



8 August 2019



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By Charles B. Gale, Richard Vlosky, Mason T. LeBlanc, and Rajan Parajuli

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# Perceptions, Awareness, and Participation: Sawmills and the CLT Market in the South

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Mass timber has been produced and used in many forms over the past decade. Examples are glulam beams, laminated veneer lumber (LVL), and parallel strand lumber (PSL). More recently, new entrants have been developed and are being adopted in the North American engineered-wood family of products: Cross-laminated timbers (CLTs), nail-laminated timbers (NLTs), dowel-laminated timbers (DLTs), and mass plywood panels (MPPs) have experienced years of product testing and manufacturing learning curves, yet so far have gained limited market space.

CLT manufacturing has been an established industry in Europe for decades, but is in its infancy stage in the US and Canada. The potential markets for CLT in the US are enormous, if architects, developers, builders/contractors, and building owners accept the product as a substitute for steel and concrete.

Led by CLTs, North American mass timber-panel manufacturing is poised for substantial growth: It is projected to double in size in terms of projects and manufacturing capacity annually for the next four years. The awareness and understanding of this emerging market are accelerating, due to the International Mass Timber Conference—held in Portland, Oregon, for the past three consecutive years—as well as the efforts of WoodWorks, a national organization, to disseminate knowledge. This is just the beginning of a very long upward trajectory for an industry that will replace traditional construction materials, such as steel, concrete, and masonry, in many applications. Mass timber panels will also be used in conjunction with traditional building materials, further expanding markets and use. As the environmental, economic, construction, and aesthetic implications of using wood are better understood by architects, developers, builders, engineers, and government officials, the mass-timber industry will be firmly established in both nonresidential and residential construction in the future.

In North America, current mass-timber plants under construction include Kattera, Vaagen Brothers, and Smartlam's expansions in the Pacific Northwest, all of which are medium-large-capacity facilities. In the South, CLTs are gaining increased exposure and use as well, with the recent completion of the International Beams CLT facility in Dothan, Alabama; the construction of Sterling Solutions' large-scale industrial mat facility in Lufkin, Texas; and a planned Texas CLT LLC plant in Magnolia, Arkansas. More recently, two firms in Canada—White River Forest Products in Ontario and Kalesnikoff Lumber Co. in South Slokan, British Columbia—have announced plans to complement sawmill operations with state-of-the-art CLT production lines. At the current rate, the North American mass timber-panel sector is constructing almost one plant annually, with an average capital investment of \$20–\$30 million.

With dramatic investment in new production capacity, North America is expected to realize a CLT capacity gain of 1,000 percent from 2010 to 2020 (Mass Timber: Industry Report). With that comes an anticipated demand for CLT feedstock: quality lumber from local markets (#2 2x6s and 2x8s, kiln-dried with 12 percent +/-3 percent moisture content). New entrants will have the benefit of understanding the market and front-end feedstock supply sides of the business, as well as an increasing knowledge base on how to use mass timber in building applications.

## CLT Drivers

One of the major potential drivers of CLT growth is recent changes in related building codes. The 2021 International Building Code (IBC) Type IV categories now include new subcategories of mass-timber buildings. According to the Softwood Lumber Board (SLB), taken together, the 14 tall mass-timber code changes create three new types of construction in the US that set fire-safety requirements and allowable heights, areas, and number of stories for mass-timber buildings up to 18 stories tall. Mass timber includes any product currently permitted for use in Type IV construction, including cross-laminated timber, structural composite lumber, glulam timber, and large-section sawn lumber.

The three new mass timber building types are:

- Type IV-A: Up to 18 stories tall
- Type IV-B: Up to 12 stories tall
- Type IV-C: Up to 9 stories tall

This outcome represents in part the efforts of the Softwood Lumber Board, which, alongside the American Wood Council (AWC) and the US Endowment for Forestry and Communities, funded a multiyear initiative led by AWC to generate new data to demonstrate the performance of tall mass-timber structures, engage and educate code and fire officials, and ultimately, gain acceptance for tall wood in building codes and standards.

Although rapid growth is taking place in this newly emerging sector, there are still unknowns within the industry. For example, research, development, and testing are taking place at such leading institutions as Clemson University, Oregon State University, the University of Maine, Massachusetts Institute of Technology, and the University of Minnesota. In addition, the US Forest Service's Forest Products Laboratory in Madison, Wisconsin, and wood-panel standards/testing/accrediting entities such as APA—The Engineered Wood Association and PFS-TECO, are exploring a number of areas, including building applications, connectors, and seismic and acoustic performance. WoodWorks—Wood Product Council and Think WOOD, along with various local and state agencies, have been instrumental in ad-

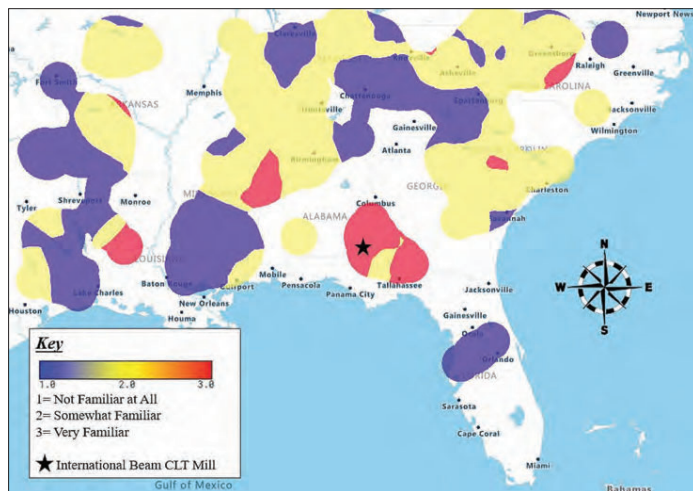


Figure 1. In a survey of sawmills in the South, 46 percent of respondents indicated that they were not at all familiar with cross-laminated timbers (CLTs), while 41 percent were somewhat familiar, and 12 percent were very familiar.

vancing this sector. In Canada, FP Innovations and the Canadian Research Council, alongside local officials and forest-product associations, have also supported the growth of the industry.

## Southern Mass-Timber Study

Although North American CLT production began and has grown significantly in the Pacific Northwest and eastern Canada, the manufacture and use of CLTs made from southern yellow pine (SYP) in the South is in its relative infancy. The literature is sparse regarding drivers, perceptions, awareness, and potential involvement in the CLT supply chain in the region. Given this, a study was conducted at the Louisiana Forest Products Development Center, in the School of Renewable Natural Resources, Louisiana State University Agricultural Center, which took a social science, market perception/adoption approach targeting architects, engineers (architectural, civil, and structural), nonresidential builders, and sawmills.

The study, led by Richard Vlosky, Crosby Land and Resources Endowed Professor of Forest Sector Business Development, included 10 southern states: Alabama, Arkansas, Florida, Georgia, Louisiana, Mississippi, North Carolina, South Carolina, Tennessee, and Texas. More than 20 companies, universities, federal and government entities, associations, and foundations were instrumental as funding and/or study partners that helped provide input for the survey instrument and guidance throughout the project. This article focuses on the sawmill component of the study.

The study, conducted in fall 2018 and spring 2019, was designed to better understand the dynamics of CLT production and the South's wood supply from the perspective of sawmills in the study region. Lumber is the main feedstock for CLT, and as such, it was essential to better understand the supply side. A paper-based sur-

vey instrument was developed, with input from key partners versed in the sawmill sector. Mail-based survey techniques were used to assess the current market knowledge base of southern sawmills toward CLT and its potential in the South.

A random sample was taken from the sawmill sector in the study region. Following the Tailored Design Method (Dillman 2000), pre-notification postcards, a first survey mailing with a postage-paid envelope, reminder postcards, and a second survey mailing were sent to the 824 study recipients. After accounting for undeliverable surveys—primarily firms that had gone out of business—incomplete surveys, and nonresponses, the adjusted response rate was 16 percent, with 96 useable responses. Tests for nonresponse bias at  $p = 0.05$  level significance indicated this was not an issue. Comparisons were conducted for frequency by state for respondents, compared to viable nonrespondents and quantitative responses comparing first- and second-mailing respondents.

## Survey Results

The highest survey response rates were from the states of Tennessee, North Carolina, and Mississippi, comprising 20, 16, and 14 percent of the collected responses, respectively. Most of the sawmills were moderately sized in terms of employment, with 32 percent of them employing 20–49

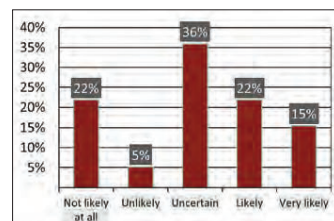
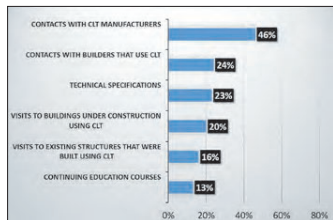


Figure 2. Respondents' likelihood to sell lumber to a CLT manufacturer operating within their region (n = 78)



**Figure 3. Information that would improve respondents' understanding of selling lumber to CLT manufacturers for use in building construction (n = 52); multiple responses possible.**

people, while only 2 percent employed more than 500, and 7 percent had fewer than four employees. Fifty percent of respondents were hardwood sawmills, 41 percent were softwood sawmills, and the balance produced other potential CLT feedstock products such as poles and posts.

**What do they know about CLT?** While the CLT market is poised for substantial growth, results indicate that respondents (n = 82) are generally unfamiliar with CLT. Almost half of the respondents, 46 percent, indicated they were not at all familiar with the product, while 41 percent were somewhat familiar, and 12 percent were very familiar. Two areas in which respondents reported the highest familiarity occurred in clustered groups located near the International Beams mill in Dothan, Alabama, and a region southwest of Birmingham, Alabama, as indicated by the heat map in Figure 1. The recent establishment of a CLT manufacturer within the region seems to be slow in gaining the attention of southern

sawmills, as 59 percent of the respondents reported they knew nothing about the current CLT manufacturers within the US; only one percent were very familiar.

**Will they sell lumber to CLT manufacturers? Can they meet CLT lumber requirements?** While the lack of familiarity may be daunting to potential CLT manufacturers hoping to locate in the southern "wood basket," about 37 percent of respondents claimed a positive likeliness to sell lumber to a manufacturer operating within their region, while 4 percent of respondents claimed to have already sold lumber to a manufacturer. In fact, a larger portion of sawmills generally appeared to be either willing or on the fence about selling lumber to a CLT manufacturer versus being unlikely or not likely at all to regard the opportunity (Figure 2). About 81 percent of the respondents reported they would not require long-term contracts with manufacturers, but 56 percent said they would accept them. The capability of southern sawmills to produce CLT-grade lumber is of no issue. Nearly half of the respondents reported that they could meet the lumber specifications, with about 54 percent claiming that they could dry wood to a 10–12 percent moisture content, and 46 percent stating they were able to sort and provide higher-density wood.

#### What's Next?

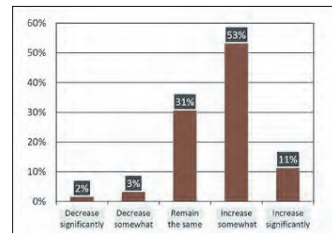
Although this study established a general unfamiliarity with CLT and CLT manufacturers from the perspective of southern sawmills, the opportunity to increase

knowledge and expand the industry presents itself. Sawmills expressed that they mostly preferred contact with CLT manufacturers, as well as the builders who use the material, as a means of improving the understanding of their opportunities within the market (Figure 3). This is an opportunity for CLT education providers to target this segment.

As previously mentioned, respondents expressed their willingness to cooperate with manufacturers, but they also shared a positive outlook on the level of CLT used by builders in the next year (Figure 4).

As with any new industry, communication is crucial for efficient interactions between suppliers and manufacturers. In today's world of social media and global interconnectivity at the tap of a phone screen, there are not many reasons limiting wood-products neighbors in the South from networking and ushering in a new era of building materials. Willingness and cooperation for a change are sometimes inherent; familiarity and understanding can be enhanced; and connections can be quickly established. It is now on the shoulders of the forest-products industry to develop the essential connections to bring about a change and a new market. In the words of Albert Einstein, "The world as we have created it is a process of our thinking. It cannot be changed without changing our thinking." **FS**

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**Figure 4. Respondents' estimated level of change in CLT use by builders in the next year (n = 62).**

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