BRB fatigue life, post-tensioning force, and wall uplift, among others. The three-dimensional shaking testing program included 23 ground motion records with intensities of shaking ranging from Service to Risk-Targeted Maximum Considered Earthquake (MCER) levels. Results highlighted that: [i] the drift response was near uniform along the height of the building, [ii] the acceleration response included large contributions from the higher modes, [iii] the BRBs developed full, stable hysteretic response, and [iv] the self-centering system resulted in negligible residual drifts. Qualitative observations from construction and testing were also cataloged to further support the feasibility of implementing the lateral system in practice. By mixing and matching traditional steel BRBs and post-tensioning with MPP rocking elements, the system was able to meet enhanced seismic performance goals. Future work will seek to define both resilience and sustainability targets for designs incorporating multiple performance objectives.	Morgan	McBain	Stanford University
6A	TESP - Engineering - Resilient solutions for Mid-rise mass timber building in high seismic regions	Timber Engineering & Structural Performance - Engineering Focus	Full-Scale Shake Table Test of Resilient Six-Story Hybrid Mass Timber and Steel Structure	Mass timber solutions are becoming viable for high-seismic regions while remaining sustainable, efficient, and affordable. Yet, the industry is driving innovation and leading to the development of resilient hybrid steel-mass timber solutions that can minimize post-earthquake losses and downtime. A six-story hybrid mass timber structure with laminated veneer lumber (LVL) beams and columns, a cross-laminated timber (CLT) self-centering rocking wall (SCRW) in one direction, and a resilient steel moment-resisting frame/concentric braced frame (MRF/CBF) in the other was tested at the University of California, San Diego (UCSD) large high-performance outdoor shake-table facility. The innovative design allowed the MRF to remain essentially elastic, while the CBF was designed to provide stable and controlled hysteretic energy dissipation. The dynamic testing included uni-, bi-, and tri-directional ground motion time histories applied at a range of intensities including 43- and 225-year hazard level, design earthquake level, and risk-targeted maximum considered earthquake level per ASCE 7-16 for a location in Seattle, Washington. Four (4) design earthquakes and two (2) risk-targeted maximum considered tri-directional earthquakes were applied to the structure. Testing resulted in maximum drift ratios in the SCRW direction of 2.4% and 1.4% in the MRF/CBF direction. After testing, residual drifts were smaller than 1.6 mm (1/16") at the roof, showing promise that resilient steel lateral force-resisting systems (LFRS) alongside mass timber gravity and lateral systems are viable. This paper presents the specimen design and reports the results from the shake-table testing.	Tanner	Field	Oregon State University
6A	TESP - Engineering - Resilient solutions for Mid-rise mass timber building in high seismic regions	Timber Engineering & Structural Performance - Engineering Focus	MODAL CHARACTERISTICS OF TWO MID-RISE MASS TIMBER-STEEL HYBRID BUILDINGS UTILIZING AMBIENT VIBRATION TESTS	Modal characteristics of buildings are fundamental properties for their seismic and wind design. In this study, AVTs were conducted to measure the dynamic properties, including natural frequencies, mode shapes, and damping ratio, of two hybrid mass timber buildings located in Canada. The structural system of both the 12-story (The Vue) and 5-story (Terminus) timber buildings includes mass timber elements and steel braces for the gravity and lateral force resisting systems, respectively. The modal characteristics of the buildings were extracted by operational modal analysis (OMA) using both the Stochastic Subspace Identification (SSI) and Frequency Domain Decomposition (FDD) techniques. The measured fundamental periods and the ranges of damping ratios were compared with the values recommended in the National Building Code of Canada (NBCC) and the Canadian CLT Handbook. The differences in the measured frequencies by SSI and FDD were less than 3%, while more discrepancy was found in damping ratios. The result of the study showed a discrepancy of up to 37% between the experimental fundamental period and the design values. Up to eight frequencies were obtained for the buildings, providing a more comprehensive understanding of the buildings' dynamic behavior, including higher modes, which can be used for improving numerical structural analysis in the future.	Samira	Mohammadyzadeh	UNBC

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6A	TESP - Engineering - Resilient solutions for Mid-rise mass timber building in high seismic regions	Timber Engineering & Structural Performance - Engineering Focus	MULTI-STOREY LIGHT-WOOD FRAME SHEARWALL LATERAL DEFLECTION: INVESTIGATION OF THE CUMULATIVE ROTATION EFFECT IN SEISMIC DESIGN	Multi-storey light-wood frame structures are one of the most efficient types of constructions, as they require cost-effective materials to build structures in a timely manner. However, their seismic design faces challenges with higher seismic hazard introduced in the National Building Code of Canada 2020. The study herein has targeted one approach to reduce design forces using mechanic-based period calculations permitted in the building code. This approach relies on the elastic deflection calculations of multi-storey shearwalls, including the effects of cumulative rotation as recommended in Annex A of CSA O86 Engineering Design in Wood. While cumulative rotations are likely to happen in the elastic domain, the racking movement characteristic of light-frame shearwalls would prevent this rotation from continuing in the inelastic domain. This study compares deflection calculations in Annex A of CSA O86 with linear and non-linear dynamic analyses and investigates the effects of ignoring the cumulative rotations in the inelastic domain. The preliminary results suggest that not amplifying the cumulative rotation in the inelastic domain (i.e., using RdRo force modification factors) leads to more realistic results, as confirmed in the non-linear analysis.	Diego	Flores	Canadian Wood Council
6B	TESP - Engineering - Floor Systems	Session Chair: DR CHRISTOPHE SIGRIST / UNIVERSITY OF APPLIED SCIENCES, BFH/AHB					
6B	TESP - Engineering - Floor Systems	Timber Engineering & Structural Performance - Engineering Focus	Reliability of smartphone sensors for the vibration comfort assessment of existing timber floors	This work faces the issue of the reliability of smartphone sensors for the confort assessment of existing timber floors. A real-scale floor was built and will be subjected to human-induced actions. The response of the structure will be measured by means of MEMS and smartphone accelerometers and the data will be analysed in terms of peak and RMS accelerations and frequencies, and the outcomes will be then compared.	MARTINA	SCIOMENTA	University Of Trieste
6B	TESP - Engineering - Floor Systems	Timber Engineering & Structural Performance - Engineering Focus	Comparison of the calculated and measured vibration behaviour of long span timber floors	The demand for longer spans in timber floors is increasing steadily. Modern materials facilitate these from a load-bearing perspective, serviceability concerns, particularly vibration analysis, remain crucial. Current design practises often result in over-designed cross-sections to mitigate perceived vibration issues, although in-situ floors typically surpass the calculation. This study aims to analyse up to 50 existing timber floors to empirically demonstrate this discrepancy between theoretical predictions and in-situ performance. By comparing measured data with computational models, this research seeks to refine design methodologies for more accurate vibration analysis, potentially reducing material usage without compromising structural integrity.	Johannes	Ruf	Biberach University Of Applied Sciences   Institute for Timber Design
6B	TESP - Engineering - Floor Systems	Timber Engineering & Structural Performance - Engineering Focus	Moment joints in the minor strength axis of CLT panels	The structural performance of joints in the minor strength axis of cross-laminated timber (CLT) panels was experimentally assessed using four-point and three-point bending tests. Four different joints were tested: S1) screwed plywood splines; S2) glued plywood splines; S3) T-joints; and S4) X-fix shear keys. The glued splines provided the highest rotational stiffness, while the screwed splines and T-joints exhibited larger ductility. Subsequently, a numerical model, validated by the experiments, was used to evaluate the joint demands. It was shown that increasing the rotational stiffness from 500 to 5000 kNm/rad/m significantly improved floor performance, specifically reducing the deflection by approximately 50%. However, further increases in rotational stiffness only resulted in incremental performance gains.	Jianhui	Zhou	University of Northern British Columbia
6B	TESP - Engineering - Floor Systems	Timber Engineering & Structural Performance - Engineering Focus	Experimental and analytical investigation of a novel adhesive-free timber-steel composite using eucalyptus globulus hardwood	The objective of this study is to investigate the structural behaviour of a novel adhesive-free timber-steel composite (AFTSC) system as a high-performance floor panel for sustainable mid- and high-rise construction. Local plantation eucalyptus globulus timber boards and laser cut mild-steel were used to fabricate the test specimens. Four-point bending tests were carried out to experimentally record the force, displacement, and failure mechanism of the panels. An analytical model informed by material grading tests was generated and compared against the experimental results. The novel AFTSC panels maintained near full composite action past 40% of ultimate load and consistently exhibited substantial ductile behaviour. In addition, the effective ultimate bending capacity of the timber components was found to increase by up to 25% when included in the AFTSC panels. This demonstrates the high-performance credentials of the novel AFTSC system along with the potential to valorise plantation hardwoods such as eucalyptus globulus.	Richard	Nero	University of Melbourne
6B	TESP - Engineering - Floor Systems	Timber Engineering & Structural Performance - Engineering Focus	ADVANCED TIMBER COMPOSITE FLOOR PANELS USING PLANTATION EUCALYPTUS HARDWOOD	The Advanced Timber Composite (ATC) floor panel combines low carbon, locally available materials to span further than conventional mass timber floor plates. ATC panels consist of; PEFC-certified local hardwood glulam for the joists, visual grade structural plywood for construction stage and soffit finish, and green concrete for durability to the finished floor. By utilizing composite action, these panels remove material from low efficiency areas and provide greater structural performance using less fibre. ATC provides a deemed to satisfy solution to Australia's often difficult to navigate fire code, while still ensuring the well-known installation speed of prefabricated mass timber elements. The low compressive strength required for the concrete screed provides the opportunity to use green concrete while still increasing vibration and acoustic performance and providing a continuous diaphragm and waterproof membrane to the floor design.	Daniel	Watson	Australian Sustainable Hardwoods
6C	TESP - Case Studies	Session Chair: GIANLUIGI TRAIETTA / RUBNER					
6C	TESP - Case Studies	Timber Engineering & Structural Performance - Engineering Focus, Timber Engineering & Structural Performance - Practitioner Focus, Exemplars & Construction Case Studies - Engineering Focus	Recorded natural frequencies of timber buildings – A review	The structural design of multi-storey timber buildings is often governed by serviceability criteria limiting wind-induced vibration. To perform a serviceability check, the natural frequencies of the building need to be estimated, for which empirical equations are proposed by building codes. Their accuracy is not validated for timber buildings. This paper is a review of 21 measured natural frequencies of timber and hybrid timber buildings of heights between 16 m and 80 m. The natural frequencies together with building heights are used for validating the empirical equations. The considered empirical equations are from the Eurocode, the ASCE, Canadian, and Japanese building codes.	Carl	Larsson	Linnaeus University

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6C	TESP - Case Studies	Timber Engineering & Structural Performance - Architectural Focus, Timber Architecture & Biophilic Design - Architectural Focus, Exemplars & Construction Case Studies - Architectural Focus	LATTICIZING AXIALLY COMPRESSED MEMBERS IN TIMBER STRUCTURES: A METHOD FOR USING SMALL DIMENSIONAL LUMBER AS ALTERNATIVE OF MASS TIMBER PRODUCTS	China's reliance on imported timber stems from the limited mechanical properties of domestic wood species, leading to the predominant use of mass timber products from imported wood in modern timber structures. To address this issue, innovative design approaches are needed to integrate domestically sourced timber into construction projects. This study explored the feasibility of using domestic wood species for small structural elements in axially compressed members as a potential alternative to mass timber products. The proposed latticization method, which integrates engineering mechanics with architectural design, aims to reduce material consumption and enhance structural stability and load-bearing capacity. This method's effectiveness was validated through a case study of Future City Experience Hall in Hangzhou, China, where its performance was evaluated in terms of structural safety, cost-effectiveness, and environmental impact. By demonstrating the sustainable use of local forest resources, this study contributed significantly to the design of axially compressed timber members, offering a pathway to reduce reliance on imported timber and minimize environmental footprint in China.	Harrison	Huang	Zhejiang University
6C	TESP - Case Studies	Timber Engineering & Structural Performance - Practitioner Focus	Practical Design Considerations for TCC-Elements with CLT-Slabs	The timber-concrete composite (TCC) construction method can look back to a long period of use in building and with the availability of planar elements like cross-laminated timber (CLT), also flat TCC-elements are being used increasingly in construction practice. These TCC-elements may be designed according to CEN/TS 19103:2021 [1] or other regulations [3], when notches are used to transfer the shear forces between the two parts of the composite element. One of the often controversially discussed points with respect to this design method is the uplift-force acting in the notched connection. This paper tries to evaluate the amount of uplift-force acting in real design situations.	Harald	Krenn	KLH Massivholz GmbH
6C	TESP - Case Studies	Timber Engineering & Structural Performance - Engineering Focus, Timber Engineering & Structural Performance - Practitioner Focus, Education, Innovation & Challenges -	VIBRATION SERVICEABILITY OF MASS TIMBER COMPOSITE CLT-GLULAM TIMBER FLOOR WITH MECHANICAL SHEAR PLAT	Mass timber products are increasingly used in modern construction due to their strength and light weight, yet their use in large-span floors is restricted by serviceability issues related to floor vibrations. Existing vibration assessment guidelines do not suitably address mass timber composite (MTC) floors, lacking a unified approach. This study aims to close this gap by analyzing the dynamic behavior of MTC floors under various excitations, refining design guidelines, and advancing sustainable building practices, thus enhancing predictive models for MTCs.	Sultani Mulk	Khan	University of Waterloo
6C	TESP - Case Studies	Exemplars & Construction Case Studies - Practitioner Focus	UTILIZING WOOD RESIDUES FOR HIGH ADDED-VALUE MODULAR BUILDINGS – A CASE STUDY	The purpose of this experimental building is to carry out research and continuous monitoring on insulation material, wood paneling and cladding as well as on load-bearing parts, and to use the building as presenting area for the results of research and testing. We used oak wood residues wherever possible - triangular lath for cladding, residual veneer for interior paneling, wood bark for insulation of exterior walls, and ash wood for load bearing beams and columns. Measurements of thermal conductivity of exterior walls with oak bark have demonstrated its suitability as insulation material in a moderate continental climate. In addition, measurements of thermal conductivity and acoustic properties of paneling products proved their suitability for interior paneling.	Vjekoslav	Živković	University of Zagreb Faculty of Forestry and Wood Technology
6C	TESP - Case Studies	Material Performance & Durability - Engineering Focus, Timber Engineering & Structural Performance - Engineering Focus, Timber Engineering & Structural Performance - Practitioner Focus	Vibration Assessment and Numerical Modelling of Mass Timber Floors: Insights From Building Tests	Mass timber construction is increasingly favored by developers and architects due to sustainability concerns compared to conventional concrete and steel systems. Several design guides worldwide aid practitioners in utilizing mass timber products effectively. However, methodologies for assessing vibration in mass timber floors proposed by these guidelines have not been thoroughly validated in real-world scenarios. Existing methodologies often rely on laboratory tests which may not directly applicable to vibration design of actual buildings with various connections and presence of partition walls and furniture. Recently, a detailed experimental campaign was conducted on real buildings in California to investigate these methodologies. This study compares a range of vibration tests (hammer, heel-drop, and human walking tests) in real mass timber buildings to modelling predictions, examining the influence of parameters and assumptions outlined in the US mass timber design guide on dynamic response of tested floors. The effects of damping, gamma factor, timber-to-timber and timber-to-concrete connections, and different boundary conditions such as beam-to-beam, beam-to-column, and adjacent bays, along with considerations in EI calculations are discussed.	Sardar	Malek	University of Victoria (UVic)
6D	MPD - Engineering - Protective Design - moisture safety in timber buildings and construction processes.	Session Chair: CALIL NETO / REWOOD					
6D	MPD - Engineering - Protective Design - moisture safety in timber buildings and construction processes.	Material Performance & Durability - Engineering Focus	MOISTURE INGRESS AND MOVEMENT PATTERN IN AUSTRALIAN CLT PANELS – A PILOT STUDY	Australian Radiata CLT panels were subjected to different methods aiming to increase the overall moisture content. These methods were chosen to simulate scenarios of free water contact and high humidity, which are common in subtropical climates like Australia. To mimic free water exposure, CLT samples were submerged in water, while environmental chambers were used to simulate high humidity events over different duration. Specific moisture targets were set at 20% MC for high humidity and 30% MC for free water. After achieving the desired moisture levels, the distribution of moisture through CLT panels was assessed for each method. A grid system was developed to map moisture pockets within the panels and identify pathways for moisture ingress. The study also examined the impact of density, grain and cutting patterns on moisture content. The findings indicate that CLT panels are unlikely to reach moisture contents above 20% MC when exposed to high humidity. However, exposure to free water resulted in a rapid increase in moisture content well above 30% MC. This suggest that rain events and leaks pose significant concern for CLT, warranting further investigation.	Claudia	Roder	University of the Sunshine Coast
6D	MPD - Engineering - Protective Design - moisture safety in timber buildings and construction processes.	Material Performance & Durability - Engineering Focus	Moisture monitoring of a mass timber building - study of condition variation and building environment design	Exposure to moisture in mass timber structures, can result in higher moisture content (MC) and moisture gradients within the panel structure. This exposure can occur either during (heavy rain, flash flooding) or post construction (condensation, plumbing leaks). Adding to this, mass timber products like cross-laminated timber (CLT) have a higher capacity to absorb and store moisture when compared to light timber framing (LTF). Prolonged exposure and high MC in products like CLT can lead to decay, necessitating drying, repairs, or replacement of panel sections. It is crucial to incorporate moisture management and safety into building design and construction planning to prevent issues such as dimensional variation, structural changes, and product degradation during and after construction. However few studies have focused on the impacts these preventative solutions can have on mass timber structures, specific to the Australian climatic conditions. To address the lack of data on the moisture content of mass timber construction in hot and humid climates, wireless moisture monitoring sensors were installed in a mass timber building in Queensland to monitor potential variations in moisture during different phases of the building's life. The project aimed to develop a detailed understanding of condition variations throughout a calendar year and the effects of varying indoor and outdoor environmental conditions on CLT panel characteristics. Moisture content data collected over the buildings' service life within the mass timber assemblies were used to simulate mould growth index predictions and evaluate the drying capacity of the mass timber assemblies associated with certain design variables. The modelling results were calibrated using initial material conditions as well as internal and external boundary conditions to verify statements about moisture safety planning and risk assessment.	Maryam	Shirohammadi	Department of Agriculture and Fisheries, Queensland Government

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6D	MPD - Engineering - Protective Design - moisture safety in timber buildings and construction processes.	Material Performance & Durability - Practitioner Focus	MOISTURE INTRUSION PATTERNS IN SMALL-SCALE MASS PLY PANEL FLOORS	Moisture intrusion in mass timber structures poses a major challenge, especially during erection. Understanding the degree of intrusion can help define the problem and help encourage practical prevention strategies. The degree of water penetration in Douglas-fir cross laminated timber (CLT) and mass plywood panels (MPP) was examined following short term wetting exposures. Moisture intrusion in MPP was limited to a few veneers inward from the exposed surface, while intrusion in CLT concentrated around the non-edged glued joints. The results highlight the differential behaviour of these materials during construction and emphasize the importance of moisture management during construction.	Jeffrey	Morrell	Oregon State University
6D	MPD - Engineering - Protective Design - moisture safety in timber buildings and construction processes.	Material Performance & Durability - Engineering Focus, Timber Engineering & Structural Performance - Engineering Focus, Exemplars & Construction Case Studies - Engineering Focus	ENVIRONMENTAL, ECONOMIC AND MOISTURE RELATED ASPECTS OF LARGE SPAN TIMBER STRUCTURES IN HIGHLY CORROSIVE SURROUNDINGS	The material choice for swimming facilities is a complex and demanding process. In the soon to be finished "Tøyen-bath" in Oslo - Norway, both steel and timber were compared in the early design-phase of the project. The city of Oslo's strong environmental policy emphasizes increased use of timber in public buildings. Comparisons were made regarding both costs and LCA. This paper will address the material design strategy of designing large roof structures in corrosive surroundings like swimming hall facilities. The paper will also show this comparison and explain the follow up process and on-site moisture-measurements during the building process. Furthermore, the paper will give an insight into the moisture measurement approach chosen for the wooden parts of the innovative roof construction.	Tim	Skotheimsvik	Multiconsult
6D	MPD - Engineering - Protective Design - moisture safety in timber buildings and construction processes.	Material Performance & Durability - Engineering Focus	RESEARCH ON THE DURABILITY OF ORTHOGONAL GLUED CROSS-LAMINATED TIMBER UNDER GROUND CONDITIONS	This research aims to clarify the durability of Cross-laminated timber (CLT) in complex geotechnical environments and promote its broader use in both civil engineering and construction. CLT boasts superior isotropic performance not seen in conventional timber, thanks to its orthogonal arrangement of alternating layers, which addresses the inherent strength anisotropy of wood. This lightweight material is expected to streamline construction processes, reduce construction time, and enhance transportation efficiency, making it particularly advantageous for civil engineering projects in mountainous regions and river basins. To encourage the use of timber in civil engineering, it is crucial to evaluate its durability under various exposure conditions distinct from those typically encountered in conventional building structures. However, there is still a lack of data on the degradation characteristics of CLT in harsh environments exposed to soil moisture, water, soil organic matter, etc. This paper examines the degradation characteristics of CLT in a geotechnical environment after two years of exposure. To evaluate the integrity and strength properties of CLT in both air and soil exposure environments, CLT block specimens were placed in various locations across Japan. Approximately two years after installation, the deterioration of the collected block samples was assessed through visual inspection. Following this, longitudinal compression tests and block shear tests were performed, and the results were compared with the initial values recorded before installation. The results showed that longer exposure periods led to increased cracking and delamination of the laminae. Adhesive delamination and lamina cracking progressed irrespective of variations in solar radiation, rainfall and soil composition, with the extent of deterioration varying according to climatic conditions. The mechanical properties of the specimens decreased as the exposure period lengthened.	YUKO	MIZOBUCHI	The United Graduate School of Agricultural Sciences, Ehime University
6E	MPD - Architectural	Session Chair: A/PROF MARIAPAOLA RIGGIO / OREGON STATE UNIVERSITY					
6E	MPD - Architectural	Material Performance & Durability - Architectural Focus, Timber Engineering & Structural Performance - Architectural Focus	HYGROTHERMAL PERFORMANCE AND WATER VAPOUR DIFFUSION RESISTIVITY OF AUSTRALIAN PLANTATION-GROWN TIMBER	This research is investigating the hygrothermal performance of Cross-Laminated Timber (CLT) and solid wood products manufactured from Australian grown plantation timber. Over the past three decades, the use of plantation softwood and hardwood, and engineered wood products within Australian buildings has significantly increased. However, wood products can also provide a good food source for the growth of mould in climatically inappropriate external wall (façade) systems. High quality data about solid wood products physical properties, including water vapour diffusion resistivity, is needed to complete multi-year transient hygrothermal and mould growth calculations. This paper provides a review of the current knowledge about, and methods to establish, the water vapour diffusion resistivity properties of solid wood products. The research identified there is a significant lack of data about the water vapour diffusion resistivity of Australian-grown timbers and solid wood products. The review also assessed laboratory-based evaluation methods to quantify water vapour diffusion resistivity properties and methods to empirically validate hygrothermal simulation results within full-scale buildings. By establishing high-quality water vapour diffusion resistivity input data for hygrothermal simulations, this research aims to support building design professionals and regulators in making informed decisions, leading to energy-efficient, healthy, sustainable, and durable buildings. KEYWORDS: Water vapour diffusion resistivity, Mould Index, plantation timber, Pinus radiata, Eucalyptus nitens	Mark	Dewsbury	University of Tasmania
6E	MPD - Architectural	Material Performance & Durability - Architectural Focus, Sustainability and Timber in a Circular Economy - Architectural Focus, Timber Engineering & Structural Performance - Architectural Focus	LOW-CARBON INTENSITY TIMBER FAÇADE SYSTEMS FOR MID-RISE BUILDINGS	Since 2010 there has been an increasing presence of surface and interstitial moisture and mould within single- and multi-residential buildings in Australia. The increasing presence of moisture and mould has coincided with the adoption of national energy efficiency regulations, which have aimed to reduce the energy needed to heat and/or cool new buildings. The energy efficiency regulations have led to increased amounts of insulation within façade systems, combined with a greater focus on exterior weather-tightness and interior building-sealing (airtightness). Furthermore, most Australian mid-rise façade systems comprise composite structures of high-embodied energy concrete, steel and clay brick components. This research seeks to establish what the built fabric requirements for timber-framed and solid-wood mid-rise high-performance façade systems may need to comprise for Australia's warm-humid, temperate and cool temperate climates such that they do not accumulate moisture or support surface or interstitial mould growth.	Mark	Dewsbury	University of Tasmania
6E	MPD - Architectural	Material Performance & Durability - Architectural Focus, Timber Architecture & Biophilic Design - Architectural Focus	MOULD GROWTH RISKS FOR LOW-RISE TIMBER-FRAMED RESIDENTIAL BUILDINGS IN SOUTHERN AUSTRALIA	Since 2010 there has been an increasing presence of surface and interstitial moisture and mould within single- and multi-residential buildings in Australia. The increasing presence of moisture and mould has coincided with the adoption of national energy efficiency regulations, which have aimed to reduce the energy needed to heat and/or cool new dwellings. Whilst the research until 2012 focused on international practices for the design and construction of modern façade systems, in 2013 several thousand non-transient moisture calculations were completed to identify typical external wall systems that may be at risk of moisture accumulation. Recognising the deficiency of this method, in 2017 the research adopted transient hygrothermal and mould growth calculation methods. Through a mix of State and Industry funded research activities transient moisture and mould risk assessments have been completed for hot and humid, warm-humid, temperate and cool temperate climates in Australia. This paper reports on the most recent research that explored simulated Mould Index calculations for the temperate and cool-temperate climates of Victoria and Tasmania. The research identified significant deficiencies in the regulatory framework and the need for significant changes in design and construction practices to ensure timber-framed dwellings are durable, sustainable and provide healthy interior environments.	Mark	Dewsbury	University of Tasmania

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6E	MPD - Architectural	Material Performance & Durability - Architectural Focus, Sustainability and Timber in a Circular Economy - Architectural Focus, Timber Engineering & Structural Performance - Engineering Focus	A design methodology considering acoustic prediction model and LCA: A comparative study of different CLT-based assemblies	This paper aims to develop an acoustic design methodology for CLT floor assemblies using artificial neural networks approach by integration of life cycle assessment (LCA). 72 Lab-based measurements are used to develop the acoustic prediction tool. They are related to 29 different CLT-based floor assemblies. The weighted sound reduction index (R <sub>w</sub> ), and the weighted normalized impact sound pressure level (L <sub>n,w</sub> ) are estimated with an accuracy of 2 dB. Then a LCA study is conducted on assemblies that are used to test the network model. The acoustic performance and their environmental impacts are compared to highlight trends that may guide decision-makers in the design phase. This paper initially found that CLT-based floor assemblies generally increase the environmental impacts to achieve better acoustic insulation. However, a good sound attenuation can be reached by selecting suitable acoustic solutions.	Sylvain	Ménard	University of Quebec at Chicoutimi
6E	MPD - Architectural	Material Performance & Durability - Architectural Focus, Timber Engineering & Structural Performance - Architectural Focus, Exemplars & Construction Case Studies - Architectural Focus	PARAMETRIC IMPLEMENTATION OF STRUCTURAL ANALYSIS DATA IN THE CONSTRUCTION OF A COMPLEX CURVED TIMBER STAIRCASE	This paper presents the use of advanced computational techniques to generate and integrate structural analysis data for the Atrium staircase at the new Blumer-Lehmann head office in Erlenhof, Switzerland. The project, realised through a collaborative effort among architects, structural engineers, and digital fabrication experts, exemplifies the application of parametric tools in enhancing structural integrity and material efficiency. Parametric modelling tools, such as Grasshopper; a visual programming language and environment for the Rhinoceros 3D design software, and Python scripting, were used to create detailed 3D and structural design models to perform iterative design adjustments. This project highlights the practical benefits these computational techniques bring for developing efficient and precise CNC manufacturing for complex curved timber structures.	Stefan	Rick	SJB
6F	STCE - Engineering	Session Chair: PROFESSOR GREG NOLAN / UNIVERSITY OF TASMANIA					
6F	STCE - Engineering	Sustainability and Timber in a Circular Economy - Practitioner Focus	Upcycling CLT cut-offs into modular building blocks: LCSA case study, adopting a multiple-cycles approach at building element level	This study delves into the sustainability impacts of circular timber construction products, with a particular focus on REBlåkk, a modular building system developed by OMTRE AS. REBlåkks are crafted from upcycled cross-laminated timber (CLT) cut-offs. These cut-offs, reclaimed from CLT manufacturing waste, are transformed into versatile building blocks for partition and load-bearing walls. The research employs a Life Cycle Sustainability Assessment (LCSA) to comprehensively evaluate REBlåkk across multiple use cycles, assessing its environmental, social, and economic dimensions. By adopting a circular business model, REBlåkk not only extends the service life of CLT but also enhances carbon sequestration. This contrasts sharply with traditional timber products that often end up incinerated for energy. The study evaluates the sustainability benefits of REBlåkk compared to traditional timber products through LCSA at the building element level. It also proposes a methodological framework for practitioners in the early phases of designing climate-smart and socially inclusive circular wood solutions for construction, suggesting initial assessments before involving a third party for the final assessment of the complete commercial product. Given the complexity of assessing circularity and sustainability, the study aims to demonstrate that REBlåkk offers a superior circular solution to conventional practices.	Francisco	Tienda	OMTRE AS
6F	STCE - Engineering	Timber Engineering & Structural Performance - Engineering Focus	Cyclic Behavior of Composite Steel-Cross-Laminated-Timber Structural System	In pursuit of achieving near-net-zero carbon buildings, this project investigates the development of a new structural system for high seismic zones that consists of steel framing with cross-laminated timber (CLT) floor diaphragms acting compositely with the steel floor framing. A Design for Deconstruction (DfD) design strategy is incorporated into the structural system to allow all primary structural components to be reused rather than recycled or scrapped at the end of the useful life of the structure. One of the key objectives is to develop a deconstructable connection strategy that connects the CLT to the steel beams to enable composite action. The system incorporates the use of high-strength bolted connectors to achieve composite action and explore construction benefits. A complete set of tests, including material tests, full cyclic connectors tests, composite beam tests, and large-scale composite diaphragm tests, aims to advance the understanding of the structural behavior of this hybrid system. Some additional work on this projects includes the investigation of material aspect (characterization of low-value species) for future uses, architectural considerations (e.g., fire safety, acoustic, vibration, floor framing plans, etc.), and using life cycle assessment (LCA) to inform sustainable design decisions. The presentation will emphasize the structural performance achieved by utilizing high-strength bolted connectors in steel-CLT hybrid structures, supplemented by experimental tests results, and highlights future planned work.	Baiyu	Chen	Northeastern University
6F	STCE - Engineering	Sustainability and Timber in a Circular Economy - Engineering Focus	LIFE CYCLE ASSESSMENT OF END-OF-LIFE OPTIONS OF DEMOLITION WASTE WOOD IN NEW ZEALAND	The concept of circular economy (CE) in construction has become significantly more important and is recently gaining increasing attention. The concept of CE proposes a change in mindset in which waste can be valued as an additional resource rather than an issue to manage and send for disposal. The approach prolongs the value of useful materials and optimises supply chains. This research study investigates the potential of reusing demolition waste wood to counteract climate change. A life cycle assessment (LCA) was conducted to quantify the environmental impacts of managing waste wood across different avenues in the New Zealand construction environment. A range of alternatives, such as remanufacturing the waste wood into glued-laminated timber (GLT), cross-laminated timber (CLT) and dowel-laminated timber (DLT) products, recycling for chipboards, and energy recovery, were examined. The LCA results revealed that all the alternative scenarios were beneficial regarding global warming potential (GWP) and abiotic depletion potential - fossil fuels (ADPF), while the remanufacturing scenarios also had substantial reductions in the acidification potential of land and water (AP), eutrophication potential (EP), and photochemical ozone creation potential (POCP). These results advocated for adopting remanufacturing strategies in waste wood management systems to enhance sustainability and resource efficiency in New Zealand's construction industry.	Hao	Liang	University of Auckland
6F	STCE - Engineering	Sustainability and Timber in a Circular Economy - Engineering Focus	A WEB-BASED LIFE CYCLE ASSESSMENT PLATFORM FOR IMPORTED TIMBER PRODUCTS	Under the dual pressure of increasing housing demand and carbon reduction commitment, timber has been suggested as one of the easily implemented solutions for Irish construction. However, the incomplete life cycle assessment (LCA) practices for Irish timber products could impede the promotion of timber construction. Currently, the customised LCA for Irish-imported timber products is missing. Based on the actual trade and environmental data, this research successfully develops the upfront global warming potential (GWP) values for Irish-imported timber products, covering the production, transportation, and construction stages. Due to its timely updates, the UN Comtrade database was selected as the source of trade data for the last decade. Through analysing trade data, regions producing Irish-imported timber products are determined and then corresponding environmental data is applied from environmental product declarations and generic lifecycle inventory databases. After data quality integration, suggestions are given for applying the generated GWP values in building LCA.	Song	Ge	University of Galway

Session No.	Session Topic	Abstract Topic	Submission Title	Summary	First Name	Last Name	Company
6F	STCE - Engineering	Sustainability and Timber in a Circular Economy - Engineering Focus	Engineered Wood Panels from Recycled Timber: A Sustainable Solution for Australian Construction	The rising demand for sustainable construction materials has highlighted the potential of engineered wood panels to be made from recycled timber. This study explores the benefits of utilising these panels in Australia, a nation committed to reducing its carbon footprint and promoting sustainable practices and embracing a circular economy. Data was collected from various sources regarding the demand for engineered wood panels, the availability of recycled wood and the feasibility of these panels, supported by successful case studies. Detailed statistical analysis and forecasting were performed, demonstrating that these panels offer a viable solution to both the increasing wood waste problem and the wood supply shortage for wood panel production in the country. Despite some challenges, these panels provide significant environmental, economic, and technical benefits. The paper concludes with recommendations to enhance the adoption of engineered wood panels, highlighting their crucial role in advancing Australia's sustainable construction initiatives.	Isuri	Amarasinghe	The University of Melbourne
6F	STCE - Engineering	Sustainability and Timber in a Circular Economy - Engineering Focus	REIMAGINING TIMBER: AN INTEGRATED APPROACH OF RESOURCE EFFICIENT FABRICATION PROCESS FOR TOPOLOGICALLY OPTIMISED CROSS-LAMINATED TIMBER SLABS	Timber, recognised for its sustainable properties including renewability, carbon sequestration, and low embodied energy, plays a vital role in modern construction. This project focuses on using a standard timber product to make structurally optimised irregular slabs in a resource-efficient manner. This research develops an innovative computational workflow integrating architecture, computational design, structural engineering, and advanced manufacturing technologies to create complex laminated timber form with both structural and resource efficiency. The methodology combines topology optimisation, discrete assembly, and bin-packing algorithms within a comprehensive framework. Through prototype development and testing, the research demonstrates very high (>95) material efficiency through production, while maintaining structural integrity and design flexibility. The research establishes new pathways for sustainable timber construction, contributing to improved resource efficiency and environmental sustainability in architectural practice.	Lingju	Wu	The University of Queensland
6G	ECCS/TESP - Engineering	Session Chair: PROFESSOR ALEXANDER SALENIKOVICH / UNIVERSITE LAVAL					
6G	ECCS/TESP - Engineering	Timber Engineering & Structural Performance - Engineering Focus, Exemplars & Construction Case Studies - Engineering Focus	Timber as bridge between past and future: structural upgrading and conservation of the ancient timber and masonry venetian sawmill of Vallaro (Brescia, Italy)	This work presents an extensive static and seismic retrofitting intervention performed on a relevant historic case-study building, the Venetian sawmill of Vallaro (Brescia, Italy). This heritage construction from the end of the 19th century features three building portions, two realized in timber and one consisting of a masonry structure with timber floors and roofs. The building had been neglected for decades and was in a poor state of conservation, despite representing a valuable example of the typical historic architectures of the mountain area in the Province of Brescia. With the support of the local municipality, a complete restoration of the sawmill has started, with the objective of transforming it into a territorial museum. To this end, a series of reversible and compatible timber-based interventions were planned in consultation with the local superintendence for architectural heritage. The structural design aimed at preserving the historic value of the sawmill, especially in its original timber components, such as trusses, braced columns, and diaphragms. The present case study enables to showcase the advantages of the applied strengthening methods in such a complex architectural restoration and the importance of tailored structural detailing, combining the improvement in static and seismic performance with the protection and preservation of ancient timber members.	Michele	Mirra	Delft University of Technology
6G	ECCS/TESP - Engineering	Exemplars & Construction Case Studies - Engineering Focus	In-plane stiffness of large-area framed floor diaphragms constructed with oriented strand board panel sheathing using a Swiss case study	In a case study of a Swiss building, wood structural panels made from oriented strand board (OSB) are stapled continuously on the top side of a hollow-core timber slab to create one large-area framed floor diaphragm measuring 41.1 x 50 m <sup>2</sup> . The diaphragm acts as horizontal bracing structure for six 41.1 m long steel trusses. The in-plane stiffness is investigated due to the internal stability load of the trusses in the ultimate limit state. A finite element model is developed using linear elastic material behaviour. The numerical total in-plane displacements are compared to the analytical results of the design method based on the shear field beam theory. The stiffness of the sheathing-to-framing connection and the size of the OSB panels are decisive factors for limiting the total in-plane displacement, which easily exceeds the limit value.	Miriam	Kleinhenz	Basler & Hofmann AG
6G	ECCS/TESP - Engineering	Timber Engineering & Structural Performance - Engineering Focus, Exemplars & Construction Case Studies - Engineering Focus	SPIRAL CLT-CONCRETE COMPOSITE STAIR CLEAR SPANS 21m	Using a special application of timber-concrete-composite (TCC), the KF Aerospace Spiral Stair is comprised of doubly curved and warped CLT with a structural concrete topping throughout the full spiral. Creating composite action between the concrete and the CLT significantly increases the overall stiffness and strength of the stair. This removes the requirement for any support columns along the 21m (70ft) clear span and maintains a highly aesthetic structure that serves as a welcoming showcase for the KF Aerospace museum, and a tribute to continually pushing the boundaries of what is possible with timber construction. The added mass of the concrete improves the vibration performance and ensures comfort for people ascending and descending the stairs. A Finite-Element orthotropic shell model was created to predict the structural performance of the TCC system which relies on composite action both in-plane and out-of-plane. This bi-axial composite application is highly innovative for TCC systems and required unconventional analysis and design methods.	Ben	Moerman	StructureCraft
6G	ECCS/TESP - Engineering	Exemplars & Construction Case Studies - Engineering Focus	TOWARDS MANUFACTURING OF FULL SCALE WOOD VENEER AUTOMOTIVE PANEL	This study investigates the ability to manufacture automotive body panels using wood veneers. Creating wood preforms similar to the composite manufacturing industry was found to be the ideal approach, with the challenges of controlling moisture during forming and drying prior to adding adhesive. In this study, preforming was conducted using steam and hot water. Experiments to date show the feasibility is not restricted by the material, rather by the complexity and longer manufacturing process. Various techniques are currently deployed to minimise the issues associated with complexity of layup.	Matt	Jennings	Deakin University
6G	ECCS/TESP - Engineering	Exemplars & Construction Case Studies - Engineering Focus	WALMART HOME OFFICE – CONSTRUCTION MOCK-UP CASE STUDY	The Walmart Home Office in Bentonville, Arkansas, serves as a pioneering case study in the field of large-scale, commercial building development with twenty buildings and over 2-million square feet of mass timber construction. This case study delves into the intricacies and outcomes of employing a construction mock-up to evaluate connections, and other critical elements of the mass timber system for cost and construction efficiency including approximately thirty-five gravity connections and over fifteen-lateral connections, with four different lateral systems evaluated.	Carla	Dickof	Fast + Epp
6H	EIC - Practitioner	Session Chair: PROFESSOR KEITH CREWS / THE UNIVERSITY OF QUEENSLAND					

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6H	EIC - Practitioner	Sustainability and Timber in a Circular Economy - Engineering Focus, Timber Engineering & Structural Performance - Architectural Focus, Education, Innovation & Challenges - Practitioner Focus	Innovative Approaches to Optimization and Sustainability in Timber Construction: Insights from the Austrian Research Project Sys.Wood	The research project Sys.Wood addresses the entire life cycle of timber buildings aiming to develop new interfaces, methods, and principles for system optimization in Austrian timber construction. The goal of Sys.Wood is to transform the value chain by optimizing processes and methods at every stage, including design, manufacture, use, maintenance, reuse, and disposal. Key objectives are sustainability, digitalization, and quality management. A particular focus is on enabling small and medium-sized enterprises to participate competitively in larger projects by integrating manufacturing expertise early in the planning process. This integration intends to ensure a sustainable value chain from the outset. This paper outlines the strategy and objectives of the project and presents findings from the first of three years planned, setting the stage for ongoing and future research to the timber construction industry.	Benjamin	Kromoser	Universität für Bodenkultur Wien
6H	EIC - Practitioner	Sustainability and Timber in a Circular Economy - Practitioner Focus, Education, Innovation & Challenges - Practitioner Focus, Exemplars & Construction Case Studies - Practitioner Focus	ALIGNING NEEDS AND SUSTAINABILITY: A CASE STUDY OF BIO-BASED TEMPORARY HOUSING	As a result of repeated natural disasters in the last decade, Australia has an acute need for innovative and scalable models for provision of temporary housing. Common criticisms of currently available housing systems revolve around their high production costs and a heavy reliance on imported building solutions. To address these limitations, a model for temporary post-disaster housing has been developed to utilise locally available and renewable timber resources, to enable faster, cheaper, low-carbon, and scalable temporary housing delivery options for Australian disaster recovery. This paper presents the developed "TCS House", as the result of a significant collaborative effort between academics, government, industry, and community partners. It is constructed using a novel hybrid timber-cardboard sandwich (TCS) composite, fabricated from a laminated cardboard core sandwiched between two plywood face layers. The cardboard core can be made from waste or recycled materials, and the TCS panels are combined with a number of other residue and recycled timber products, available from local manufacturers, to provide other building performance functions related to weatherproofing, robustness, thermal comfort and aesthetics. A full-scale prototype is built to benchmark the affordability, sustainability, design flexibility, fabrication complexity, embodied carbon, and durability of the TCS House system. The prototype is also used to explore strategies to maximise the use of renewable and recycled materials in temporary housing construction, by providing direct links between local communities and the forestry and wood products sector.	Mahmoud	Abu-Saleem	The University of Queensland
6H	EIC - Practitioner	Sustainability and Timber in a Circular Economy - Practitioner Focus, Education, Innovation & Challenges - Practitioner Focus	Increasing Carbon Literacy within the Design Sector	Increased attention on the embodied carbon impact of buildings has brought the topic of life cycle assessment to a new audience of design professionals. It is imperative for the wood industry to provide resources that clearly demonstrate the carbon benefits of wood in a way that is easy for designers to understand and implement into their typical design process. WoodWorks developed and continues to expand such a library of resources which addresses topics like biogenic carbon and comparative life cycle assessments for wood buildings. These resources have seen great success in the U.S., being referenced by several influential design firms and industry organizations, helping designers to understand the sustainability of wood construction and giving them the tools to be able to quantify the carbon benefits of their wood designs. Although these resources are written specifically for the U.S. audience, a similar approach could be used in other countries.	Ashley	Cagle	WoodWorks - Wood Products Council
6H	EIC - Practitioner	Education, Innovation & Challenges - Engineering Focus, Education, Innovation & Challenges - Architectural Focus, Education, Innovation & Challenges - Practitioner Focus	Fundamental Study on Using of Motion Confirmation and Gaze Measurement for Preserving Carpentry Technique	In order to maintain the value of historical buildings such as cultural properties for a long time, proper daily management and regular repair are necessary. Therefore, preservation and repair require in-depth knowledge, techniques and skills to pass on the value of a building to future generations. In addition, the high level of preservation and repair techniques in Japan is known, and such techniques have been designated as an Intangible Cultural Heritage. At present, however, there are few young talents and the number of carpenters is insufficient. The reasons for this include the need for a long period of training and many sensuous teaching methods. In this study, we focused on "planing," which is difficult and requires a long training period among carpentry jobs, and examined the conservation of techniques and the efficiency of education. As an experimental method, the work was visualized by gaze measurement and motion measurement for specialists and unskilled workers. For the amateurs, changes before and after instruction were also measured. From the experimental results, it became clear that the expert gazed at the cutting edge when adjusting the plane, and alternately checked the operating point and the plane when planing, and that the time of watching the plane was about 20%. On the other hand, the amateurs person tended to pay attention to the place to strike when adjusting the plane, but he became able to pay attention to the cutting edge after receiving instruction. In addition, during the planing operation, the line of sight was widely dispersed before the personal guidance, but after the personal guidance, the line of sight dispersion was reduced by correcting the posture. These results suggest that data collection by gaze and motion measurement is effective for preserving technology and improving educational efficiency.	Akiko	Ohtsuka	Akita Prefectural University
6H	EIC - Practitioner	Education, Innovation & Challenges - Engineering Focus, Education, Innovation & Challenges - Architectural Focus, Education, Innovation & Challenges - Practitioner Focus	EUROPEAN POLICIES INFLUENCING WOOD PRODUCTION IN THE CONSTRUCTION SECTOR IN SCENARIOS UNTIL 2050	Wood products can play an important role to achieve the European Commission's policies for climate neutrality by fostering a decarbonisation of the construction sector. The study analyses how different policies may impact wood demand forecasted for the sawmill and wood-based panels industry, based on past trends in statistics and expert insights gained through surveys, workshops, and interviews. Two generic scenarios were portrayed: increasing production versus stagnation until 2040. The results indicate an increase of demand for sawnwood, and wood-based panels leading to a potential high raw material and supply competition. We point out policy needs and perspectives for research and innovation addressing both resource efficiency and circular uses of materials, products and building systems.	Uwe	Kies	InnovaWood
6H	EIC - Practitioner	Timber Engineering & Structural Performance - Engineering Focus	Fire engineering challenges and solutions in Mass Timber construction	This presentation will explore the challenges of fire engineering in mass timber buildings. It will address analysis and design methods, as well as mitigation strategies that can reduce the specific risks associated with this type of construction. In this context, it will examine how mass timber can influence the fundamental principles of designing and constructing safe buildings, ensuring an appropriate response in the event of a fire. In addition, regulatory and performance-based design approaches will be presented, along with specific strategies and provisions to enhance fire safety in mass timber buildings.	Cristian	Maluk	DAMA Engineering Consultants