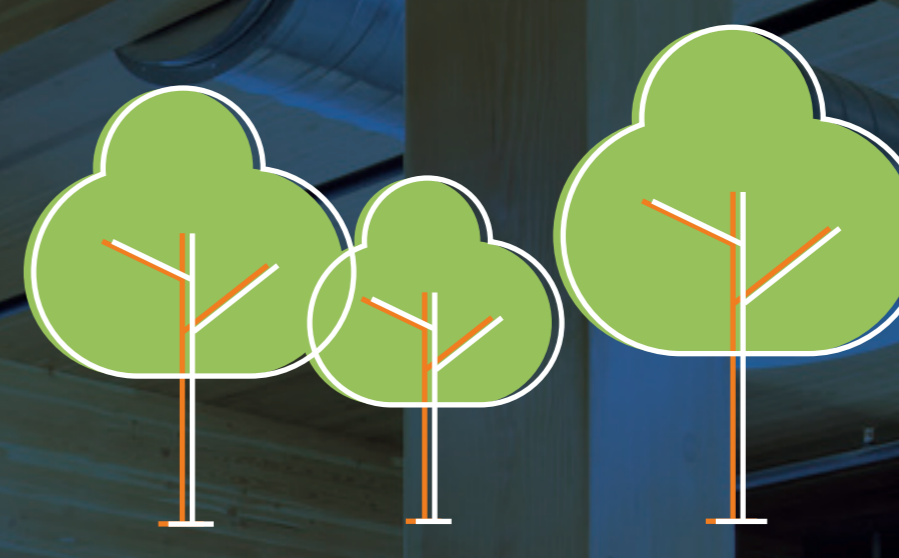


Mass Timber

LESSONS LEARNED



Mass timber continues to gain ground as an innovative alternative building material. Engineered for loads similar in strength to structural materials like concrete and steel, mass timber allows crews to build tall, with a lighter, natural, low-carbon and high-quality resource. As its adoption grows, questions inevitably arise about the do's and don'ts of its deployment.

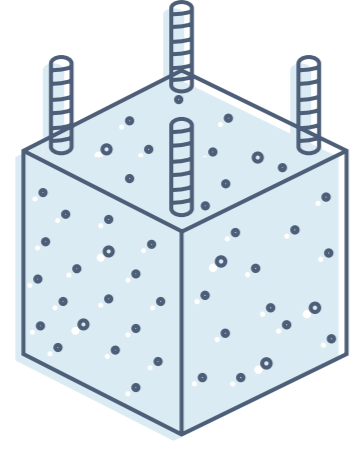
Embodying its ever forward spirit, DPR Construction has utilized mass timber on a number of projects. As with any new technology, there exists a component of "learning by doing," and mass timber is no exception. DPR has collected some valuable lessons learned from the people doing the actual work of building mass timber projects, lessons that fall into these categories:

Design Considerations



Manufacturing

Unlike man-made materials such as concrete or steel, different species of wood can yield varying structural capacities. This must be taken into account when spacing grids in building.



Foundations

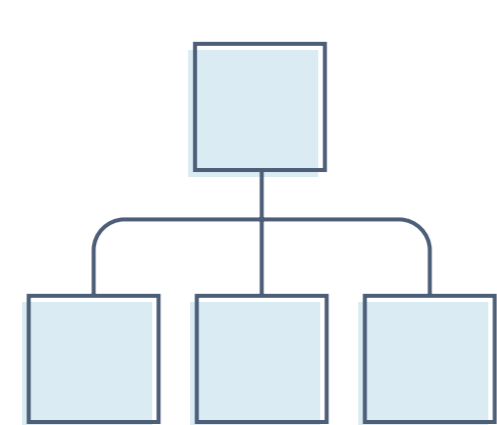
Depending on soil conditions, mass timber buildings are significantly lighter than an equally designed steel or concrete building. This has the potential to reduce foundation systems, or even eliminate the need for deep foundations. This should be taken into consideration for pricing and schedule benefits.



Collaboration

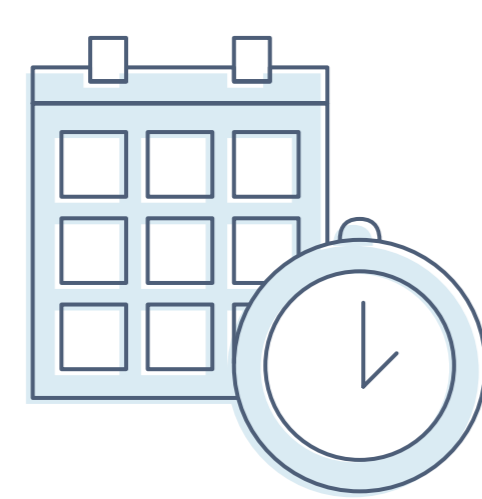
Architects and Engineers might not be familiar with all of the variables associated with mass timber—it's a relatively new material in the industry. Be sure to engage early and educate each other throughout the process. Some things to consider include:

- Details for anchorage of other systems, depths of beams and interaction with MEP distribution systems.
- Coordination with opening sizes for stairs and elevators, which may be created with hybrid structural systems within an overall mass timber building.



Responsibilities

Outline these clearly before the project starts. Who is responsible for each scope, such as engineering? Procedures for building with mass timber are not as clear cut as those long established for other materials. Make sure you know who is doing what before you start.



Planning

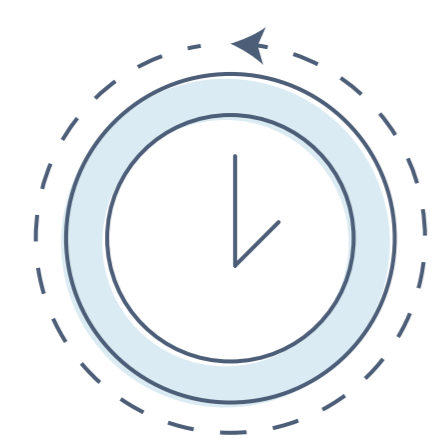
Owners should get involved as soon as possible. If mass timber is on the agenda, engage a timber provider sooner rather than later as the possible engineer of record, before locking in an outside structural engineer of record.



Building Codes

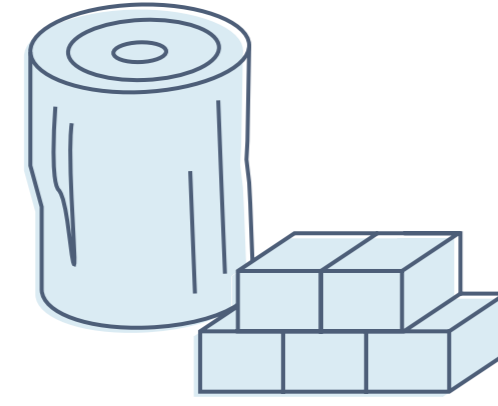
Building Codes vary from city to city, and timelines for new code adoption differ. Jurisdictions across the US are modifying local building codes to expand scale and heights of mass timber structures. Make sure you, the design team, and the owner understand exactly what's allowed by local building codes.

Procurement Strategies



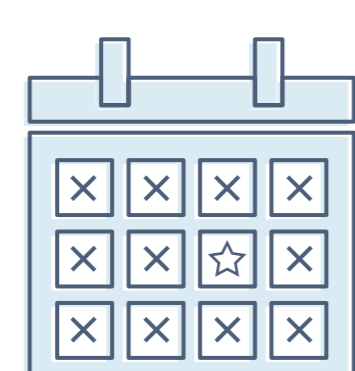
Delays

Some areas of the country have experienced 85% growth year over year in mass timber projects. Regions with large numbers of these projects can experience delays in procuring materials.



Material Availability

Ensure material availability before outlining and accepting project schedules. With existing manufacturers spread across the US, Canada and Europe, they are impacted by different holidays, production cycles and backlog. Engage early with potential specified vendors to understand manufacturing capacities.



Production Schedules

Production schedules are important. Fabrication time isn't lengthy, but getting a slot on a busy schedule can take time.



Project Schedules

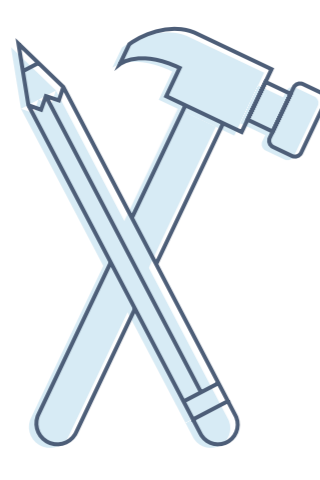
Project schedules should be pinned down early on. Discuss actual target date for fabrication clearly and honestly, and include quality inspection and verification of raw materials being used in manufacture. Because fabrication production schedules are tight, missing a fabrication date by a day or two can potentially delay a project exponentially. In addition, erection sequences should be equal to or less than with traditional structural systems.



New Vendors

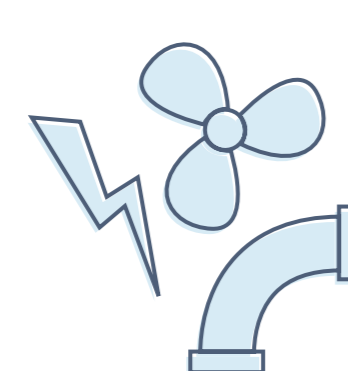
New vendors arise all the time, and their scopes of work are not standardized or consistent across the board with regard to manufacture, design and installation. It's important to have a good system for vendor management to mitigate this factor.

Operational Considerations



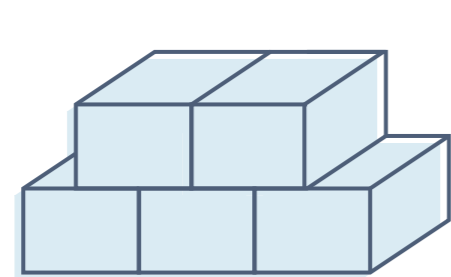
Building Processes

Building processes differ for mass timber than from those long established for steel and concrete. Many construction companies are still learning these, and this can affect site logistics and work methods. Scope alignment is critical to determining who owns connections to dissimilar materials, especially in hybrid structural solutions. Attachment to wood for concrete or steel elements is paramount in understanding the design responsibility and installation.



MEP

MEP should be locked in as soon as possible to reduce on-site install time. Understanding the nuances of mass timber, its sequence of erection and integration of MEP system penetrations, openings and distribution are critical to fabrication.



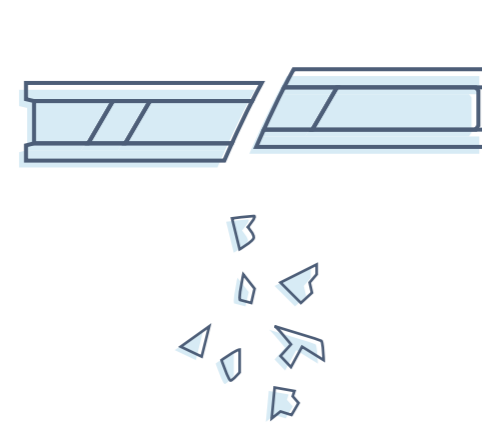
Laydown Areas

Laydown areas should be established for the materials. If material is being shipped from overseas, it might be necessary to provide space for shipping containers, as well.



Weather Concerns

Weather concerns come into play due to potential moisture risks. Specs are written such that materials should avoid directly touching the ground. Timber is wrapped before leaving the manufacturer, but what exactly is wrapped differs by manufacturer, i.e. individual beams versus groups of beams. Crews must be in the know.



Metal Shards

Metal grinding shards from nearby work on-site can land on wood and damage its appearance and integrity.



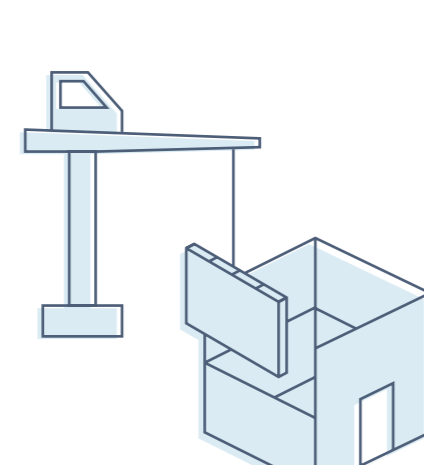
Fire Performance

Questions about fire performance often come from the uninitiated, but mass timber performs well here. Multiple fire performance tests conducted at the ATF Fire Research Laboratory confirmed that mass timber structures meet fire resistance requirements in the International Building Code. Exposed mass timber chars on the outside and forms a layer to shield the interior. When codes require that timber be protected with gypsum wall board, it was found to achieve nearly damage-free performance.



Insurance

The insurance industry is still catching up and typically still treats mass timber structures like regular wood frame houses. Premiums are higher on builder's risk.



Installation

Installation is different from that of other materials, with such questions as how many times screws can be backed out, what to do if a bolt head snaps or what happens if combustibles are covered?