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Timber's popularity growing within commercial construction

Nov. 28, 2016 | by [Steve Arel](#)



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A European [stadium](#). A Canadian [office tower](#). An American [high-rise](#).

Projects that used to consume thousands of tons of steel and concrete are being built with arguably the world's longest and most renewable industrial resource – wood.

The North American timber construction industry has transformed significantly over the past decade. At the turn of the 20th century, steel and concrete widely replaced wood in the construction of commercial buildings.

Nowadays, advances in fabrication techniques and connection engineering, along with a renewed interest in timber as an architectural medium and trends toward sustainable construction, are providing an environment for the re-emergence of timber in an array of projects.

Susan Jones, founding principal of Seattle architectural firm [atelierjones](#), is among the veteran architects advocating for the advancement of the acceptance of mass timber construction in the United States. Her firm's work has been recognized with numerous national, regional and local design awards

Jones also is among the 18 American Institute of Architects' representatives who are part of the International Code Committee (ICC) working to test the effectiveness of timber in construction projects and to define codes outlining building practices.

On the heels of the [Timber in the City Symposium](#) at Parsons School of Design this month in New York, Jones spoke with ProudGreenBuilding.com about the increasing popularity of mass timber commercial projects and the impact research will have on future building efforts.

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Proud Green Building: What was the message you tried to convey about timber at the symposium?

Susan Jones: We introduced the audience to mass timber, to our work and the hurdles and opportunities we saw. We were joined by a panel, and we had an engaged discussion. The question was really what can we do to move this forward. If there are hurdles, what are they and how can they be identified and mitigated?



We all were involved with various levels of building with mass timber already and had experiences to share. Most were optimistic in determining what can be built today and what are the challenges. Sometimes, that message gets lost in translation.

For example, there is so much focus on building above six stories, which is currently not allowed in any of the ICC codes today. There is tremendous opportunity under six stories, and that's where our work has been focused.

PGB: Are more and more architects and engineers looking to timber first when it comes to commercial projects?

Jones: Especially in the Northwest, where timber is part of the cultural heritage. Portland is filling up with beautiful, wonderful NLT (nail-laminated timber) buildings across the commercial landscape.

People, especially out of Vancouver, Washington, because we're so close to the Canadian border, we're well aware of what has been done over the last decade or so, especially with the Olympics back in 2008. There has been a lot of awareness. Certainly, when it's appropriate, we're definitely open to using wood. That wood-first policy we see implemented several years ago was a huge impact on the BC (British Columbia) market. If something were to go ahead in the States, at least on a state level, that would be a greater impetus to consider wood.

PGB: Why is timber becoming more prevalent in commercial projects? What is driving this trend?

Jones: When you talk to a timber or lumber mill person or any sort of forester, they all say, "What's with this trendy thing called timber? We've been doing this for 30, 50, 100 years and you architects were never interested in what we were doing. What's going on? Are you guys finally seeing the light?"

I always laugh when I get a comment like that.

The impact of climate change has affected our world deeply. As an individual practitioner as an architect, we all understand that we have a huge role to play in how our profession can affect climate change.

We're responsible for specifying materials. We can specify steel and concrete. We can specify wood. Of course, this is done in concert with response to budget, our client's needs and their market perception, etc. People are starting to get it. Architects have been leaders the last three or four years to help their clients understand this can be an environmental choice of materials and beneficial and beautiful one.

That's my personal motivation. Working with wood when it can be exposed as a beautifully sensitive material that reflects light and daylight in very different ways and creates a calming sense of motion when you enter a space, whether it's a commercial space or residential space. There's just a different feel when you're confronted with a natural environment.

The majority of growth has happened in our cities. We all love our dynamic, urban environments, but when you have the opportunity to touch a piece of wood, there's just something very different about it – its smell, its texture. There's a real connection to nature we all instinctively long for.



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PGB: What makes timber a good alternative to steel or concrete? Is it as strong and durable?

Jones: On the West Coast, light-framed timber has always been around in low to midrise multi-family, up to six stories. That's been a big stalwart of our multifamily construction market. As you start to get higher, the limitations from the code perspective and other areas start to phase out light-frame timber. The excitement of the mass timber work is that it can create large, somewhat awkward but very strong and lightweight panels. Typically, they're 8 feet wide by 40 feet long by 4 to 6 to 9 inches thick, depending on how many layers you use.

If you imagine an equivalent to concrete or a precast concrete system, they're lighter than that and very strong. They can create a repetitive, modular system of construction. That's a huge advantage to our contractors who, once the construction industry gets used to this system, they won't go back because it's such an easy modular way of putting things together on site, especially in tight urban sites.

It's quicker, it reduces noise, reduces pollution with trucks and it appears that the schedule is impacted favorably to 20-30 percent, which is no small amount when time is money. A lot of this, of course, depends on the individual project and consistency in the quality of design that's being executed by the architect.

From a design point of view, it puts more control in some ways back in the architect's hand. All of that work is done prefabricated in the factory before the panels even arrive on site. So there's a great deal more work that's been done beforehand, but the architect taking charge of coordinating works with the fabricator directly. Depending how well the architect does, it can go together very fast with extremely tight and very precise tolerances. It's an exciting environment to work in when you're looking at millimeters or an eighth of an inch tolerance. It's a great material to work with once you then come in with your finish work and move around the building to apply your exterior wall systems on it.

Once contractors understand that and owners realize the benefits, that's going to be an advantage in the contracting industry. Those of us deeply involved in this the last five or six years have been building that expertise to lead that process in a different way than the typical architect would lead a construction process or be part of a team. We're very conscious about being good, integrated design team players. It is a different role, but it's exciting for us who have been involved for a while and understand how to use it to everybody's advantage.

PGB: Is timber for every project?

Jones: Most likely, yes. But the real barrier at the moment is codes.

To answer that question appropriately, the answer is no. You can't build over six stories. However, there's nothing prohibiting that in terms of its constructability or structural integrity.

One of the things that's been really exciting recently is to watch the (cross-laminated timber) Framework building in Portland get closer to being approved by the municipal authorities. Portland has a strict code – the seismic codes around the country are much less than they are here on the West Coast – and it's exciting that we can seriously consider a 12-story timber building being built in the next couple of years here on the West Coast.

That tells me the sky is pretty much the limit. If you look at it carefully, there's no technical reason why you can't go to 20 stories and probably 40. At certain points, there are limitations for fire hoses, pumps and equipment.

The real issue is codes, and the foundational issue is fire codes. We can convince our structural engineers that our buildings are safe. We can convince our structural reviewers that they're safe. The fire community has a longer way to go.

I'm one of the national code committee members, one of 18 American Institute of Architects' representatives to the ICC. Most of our focus has been on how to understand better and deal with fire concerns. If you look at the codes, and this gets a little technical, there's type 1A and type 1B and those buildings have a high height limit with what are considered non-



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combustible materials, which are steel and concrete. When you add a combustible material, i.e. wood into the mix, there are a series of concerns that have to be met.

We're going about that in a very methodical way. The good news is that the committee is functioning at a high level, all parties are involved, there's a considerable amount of give and take and scrutiny.

The result is that they're pushing some important tests that will be some of the most rigorous in the world happening in the spring. Funding has been procured, and these are million-dollar fire tests that take several weeks to construct a two-story apartment dwelling with a stair core and a corridor to mimic conditions. Then we're going to set the whole thing on fire to see how it performs. Assuming those fire tests go well – and we assume they will, based on all of the other tests that have been done internationally and in Canada –I think you'll start to see some fast movement on the codes and things will fall into place very quickly in the next year or two.

PGB: As far as the discussion of regulations related to timber, are they centered on fire codes? Is there concern about strength and durability?

Jones: The structural properties of the panels are fairly extraordinary. They have a very high level of sheer and lateral resistance. Because the panels are lighter than typical concrete, the gravity loads are less and the foundation requirements, which are always concrete, are known to be less.

Some of these aspects need to continue to be tested, but I think there's a general acceptance in the industry about the structural issues. The fire questions are things we need to continue to be thoughtful and careful of and do strong research on.

They're not going to be building 14 stories in Norway, for instance, or 18 stories in Vancouver without careful, thoughtful scrutiny.

There are many ways to protect the wood. They include gypsum wall board and the natural charring ability of the wood itself.

There's really rigorous research going on right now about how to measure that char layer. What that means is that when a heavy timber member burns, it burns in a very slow way from the outside in and tends to char over and protect the inner structural layers from being burned further. There are scientific ways to design so that in the rare case of fire or event when a system might fail and that member starts to burn, there could be a protection born out by the natural wood properties.

If the testing bares that out, it will add a lot of momentum to the code process.

PGB: Will the tests next year dictate how the timber market and timber construction industry move forward in relation to commercial structures?

Jones: Once these codes are put into place, that will be the trigger. Once the codes committee – and I should stress that I don't speak for the committee, I'm only one member of 18 –performs the tests and, assuming they're performed at an acceptable level, once we have data that is very trustworthy and carefully thought out, I think the code committee will act quickly to assemble model code language. Once that goes ahead, it will go into a broader voting process sometime in early 2018.

Once the language is assembled, it can be used by authorities and cities at their discretion. They'll know it has been carefully scrutinized by an interdisciplinary body.

Everybody is waiting for that sweet spot. Up to six stories cost-wise for a commercial building maybe doesn't make maybe quite as much sense.

With going taller, it's a matter of the codes being allowed and getting familiar with the system.



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It's really exciting to imagine growing your own high-rise from a handful of seeds. It's the only material that is renewable.

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