

ACCELERATION OF UNITED STATES MARKETS FOR WOOD

Bill Parsons¹, Brian Brashaw²

ABSTRACT: While the United States (U.S.) market for wood products is well-established for single-family housing, there has also been a consistent and sustained effort over the past decade to significantly increase wood’s share of the multi-family, commercial, and institutional segments. This paper examines the current state of wood construction in these markets, emerging trends post-COVID, opportunities, and obstacles to continued growth. It will utilize data and built projects to highlight key areas of momentum and provide examples where resources have had a direct market impact.

KEYWORDS: Wood-frame construction, Podium construction, Mass timber, Tall wood, Markets

1. INTRODUCTION

Over the last fifteen years, there has been growing interest in the use of wood in structures beyond single-family homes. This has coincided with a sustained effort to communicate wood’s value for a wider range of building types, and to educate and assist design teams who have typically defaulted to other materials. WoodWorks – Wood Products Council plays a leadership role in partnership with the USDA Forest Service, Softwood Lumber Board, and others, on behalf of the North American wood industry.

In particular, larger structures and the use of innovative new systems pose challenges for building designers and construction professionals who seek to expand their use of wood. Modern projects also continually push the boundaries of wood engineering. In addition to encouraging the *desire* to use wood, the U.S. industry, through WoodWorks, provides expertise and resources that lead to quality wood buildings. Embodied carbon entering the conversation has further expanded the need for credible information around Whole Building Life Cycle Assessments (WBLCA).

2. DEFINING THE OPPORTUNITY

Although the COVID-19 pandemic has depressed construction markets in 2020 [1], there continue to be opportunities for increased wood use. As supply chain disruptions continue, cost will become an even greater concern. The most economically viable projects will come to fruition, and wood will be well-positioned as a low-cost/high-performance structural solution.

There is no shortage of economic predictions related to the future of construction markets. WoodWorks has been assessing data from a number of sources but is also in the unique position of working directly with developers and

design/construction teams to assist on projects, which provides an additional layer of insight. Dodge Data & Analytics has provided some of the best information in terms that are helpful to the WoodWorks program. Dodge is projecting total construction starts will be flat in 2023.

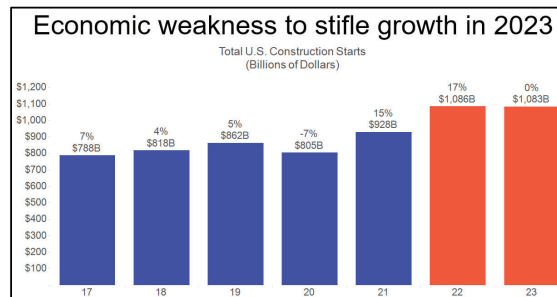


Figure 1: U.S. construction starts. Source: Dodge Data & Analytics

In 2021, almost a billion square feet of new construction are accessible to wood each year in the U.S. About half of that area (over 17,000 structures) could be wood by code but are not utilizing wood today. Wood currently has a significant opportunity for increased market share.



Figure 2: US Markets for Wood Buildings (Source: Dodge Data & Analytics 2020, WoodWorks analysis)

¹ Bill Parsons, PE, WoodWorks – Wood Products Council, Boise, ID, USA, bill.parsons@woodworks.org

² Brian Brashaw, USDA Forest Service, Cooperative Forestry, Wood Innovations, MN, USA brian.k.brashaw@usda.gov

3. MULTI-FAMILY

Since the last Great Recession (2007-2009), the multi-family market has grown significantly as a percentage of all homes constructed. The trend toward greater densification and urbanization in all major metropolitan areas has led both to an increase in multi-family projects and more design variation. Buildings with five or more stories of wood-frame construction are becoming more common, as are podium structures, which further increase the value of buildings that are primarily wood-frame. There are now nearly 600 five-, six-, or seven-story wood-frame buildings constructed in the U.S. each year [2].

While the trend is positive, many designers are still unaware that wood can be used in buildings greater than four stories or that podiums can be more than one level. This underscores the need for continued education and outreach to help people understand where wood is allowed by code, and to assist designers with the more demanding requirements of larger wood projects.

Under most U.S. codes, a multi-family wood building can be up to five stories (Type III construction), and the wood structure can then be placed on top of a podium (typically concrete). So far, most podiums are a single story, but multi-level podiums were included in the 2018 International Building Code (IBC) and are growing in use. Overall, the total multi-family market is 687 million square feet built annually, or a total of 23,400 projects.

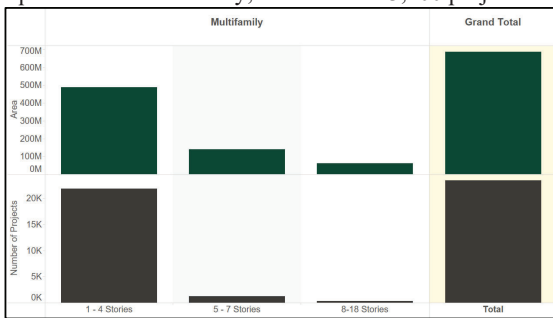


Figure 2: Total multi-family market in the U.S.; 687 million square feet annually, or 23,400 projects. Source: Dodge Data & Analytics 2021

There are many examples of podium structures built throughout the U.S. Two are featured in case studies on the WoodWorks website, Crescent Terminus in Atlanta, GA and Stella in Marina del Rey, CA. The latest case study on a podium multifamily structure is Thomas Logan Apartments.

CASE STUDY
Thomas Logan



Wood-frame urban podium project fills need for affordable downtown housing

Figure 3: Thomas Logan case study Source: WoodWorks

4. COMMERCIAL/INSTITUTIONAL

Initial gains in commercial and institutional market segments involved buildings that were similar in design to multi-family projects—e.g., hotels, motels and student housing. However, the performance capabilities of mass timber, and growing interest in products such as cross-laminated timber (CLT) as a carbon-friendly alternative to steel and concrete, have led to a much more diverse range. Mass timber has also become a significant draw for developers who want to attract quality, long-term tenants, and design teams eager to explore its creative potential.

WoodWorks tracks active mass timber projects and publishes an updated map each quarter [3]. (See Figure 4.)

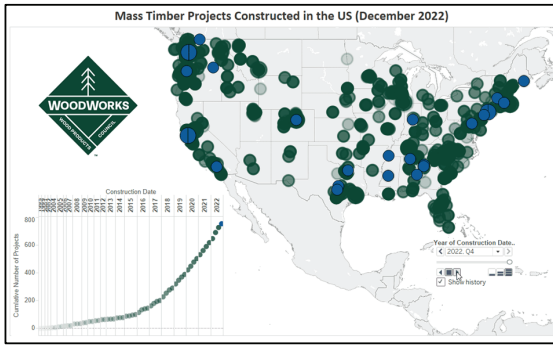


Figure 4: Map of U.S. mass timber projects. Source: WoodWorks – Wood Products Council

As of December 2022, 767 multi-family, commercial or institutional projects had been constructed out of mass timber in the U.S., and 910 were in design. (This includes mass timber and post-and-beam structures built since 2013.) The acceleration of mass timber is easily seen in Figure 4 — this growth is outpacing the growth seen with other wood systems.

WoodWorks is a leading provider of mass timber education, and assisted on more than 75% of the built projects noted in Figure 4. However, staff identified a significant barrier to continued growth. General contractors who had yet to build a mass timber project were adding risk premiums that priced wood out of the running, and projects were being converted to other materials. Recently, WoodWorks launched a program to address the issue through mass timber construction management and installation training.

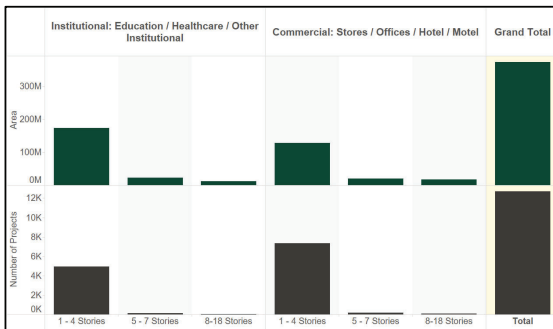


Figure 5: Commercial and institutional market in the U.S. Source: Dodge Data & Analytics 2021

The majority of commercial and institutional projects built in the U.S. are one to four stories. (See Figure 5.) In both of these categories, wood is only lightly penetrated and there are literally thousands of projects where wood can be used as the structural frame. Mass timber is gaining particular traction in these segments.

This is where the U.S. market narrative starts to diverge from other countries that have seen a trend toward the use of mass timber. After only a few years of product availability, the U.S. has 143 substantial multi-story mass

timber business occupancy buildings (primarily offices) under construction or built. (See Figure 6.) These structures represent about 12.5 million square feet of cumulative construction. As far as WoodWorks is aware, this level of commercial building activity has not been seen in other countries—especially this early in the adoption phase. With 84 million square feet of annual construction opportunity in offices alone, the U.S. market has a great deal of room to expand this emerging technology.

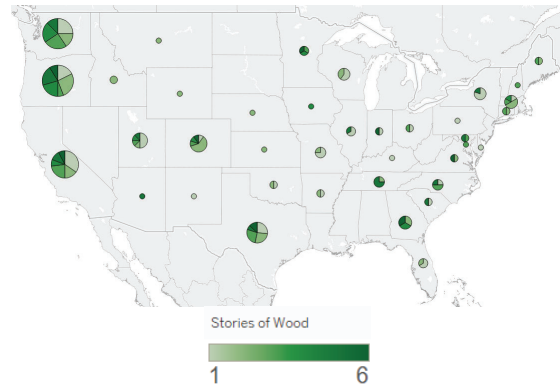


Figure 6: Mass timber projects with business occupancies built or under construction (200 as of December 2022). Source: WoodWorks – Wood Products Council

Exposed wood structure in office buildings is becoming a point of market distinction, both for the aesthetic and connection to nature. Post-COVID developers continue to look for ways to differentiate their products.

The WoodWorks case study, *Breaking Convention with Wood Offices*, outlines the benefits of wood for business occupancies and highlights examples of built projects. This resource has been very helpful in demonstrating the viability of wood in this segment. (See Figure 7.)



Figure 7: Case study featuring multiple mass timber office buildings. Source: WoodWorks – Wood Products Council

The educational and student housing segments have also shown an early uptick in the use of mass timber, with 31 projects under construction or built. (See Figure 8.) However, the financial impacts of COVID-19 may slow the growth in these markets, especially for university-owned buildings.

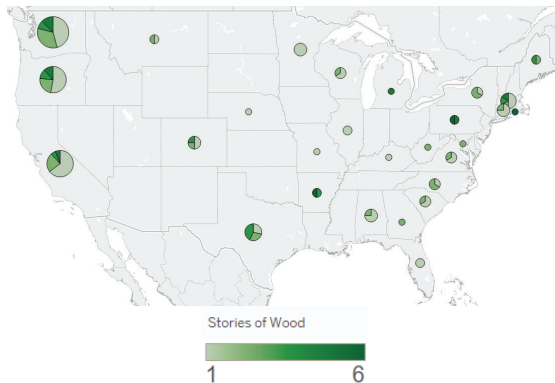


Figure 8: Mass timber projects with education and student housing occupancies built or under construction (123 as of December 2022). Source: WoodWorks – Wood Products Council

The 123 buildings noted above represent 5.4 million square feet of construction, which is very small in the context of over 106 million square feet built annually in this segment. In addition to aesthetics and connection to nature, drivers for these projects have included wood’s sustainability and light carbon footprint.

A groundbreaking example in this category is the John W. Olver Design Building at the University of Massachusetts – Amherst. This project is featured in the WoodWorks case study, *Inspiration through Innovation*. (See Figure 9.) This includes a WBLCA analysis – which is a very hot emerging topic. We are active on several other case studies.



Figure 9: Case study featuring the John W. Olver Design Building at the University of Massachusetts – Amherst. Source: WoodWorks – Wood Products Council.

5. TALL WOOD (7+ STORIES)

Innovative wood products and building technologies are taking wood beyond new building types and opening markets that have been entirely out of reach for wood solutions. Changes approved for the 2021 IBC will allow wood buildings up to 18 stories, which creates the 90 million square feet of opportunity noted in Figure 2.

Figure 10 captures the opportunity by building height; Type IV-A has a maximum of 18 stories, Type IV-B has a maximum of 12, and Type IV-C has a maximum of nine. WoodWorks is currently assisting on nearly 200 projects over seven stories.

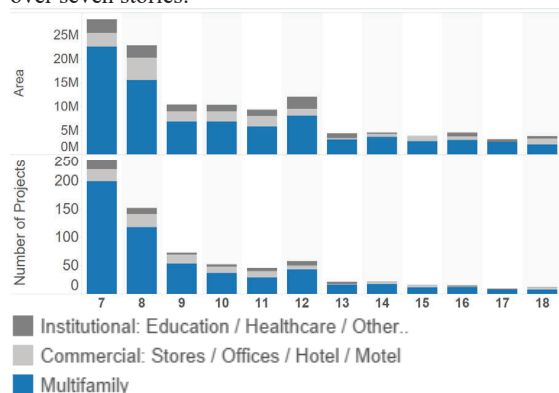


Figure 10: Opportunity for tall wood (Source: Dodge Data & Analytics 2020, WoodWorks analysis)

Many jurisdictions are adopting the 2021 IBC, which became the model code on January 1, 2021. At the end of

2022 there were nine tall projects built or under construction in the U.S.:

- [Carbon 12](#) – Portland, OR – Eight stories of mass timber.
- [INTRO](#) – Cleveland, OH – Eight stories of mass timber over a concrete podium.
- [Ascent](#) – Milwaukee, WI – Nineteen stories of mass timber over six stories of concrete.
- [80M](#) – Washington, DC – Two new mass timber floors + habitable penthouse over an existing seven-story structure.
- [Apex Clean Energy](#) – Charlottesville, VA – Six stories of mass timber over two stories of concrete.
- [11 E Lenox](#) – Boston, MA – Seven stories of mass timber.
- [Heartwood](#) – Seattle, WA – Eight stories of mass timber
- [1510 Webster](#) – Oakland, CA – 18 stories of mass timber over a concrete podium
- [Minnesota Places](#) – Portland, OR – Seven stories of mass timber over a concrete podium

Ascent is currently be the tallest mass timber building in the world.

Over 700 projects with seven or more stories are built in the U.S. each year. Early interest indicates that mass timber is poised for significant advancement in this market segment.

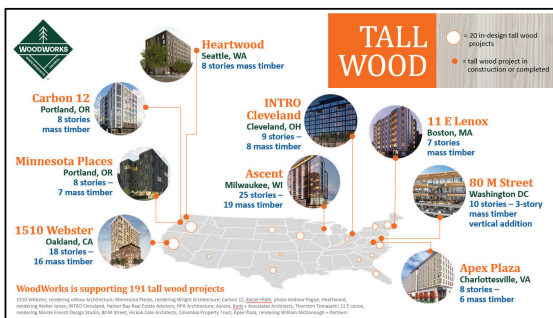


Figure 11: Tall Wood Projects built or under construction at the end of 2022. Nearly 200 are in-design throughout the U.S. Source: WoodWorks – Wood Products Council

WoodWorks has a number of resources and dedicated staff to assist with tall wood projects. (See Figure 12.) A common landing page for these topics can be found at: <https://www.woodworks.org/learn/mass-timber-clt/tall-mass-timber>.

Building Name	Location	Stories	Completion Date
Steelhaus at Murray Grove	London, UK	8-over-1	2008
Forté	Melbourne, Australia	8-over-1	2012
Via Centre	Milan, Italy	9	2013
Treet	Bergen, Norway	14	2015
UBC Brock Commons	Vancouver, Canada	18	2016
Mjøstølmet	Norway	18	2019
HöHo Wien	Vienna, Austria	24	2019

Figure 12: One of many resources published by WoodWorks to assist with the design of tall wood buildings. Source: WoodWorks – Wood Products Council

6. CONCLUSION

Historically, the U.S. single-family housing market has represented one of the most robust markets for wood in the world. With design teams turning to larger wood-frame and mass timber buildings, supported by the strategic combination of education and project assistance, the U.S. is poised to develop equally robust markets for these products in the multi-family, commercial and institutional sectors

REFERENCES

- [1] Dodge Outlook 2022 Q3. Dodge Data & Analytics. November, 2022.
- [2] Dodge Data and Analytics, 2021. WoodWorks – Wood Products Council (analysis).
- [3] Building Trends: Mass Timber. WoodWorks – Wood Products Council, 2023. Retrieved from <https://www.woodworks.org/publications-media/building-trends-mass-timber/>