

Cold-formed steel heats up as mid-rise and framing option

by Ian Harvey Oct 11, 2017

Cold-formed steel (CFS) is challenging engineered lumber as the material of choice for mid-rise structures, says Larry Williams, executive director for the Steel Framing Industry Association.



Paul De Berardis, RESCON's director of building science and innovation, says cold-formed steel is generally used for low-rise commercial structures such as big box stores. - Photo: COURTESY OF STEEL FRAMING INDUSTRY ASSOCIATION

In fact, he adds, CFS could even go higher if the economics align.

"We had an engineering study done which shows it is feasible to go 40 storeys with CFS, though economically it isn't viable," he states.

To make it more viable, codes would have to be updated and other work carried out. Still, he says, it's a promising future.

Proponents don't see much of a future in residential single family homes but they do see potential in multi-unit, multi-storey structures beyond the three storey low-rise.

The sector took a small hit when building codes in jurisdictions across North America were changed to allow wood-framed structures for mid-rise application.

Engineered lumber surged briefly, Williams says, but things have swung back again.

It's rebounding partly because of the economics and partly because of the alleged risks inherent with wood's vulnerability to combustion, especially during the construction phase, he notes.

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Steel Framing Industry Association

The upshot, Williams says, is that insurance coverage during the construction phase is much more expensive and some carriers are demanding 24-7 live security.

"The costs of builder's insurance with concrete (in U.S. figures) is about nine cents per \$100 of value. CFS is 14 cents to 15 cents per \$100 and wood is 89 cents per \$100," he says. "That's substantially adding to the cost of development. One building was costed at US\$300,000 for concrete and \$1.2 million for lumber. The owner went for concrete."

With the United States fully out of the recession following the 2008 financial crisis, he says construction has picked up and interest in CFS is rising.

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Paul De Berardis, RESCON's director of building science and innovation, says CFS is generally used for low-rise commercial structures such as big box stores.

"There is one building, Bone Structure, using it for custom single family homes," he says. "The problem though is one, the cost, which is more than wood, and two, you can't just cut it like you can with dimensional lumber to make a joist. It's an engineered product so you have to work with those limitations."

He says he hasn't heard of any push in Canada to build three or more storeys with CFS, unlike the U.S.

Wood, however, seems to be gaining ground for four-to six-storey projects and both the Ontario government and the industry are working to create best practices, including guidelines on how to reduce fire risk during the construction phase.

"With lumber, you have an established supply chain and trades," Williams says.

The wood sector is investing heavily to promote their technology, Williams says, and steel will continue to market their option too.

"We're at about 30 to 35 per cent of the market for low- and mid-rise, which is good," he says.

Brock Martin, president of Magest in Ontario, which has specialized in CFS for 25 years, says even with the initial surge of interest in wood-frame mid-rises, steel has held steady or grown.

"Our market share is growing quite well," he says. "In 2005 we had to fight for every job but today mid-rises, up to seven storeys or so, is more accepted for cold-formed steel."

Magest has projects across Canada including hotels and a seniors residence.

"For those projects, of course they like the non-combustible aspect," he says.

Mike Stiller, manager of global R&D construction at ArcelorMittal Dofasco in Hamilton, Ont., says CFS framing has been quietly holding market share for years in Canada, especially on ICI projects.

"Hospitals and seniors residences, even some hotel chains, need non-combustible construction so they go for steel and concrete," he says. "Certainly, mid-rise is a sweet spot for steel. When you look at the cost over the life cycle, the fact steel is non-combustible and is wholly recycled at demolition or renovation, it's very sustainable and cost efficient."

Steel isn't susceptible to shrinkage or mould, he states.

While a 40-storey tower framed with CFS isn't likely, he adds, there's no reason why CFS shouldn't be a viable choice for mid-rises and up.

"As one of the managers here has said, 'steel has always had a great story to tell but the problem has been we're lousy storytellers,'" says Stiller. "We're changing that."