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**Economic Commission for Europe****Committee on Forests and the Forest Industry****Seventy-fourth session**

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Item 3 of the provisional agenda

**Forest products and markets****Wood construction****Note by the secretariat***Summary*

This document provides a brief background on the factors and influencing sectors that could either limit or enable the use of wood in construction. Building with wood provides the forest sector with one of the most substantial opportunities to contribute to the low-carbon, green economy. The decision on whether and how wood would be used for a building is taken by members of sectors other than the forest sector. The secretariat invited a number of experts from these other sectors, who define the framework conditions for wood construction, to identify key barriers, determine approaches and develop ways to break down obstacles to wood construction in their area of work. City planners, architects, builders, contractors, project leaders, and educators will share their views at the 74<sup>th</sup> Session of the Committee on Forests and the Forest Industry on what is limiting the use of wood and the ways to address these limitations where it is appropriate.

The Committee is invited to share their experiences with these defining and regulatory groups, and is invited to discuss how the forest sector could further engage those groups who ultimately determine the use of materials.

## **I. Introduction**

1. The ECE/FAO Forestry and Timber Section organized a workshop on green building in 2009 in the context of the 67<sup>th</sup> session of the ECE Timber Committee. During this event, the head of the Architects Council of Europe, Mr. Adrian Joyce, urged member States, associations, and attending industry and academic delegates, to engage with architects about building with wood. His message was that architects did not want to be told what material to use, they wanted to understand how to use materials so they could make the best choice for their project.

## **II. Wood construction is making progress**

2. Since that time, there has been a surge of interest among many architects to explore the capabilities of wood including:

- an increase in taller wood structures;
- new hybrid or composite designs using wood;
- an increase in manufacturers producing mass timber elements;
- a greater collaboration and supportive competition between designers to push the frontiers for wood buildings;
- an increase in the number of countries using heavy and mass timber products, notably in the Asian region, Australia and New Zealand; and
- increased emphasis on the construction of buildings that reduce greenhouse gas emissions.

In addition to these concerns and the aforementioned lack of technical knowledge of wood by architects, engineers and contractors; there is a related and compounding problem of lack of education on the use of wood for construction. Wood construction is not advancing as quickly as its performance would indicate because the key users and regulators have not had access to comprehensive training on its utility and capabilities.

### **1. Principal Influencing Sectors**

3. The following business or professional sectors have the potential to promote or limit wood use in a project. While the relative importance of each sector may vary between jurisdictions, any one of these influencers may cause wood to be eliminated or used as a structural material:

- Architects
- Engineers
- Fire Protection professionals
- Contractors / Builders
- Building Officials
- Policy Makers / Regulators
- Insurers
- Financers

- Owners / Developers

**(i) Architects and Engineers**

4. Architects and engineers are the key professionals that determine material selection. Depending on jurisdiction, building type, professional responsibilities and codes, one profession may hold more sway over the other. For the most part, these two professionals decide upon structural, envelope and finishing materials, although they are not generally required to have a comprehensive knowledge of all potential structural materials. Engineers are generally required to have a thorough knowledge of both steel and concrete, largely due to the requirements set by the professional accreditation bodies. However, knowledge about wood products is not required for either an architect or engineer to achieve professional credentials.

**(ii) Fire Protection Professionals**

5. Despite the predictable nature of wood combustion, many fire protection professionals are resistant to wood buildings. This is probably a consequence of fires experienced at a time before modern protective measures were adopted – early detection, sprinklers, better fire-fighting equipment, built in safety measures, etc. – and became standard within most building codes. Moreover, fire protection professionals have the objective to prevent human and material loss during a fire event and thus it is natural for risk aversion/reduction/avoidance to be a critical factor when fire codes are developed.

**(iii) Contractors / Builders**

6. In the past few years, largely due to the green building movement, the concept of Integrated Design Process (IDP)<sup>1</sup> has become recognized as an effective way to optimize building design, reduce construction impacts, speed up the construction practices and enhance operational performance. As such, contractors can play a significant role in determining the structural elements of a building because they enable conceptual designs to become a reality.

7. Like other professions, contractors are noticing the resurgence in structural wood product use. However, since the dominant materials for construction for the last 100 years or more have been steel and concrete, the capacity to use wood is limited in most large construction firms. Interest among contractors is growing as clients and design teams gravitate to wood, but contractors are faced with professions which have been focussed on other materials.

8. As a member of an IDP team, contractors bring their practical experiences of building to the design process. If, however, there is a gap in their material experience, there may be a reluctance to incorporate new elements or practices.

9. In addition to a low level of knowledge about building with wood, the construction sector globally is not renowned for its investment in research and innovation and often rely on designers to inject new ideas into building design. In fact, only a few construction companies have notable research and development capabilities. Some countries have taken significant steps to reverse this as well as reinvigorate both trade skills and public perception of the construction sector to introduce leading edge practices. For example, the Construction Scotland

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<sup>1</sup> Integrated design process includes the active and continuing participation of users and community members, code officials, building technologists, contractors, cost consultants, civil engineers, mechanical and electrical engineers, structural engineers, specifications specialists, and consultants from many specialized fields.

Innovation Centre in the UK was created to help transform the construction sector by demonstrating and enabling new practices to succeed. Now that wood is expanding its potential in previously unattainable building types, it will be essential to have contractors understand how wood can be used and equip them with the knowledge to apply the practice within their companies.

**(iv) Building Officials / Policy Makers / Regulators**

10. The role of building officials is to enforce building code policies and regulations, as well as ensure a base level of structural integrity and performance to protect occupants. Even in the absence of policies which specifically exclude wood use other regulations may be constraining or preventing its use with limitations, which are not needed or are no longer relevant with current best practices in wood construction. As an example, some jurisdictions have a limit on the height of wood buildings while others will specify performance objectives and outcomes. Others limit the area of a building. Still others put special requirements for firewalls, fire protection, street frontage areas (for fire access), egress, and limits on building occupancy/use.

11. While the barriers appear numerous, there are examples for each barrier where it has been overcome and wood can be used.

12. In addition to construction barriers, there are opportunities for wood to help local jurisdictions achieve other regulatory goals, especially in the environmental arena. Jurisdictions around the world are incorporating low carbon outcomes for both performance and embodied impacts. As more jurisdictions aspire to lower the environmental footprint of the built environment, wood could become a logical choice.

13. For example, in buildings achieving passive design performance, the thermal properties of wood are recognized as an efficient way to reduce thermal bridging<sup>2</sup>. Regulators and policy makers seeking to reduce environmental impacts of buildings may well recognize the importance wood could play, but the performance of wood must be put into the context of the regulations. In other words, putting wood's capability in the context of regulatory intent may prove beneficial to motivating regulators to adjust limitations from those that specify materials to those that specify performance requirements; thus remaining neutral on material use so long as its performance meets the requirements.

**(v) Insurers**

14. Insurance companies historically base their insurance rates on the potential for damage caused by a course of construction fire. Insurance rates may be between two and six times higher for a wood structure than a similar building constructed of a non-combustible material like steel or concrete. Fortunately, these rates are not a significant contribution to the total project cost, but may nevertheless cause some builders to move away from wood. While light frame construction is at higher risk than heavy or mass timber structures, some insurance companies are reluctant to insure wood buildings at all, despite the fire resistance of thick timbers. Although wood has known and predictable responses in fire, the lack of knowledge about some wood products' performance in a fire, reduces their acceptability in both construction and use.

**(vi) Financers**

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<sup>2</sup> A thermal bridge, also called a cold bridge or heat bridge, is the area of an object (frequently a building) which has a significantly higher heat conductivity than adjacent materials resulting in an overall reduction in thermal insulation of the object or building. (Source: Wikipedia)

15. Financial institutions, like insurers, are risk averse. This includes concerns over time and cost overruns, building quality and performance guarantees. This should not be a major hurdle for wood advocates, since financiers can find plenty of examples of wood structures which have been successfully (and economically) built. These examples of successful financing of wood construction can be used as examples to attract more investors to consider incorporating wood projects in their portfolios.

**(vii) Owners / Developers**

16. Increasingly wood is recognized for its contribution to a building's ambience and stress-reduction potential, a plus for occupants. However, developers building for resale may have less interest in delivering these features if there is a perceived price increase which could either reduce sale margins or delivering a price higher than other structures.

## **2. The setup of the discussion**

17. *“Wood construction in the region: what can forest industries do to help nurture a paradigm shift to using wood for green construction”* takes the first steps to examining how each influencing sector views wood products; what their concerns or issues are with the product; and how these sectors can connect with the wood industry to bring forward solutions. The aim is to open a discussion on identification of the barriers or limiting factors (regulatory, material properties, design issues, knowledge, etc.) identified by sectoral presenters and discuss possible steps to remove the barriers and mitigate the limiting factors where it is appropriate.

18. The signing in April of the Paris Agreement brought almost 200 nations together for a common objective of reducing human activities which cause climate change. While much effort is being directed at reducing impacts from energy consumption, deforestation and transportation, the impact of buildings –operational and embodied, energy and material efficiency, affordability, aesthetic values, building resilience and future adaptability – will necessarily play a major role if success is to be achieved. All levels of governments – states, provinces, regions, cities, towns and villages – will need to work with common purpose to bring about changes to both reduce our impact and to mitigate climate change if possible. The ECE Committee on Forests and the Forest Industry (COFFI) has an opportunity to advance wood use that is aligned with the objectives of the Paris Agreement.

**(i) Presenting experts**

19. The speakers of this session are being asked to:

- Address why the sector professionals (architects, engineers, fire officials, etc.) either do not specify wood or resist its use in construction;
- Outline approaches to engage the sectors, both to understand better the concerns and collectively develop strategies to overcome these barriers;
- Recommend how best to set up a task force of industry, member States and the relevant professions to start advancing wood in construction;
- Provide a recommendation to the participating member States, industry organizations and the professional sector they represent that would initiate the process of removing hurdles to wood use;

- Provide long-, medium-, short-term and immediate proposals for actions and recommendations to delegates at the session.

(ii) **Audience**

20. Leading up to this agenda item, member States are invited to think of practical approaches within the sphere of influence of the forest sector and to comment on some of the questions below:

- Does the forest and wood products sector regularly communicate with people in each influencing sector? Is it willing to do so? If so, are there successes and could those successes be transferred to other regions? Who should take the lead?
- Are there wood champions within each sector that could become strong advocates for finding solutions to the hurdles which limit wood use within their own profession or sector? What kind of help would be required from the wood sector to accomplish this?
- Are post-secondary institutions teaching design, engineering, construction and trades serving their future clients needs if the graduates have little or no understanding of wood use in buildings?
- Is there a particular area where member States / organizations had some success with an influencing sector? Could these examples be highlighted and replicated by others? Is there an opportunity for the Joint ECE/FAO Forestry and Timber Section to better engage with that sector on a broader ECE scale?
- Are government and industry efforts coordinated and collaborative and are there resources to overcome the hurdles identified by the influencing sector speakers? If not, how could we still move ahead?

### **III. Points for Consideration**

21. The Committee is invited to discuss experiences with existing partnerships and consider potential partnerships with those that build, own, protect and regulate buildings. The committee is also invited to discuss how the forest sector could further work together with these groups that ultimately determine the use of materials.

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