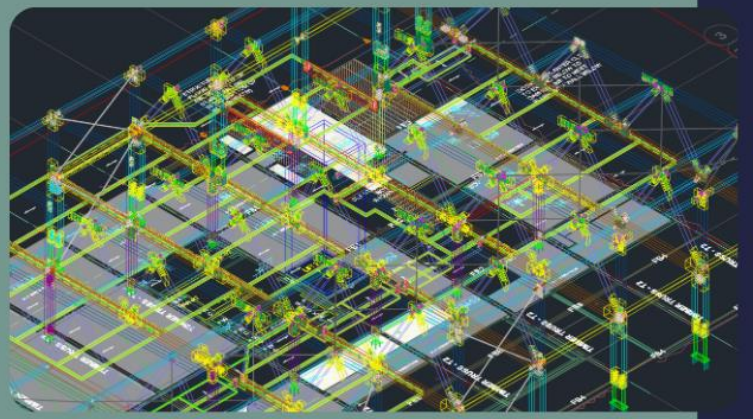
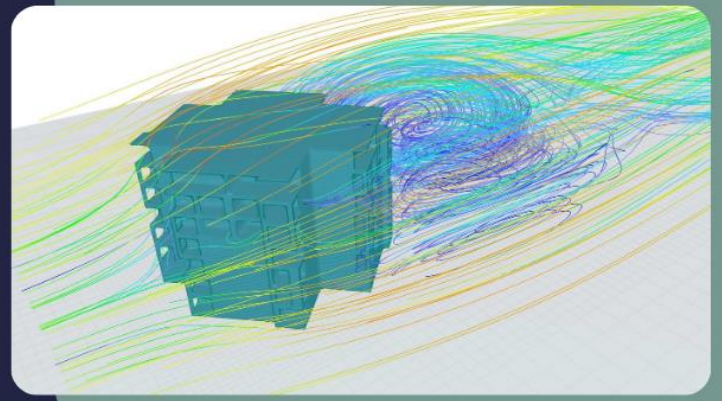
2024
Third Edition

DfMA*y*





- optimization
- experience sharing
- minimizing waste
- prefabrication
- efficiency
- value engineering

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2024

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Houston, we have a problem.

Problem

Co$t!

Timber engineers: when

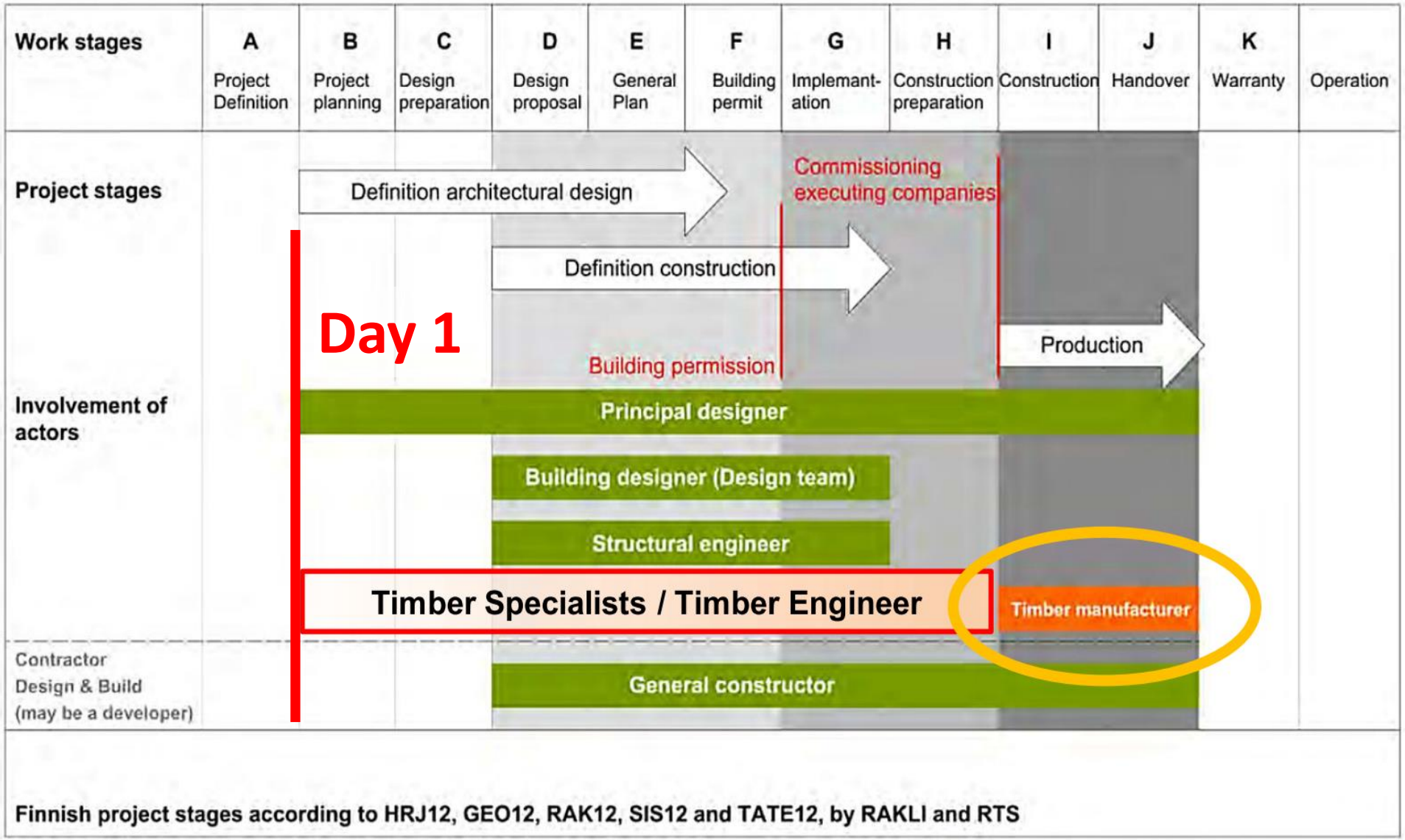
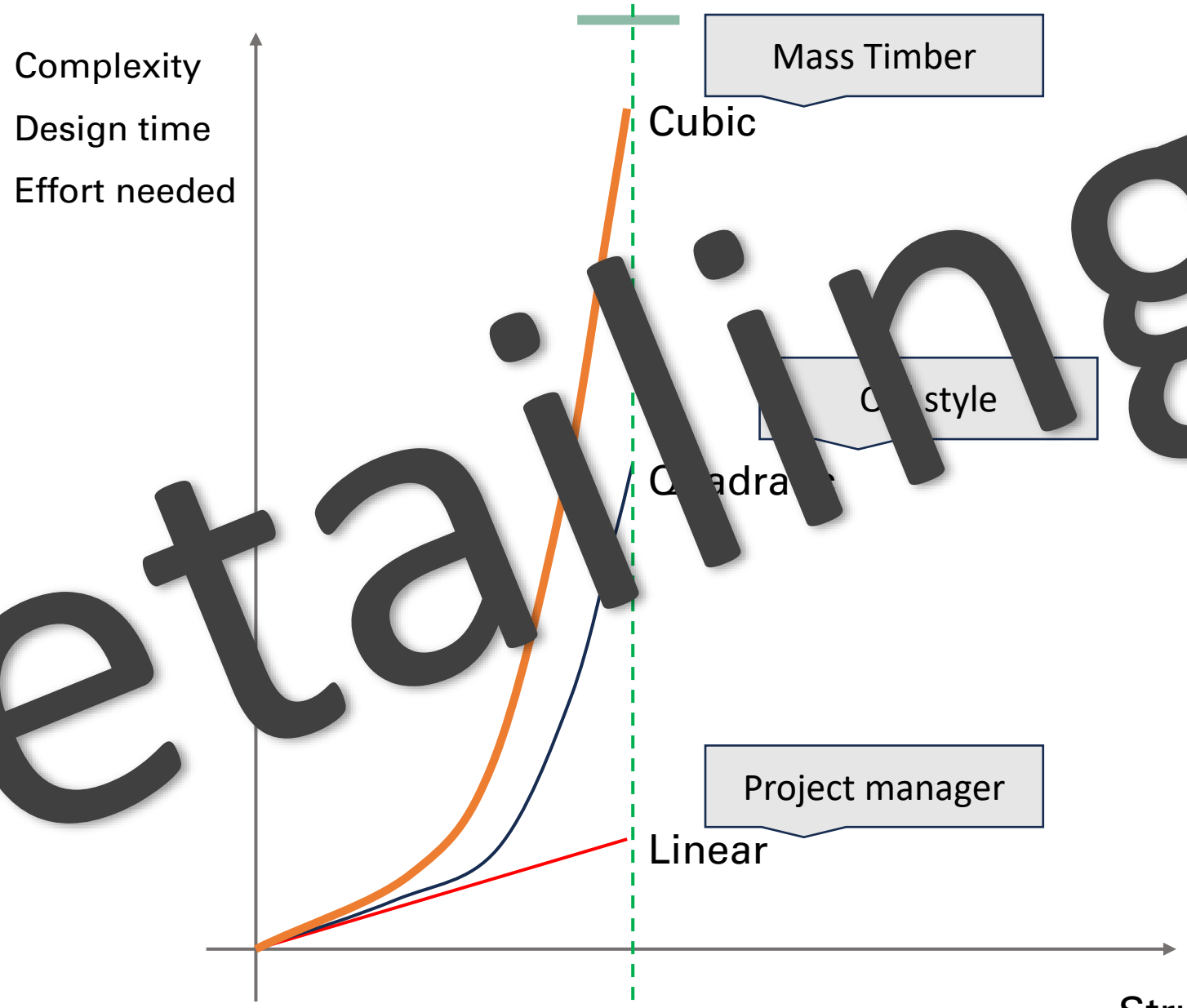


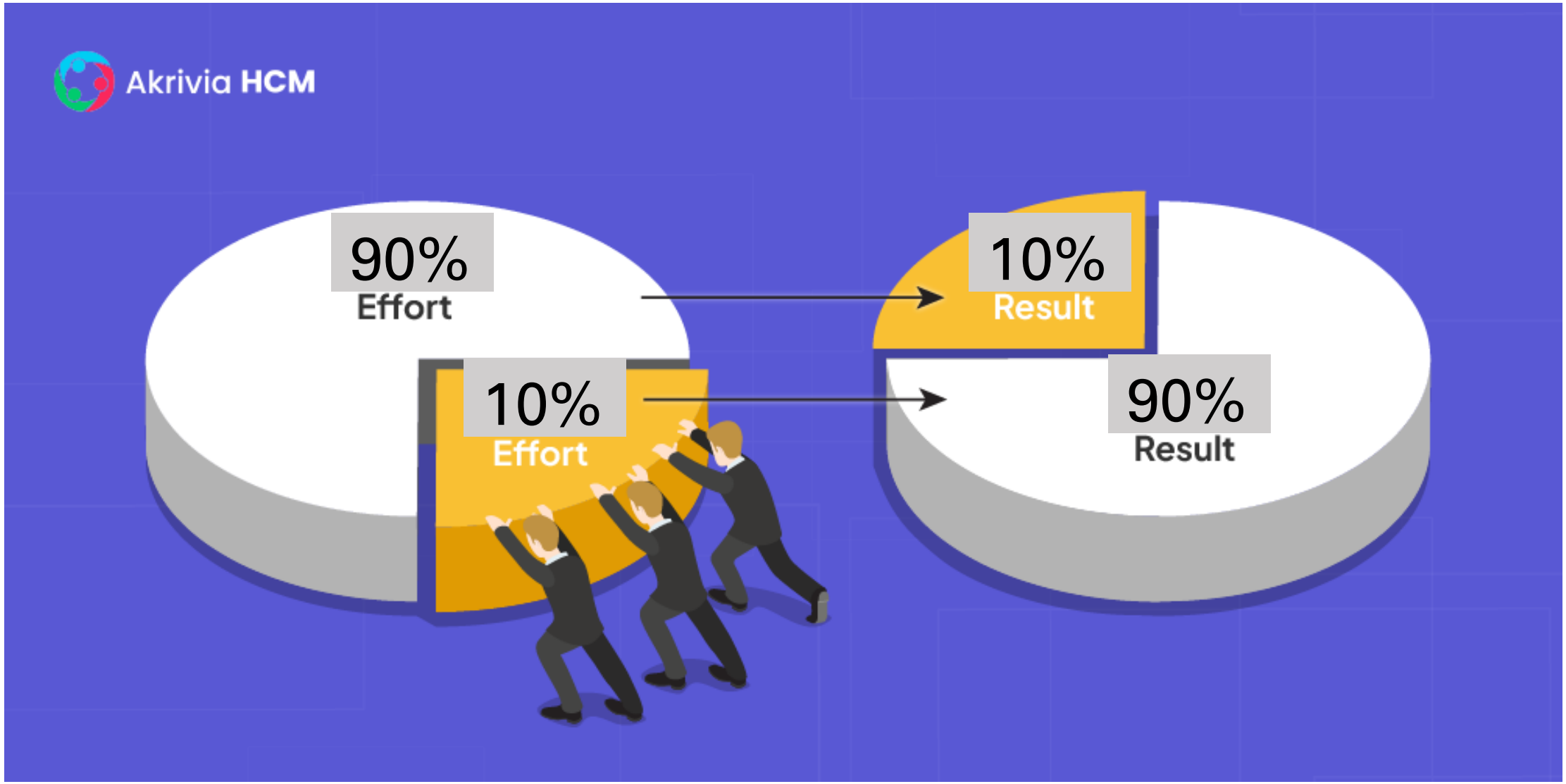
Abbildung 5: Finnische Projektphasen auf Basis der RAKLI/RTS Tehtäväluettelo 2012 Definitions. Quelle: le Roux, Simon (Aalto University).

The bigger, the…..



Detailing!!

Pareto’s rule 20/80



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The Wood Product Protocol

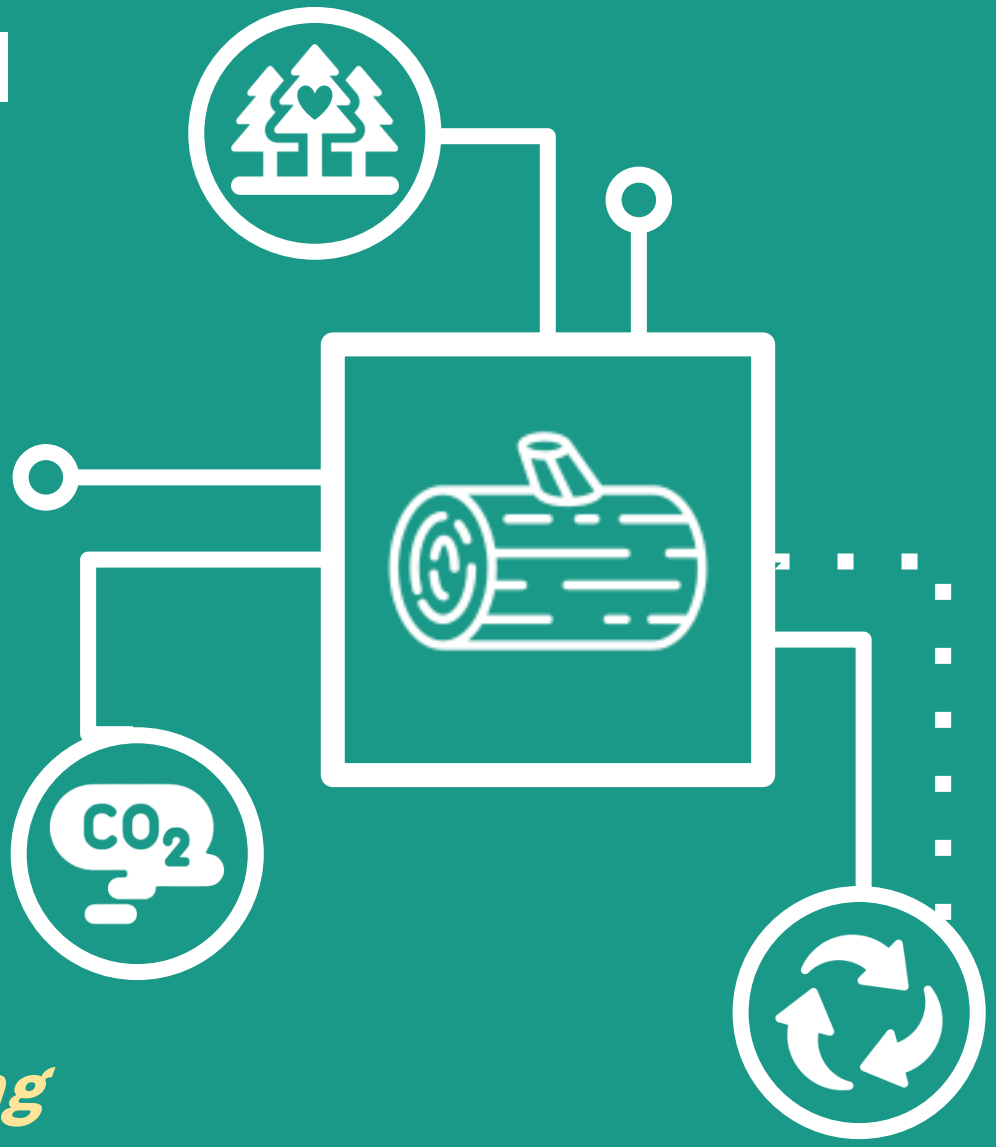
A Sustainable Approach
To Digitising Mass Timber in Construction

Presented By Kevin Hill
Co Founder

DoubleHelix

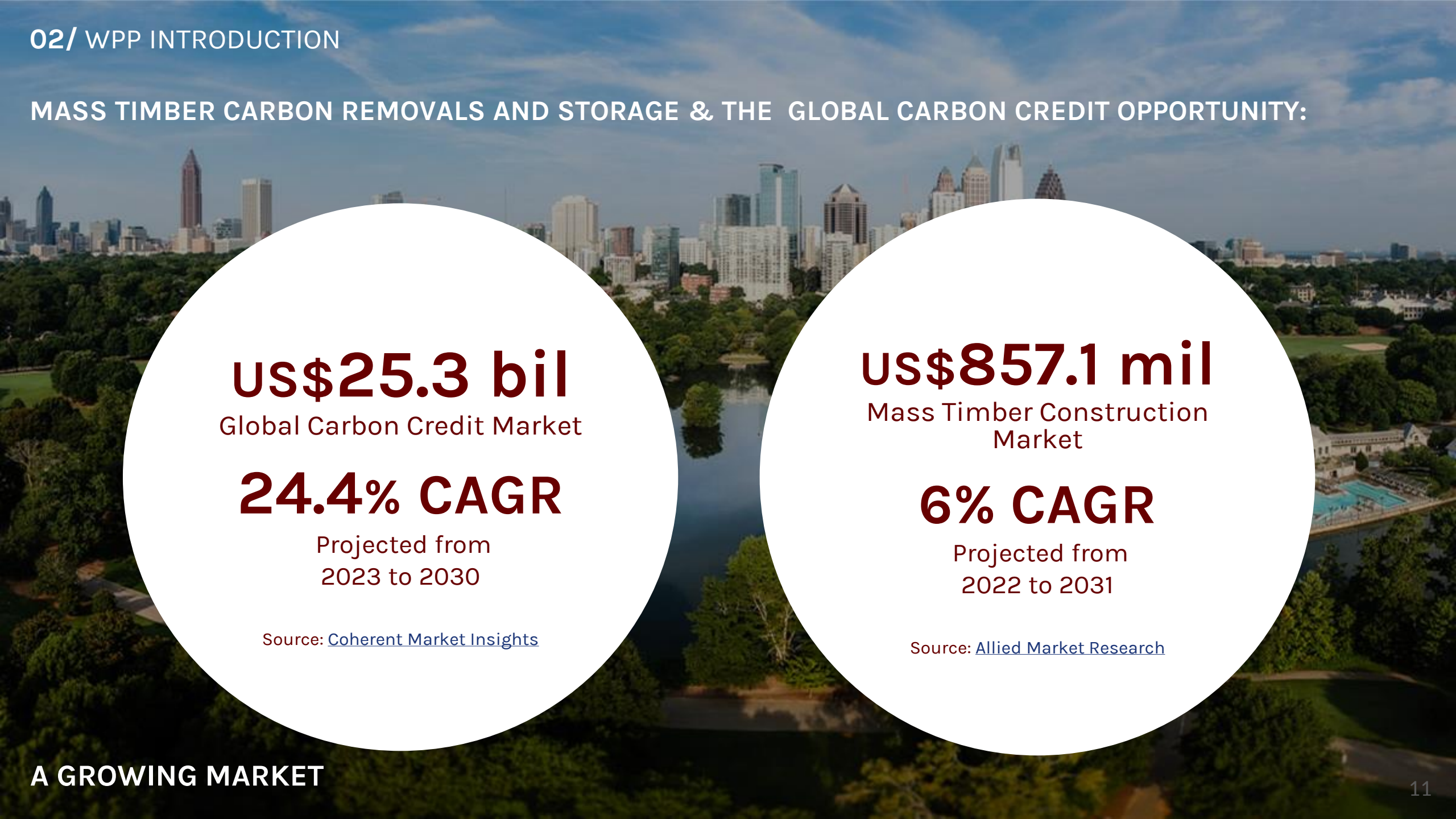
The Wood Product Protocol

The Wood Product Protocol (WPP) will authenticate mass timber through digital certificates, certifying not only the **sustainable origins** of the wood, but also sequestered net biogenic **carbon content** combined with **compliance data** for extension of life of the material.



Unlocking the Value of Mass Timber by Harvesting, Verifying, and Preserving data

MASS TIMBER CARBON REMOVALS AND STORAGE & THE GLOBAL CARBON CREDIT OPPORTUNITY:



US$25.3 bil

Global Carbon Credit Market

24.4% CAGR

Projected from
2023 to 2030

Source: Coherent Market Insights

US$857.1 mil

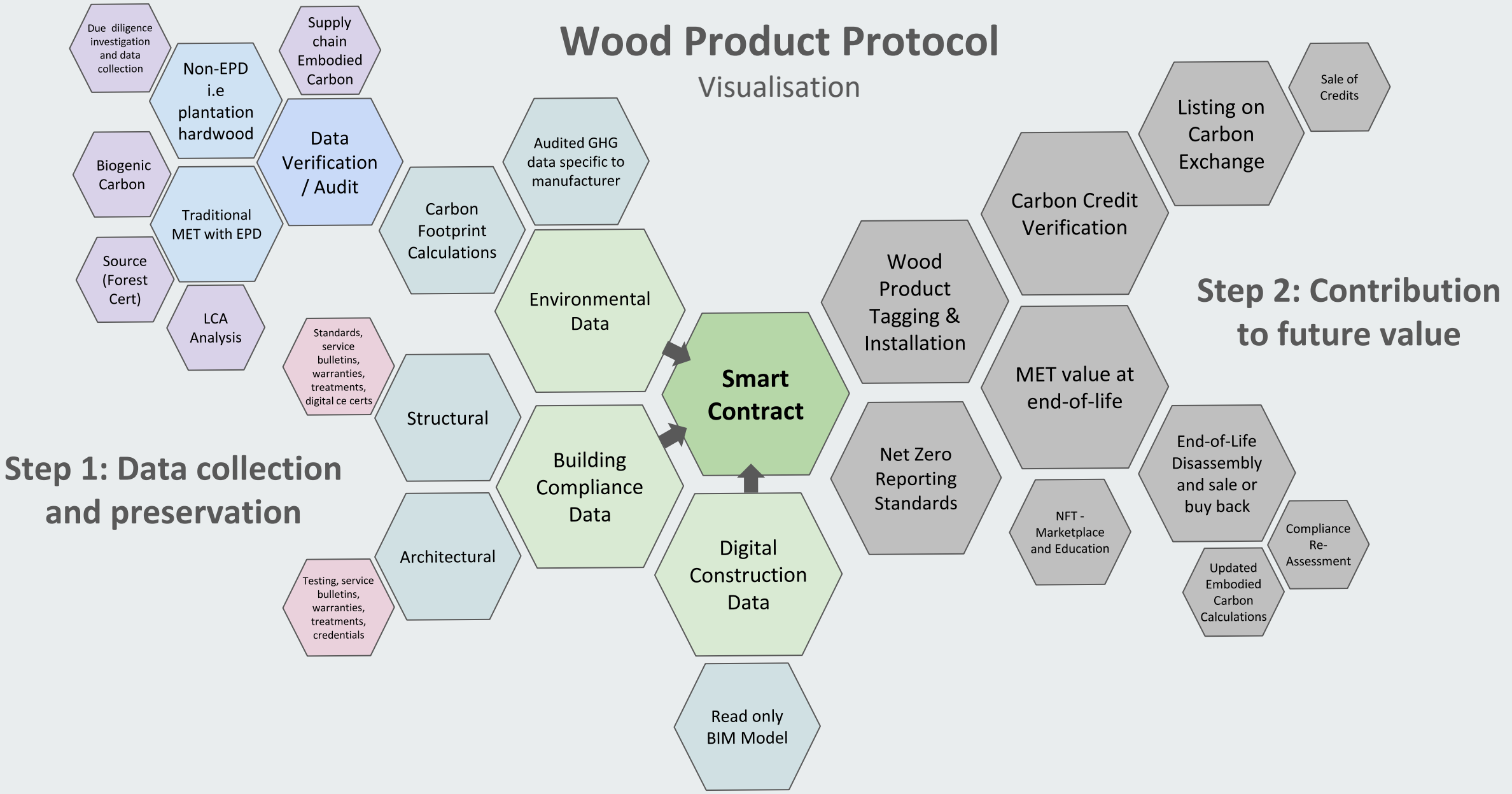
Mass Timber Construction Market

6% CAGR

Projected from
2022 to 2031

Source: Allied Market Research

A GROWING MARKET


Wood Product Protocol
Visualisation
Step 1: Data collection and preservation
Step 2: Contribution to future value
Due diligence investigation and data collection
Non-EPD i.e plantation hardwood
Supply chain Embodied Carbon
Biogenic Carbon
Data Verification / Audit
Traditional MET with EPD
Source (Forest Cert)
LCA Analysis
Audited GHG data specific to manufacturer
Carbon Footprint Calculations
Environmental Data
Standards, service bulletins, warranties, treatments, digital ce certs
Structural
Building Compliance Data
Architectural
Testing, service bulletins, warranties, treatments, credentials
Smart Contract
Digital Construction Data
Read only BIM Model
Wood Product Tagging & Installation
Net Zero Reporting Standards
Carbon Credit Verification
MET value at end-of-life
NFT - Marketplace and Education
Listing on Carbon Exchange
Sale of Credits
End-of-Life Disassembly and sale or buy back
Compliance Re-Assessment
Updated Embodied Carbon Calculations

The WPP key value proposition is gathering all data and ground truthing every step in the supply chain applying the latest ISO GHG auditing standards, whilst simultaneously preserving it together with all the compliance data relevant for Mass Timber future reuse.

It is logical to implement the WPP, before, during, or soon after the project completes, as access to the required data down the line may be difficult or not possible.

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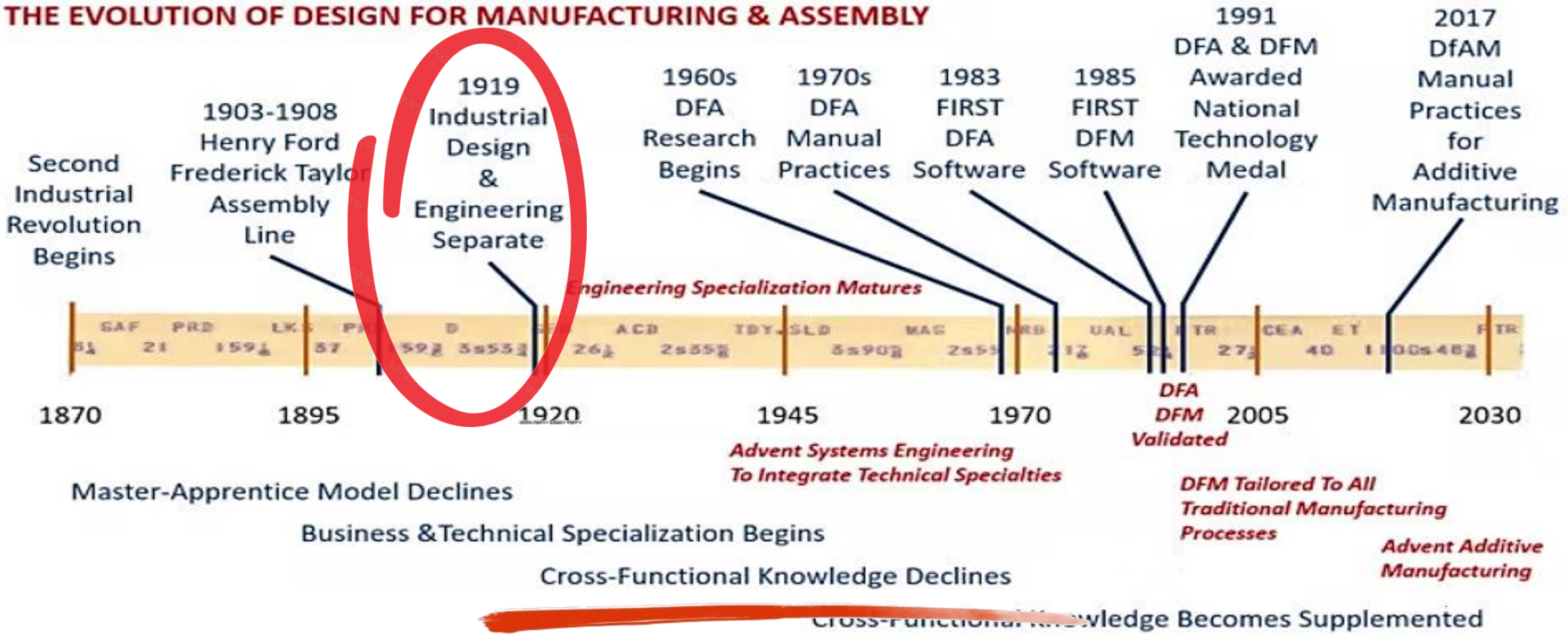
DfMA | Leadership

David ELLIOTT
Mass Timber Focus Group

“The primary reason for project failure is lack of leadership. When leadership fails, the project fails."

- Michael Armstrong

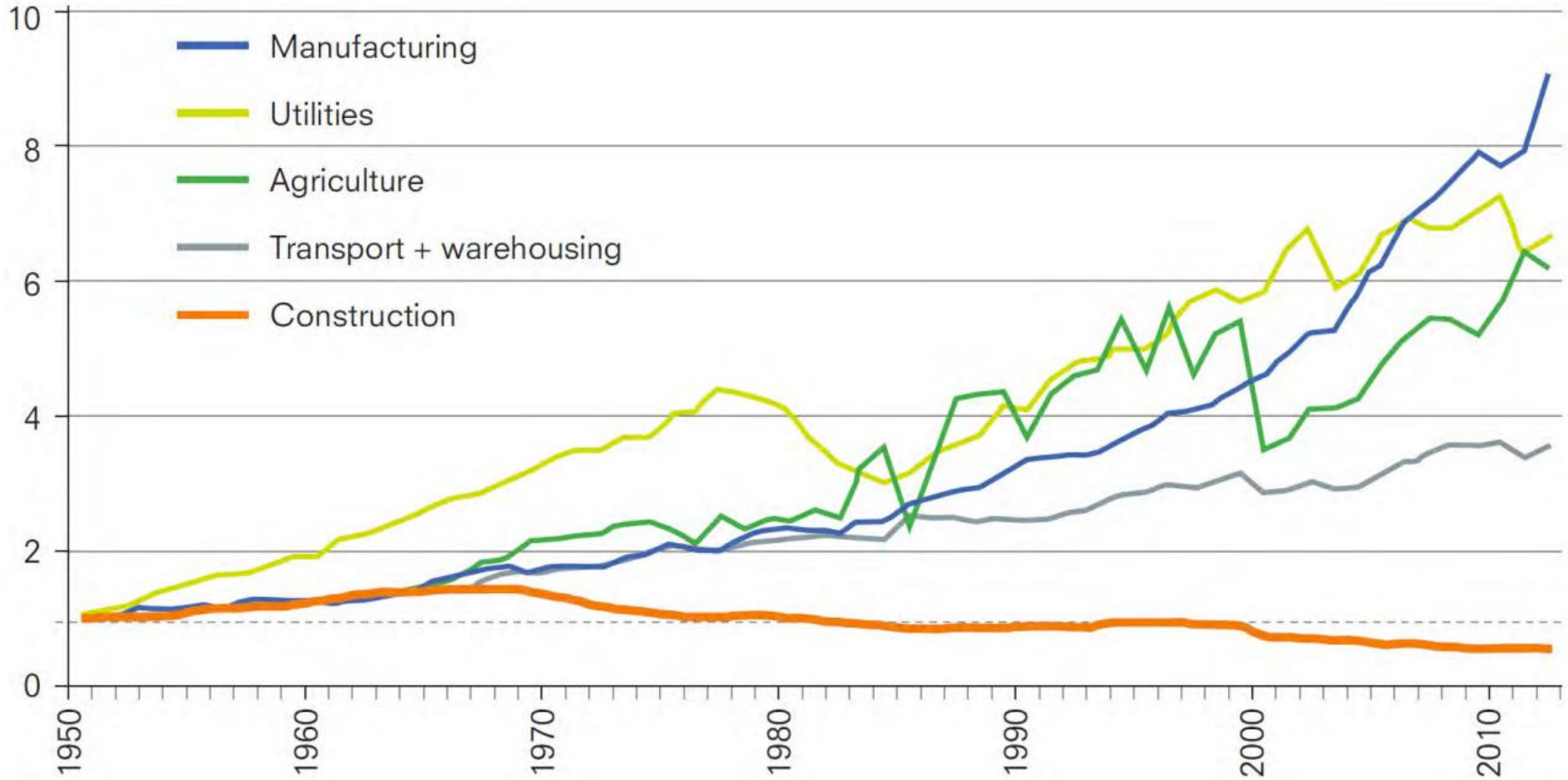
1. Historical context of DfMA



3. Contemporary significance

- DfMA is aligned to Sustainable Development Goals:
    - **Efficiency and Innovation (SDG 9):** DFMA drives innovation in product design and manufacturing, leading to more sustainable industrial practices.
    - **Resource Optimization (SDG 12):** DFMA supports responsible consumption and production by minimizing waste and maximizing resource efficiency.
    - **Environmental Impact (SDG 13):** DFMA helps reduce the environmental impact of manufacturing processes, contributing to efforts against climate change.

3. Contemporary significance



Construction productivity 1950 - 2012
Real productivity (GDP value-add per employee) by industry in the US
Indexed; 1950 = 1.0
Source: Bureau of Economic Analysis (BEA), Hideyuki (2011)

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DfMAy 2024

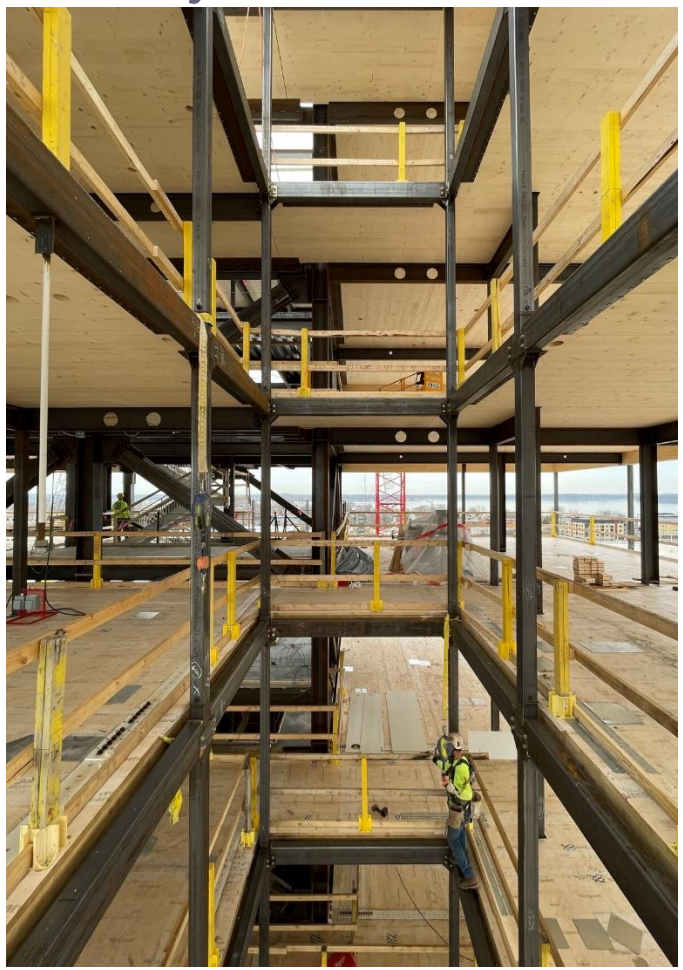
Tolerances at Interfaces

mass timber focus

m.thrailkill.architect.llc
specifications estimating research documentation

3rd Edition Online Conference
Hosted by Ergodomus
May 29, 2024

Why allow tolerance?



Baker's Place, Madison WI, Michael Green Architecture

Tolerance leaves room for the **interface of trades** and the unforgiving (and occasionally mischievous) **nature of building materials**: Concrete slumps from its formwork, steel expands and contracts in the changing temperatures of the day, and wood bows as it dries and adjusts.

We very rarely build in single materials. Because of this, the design of buildings must confront the ways the materials of construction **join**, how they **move** independently of one another, and how they **change** over time.[1]

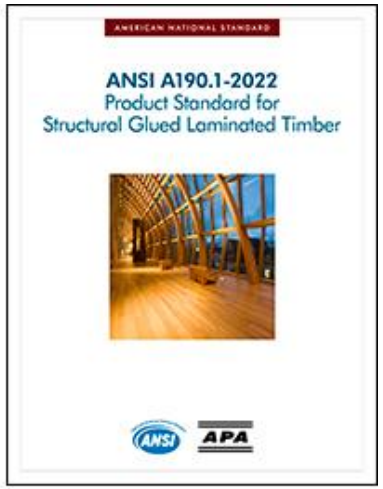
1. Genevieve Baudoin *A Matter of Tolerance*, appearing in *The Plan Journal* 2016

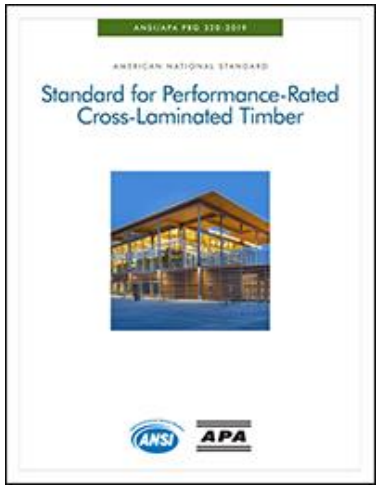
Fabrication Tolerances

Image caption

Mass Timber Framing and Deck:

- **Thickness**: Plus or minus 1.5 mm (1/16 inch) or 2 percent of panel thickness, whichever is greater.
- **Width**: Plus or minus 3.0 mm (1/8 inch).
- **Depth**: Plus or minus 3.0 mm (1/8 inch).
- **Length**: Plus or minus 6.0 mm (1/4 inch).
- **Squareness**: Deviation of lengths of two panel face diagonals less than 3.0 mm (1/8 inch).
- **Straightness**: Deviation of edges from adjacent panel corners less than 1.5 mm (1/16 inch).





Fabrication Tolerances

Steel Framing and Deck:

- **Elevation**: Of bearing devices, plus or minus 3 mm (1/8 inch).
- **Position**: Position at the base in any direction shall be equal to or less than **6 mm** (1/4 inch).
- **Deviation**: Working points shall be equal to or less than **25 mm** (1 inch) from the building column line in the first 20 stories; above this level, an increase in the displacement of 1 mm (1/32 inch) is permitted for each additional story up to a maximum displacement of **50 mm** (2 inches) from the building column line.

Fabrication Tolerances

Precast Concrete Framing and Planks:

- **Thickness**: Plus or minus 3 mm (1/8 inch) to 10 mm (3/8 inch), depending on element/ position.
- **Width**: Plus or minus 6 mm (1/4 inch).
- **Depth**: Plus or minus 6 mm (1/4 inch).
- **Length**: Plus or minus 10 mm (3/8 inch) to 25 mm (1 inch), depending on unit type.
- **Squareness**: Deviation from specified squareness, plus or minus 3 mm (1/8 inch) to 10 mm (3/8 inch), depending on element/ position.
- **Plane**: Deviation from specified plane, plus or minus 3 mm (1/8 inch) to 6 mm (1/4 inch), depending on element/ position.
- **Blockout**: Deviation from location, any direction, plus or minus 25 mm (1 inch) to 50 mm (2 inches), depending on unit type.

Fabrication Tolerances

Cast-in-Place Concrete Framing and Deck:

- **Foundations, horizontal deviation**: Where dimension is 2.440 mm (8 feet) or more, plus or minus **50 mm** (2 inches); where dimension is less than 2440 mm (8 feet), plus or minus **2%** of specified dimension or **12 mm** (1/2 inch).
- **Frame, horizontal deviation**: Top of foundation or lowest support level, plus or minus **25 mm** (1 inch); edge location of all openings, plus or minus **12 mm** (1/2 inch).
- **Frame, Deviation from plumb**: For heights less than or equal to 25.400 mm (83 ft 4 inches), **0.3%** of the height until a maximum of **25 mm** (1 inch); for heights from 25.400 mm (83 ft 4 inches) to 152.4 m (500 feet) above the top of foundation, the tolerance for plumb is **0.1%** times the height; for heights more than 152.4 m (500 feet) the maximum tolerance is **152.4 mm** (6 inches).

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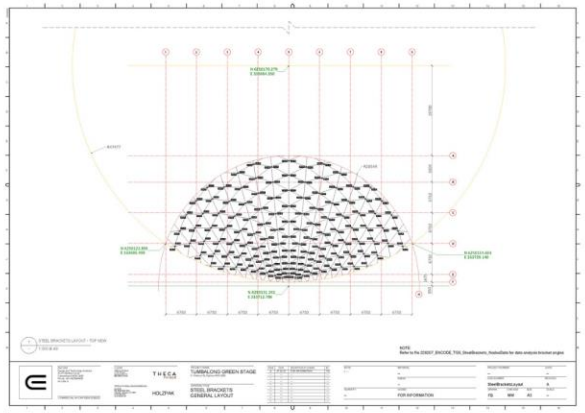
Digital Timber

Redifining Mass Timber Construction Through Digital Design

Shared Data Model

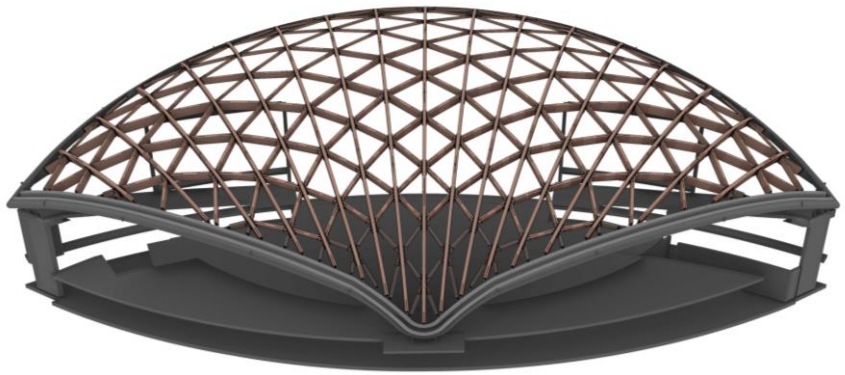


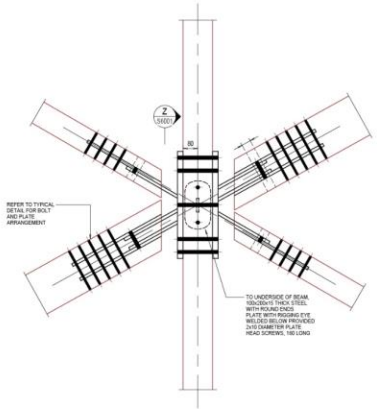
Drawings

Input

Engineering Team Contractor Fabricator Architecture Team

3D Model





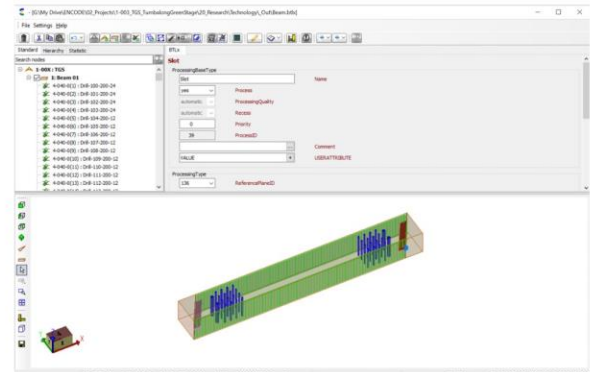
Assembly Instructions

Output

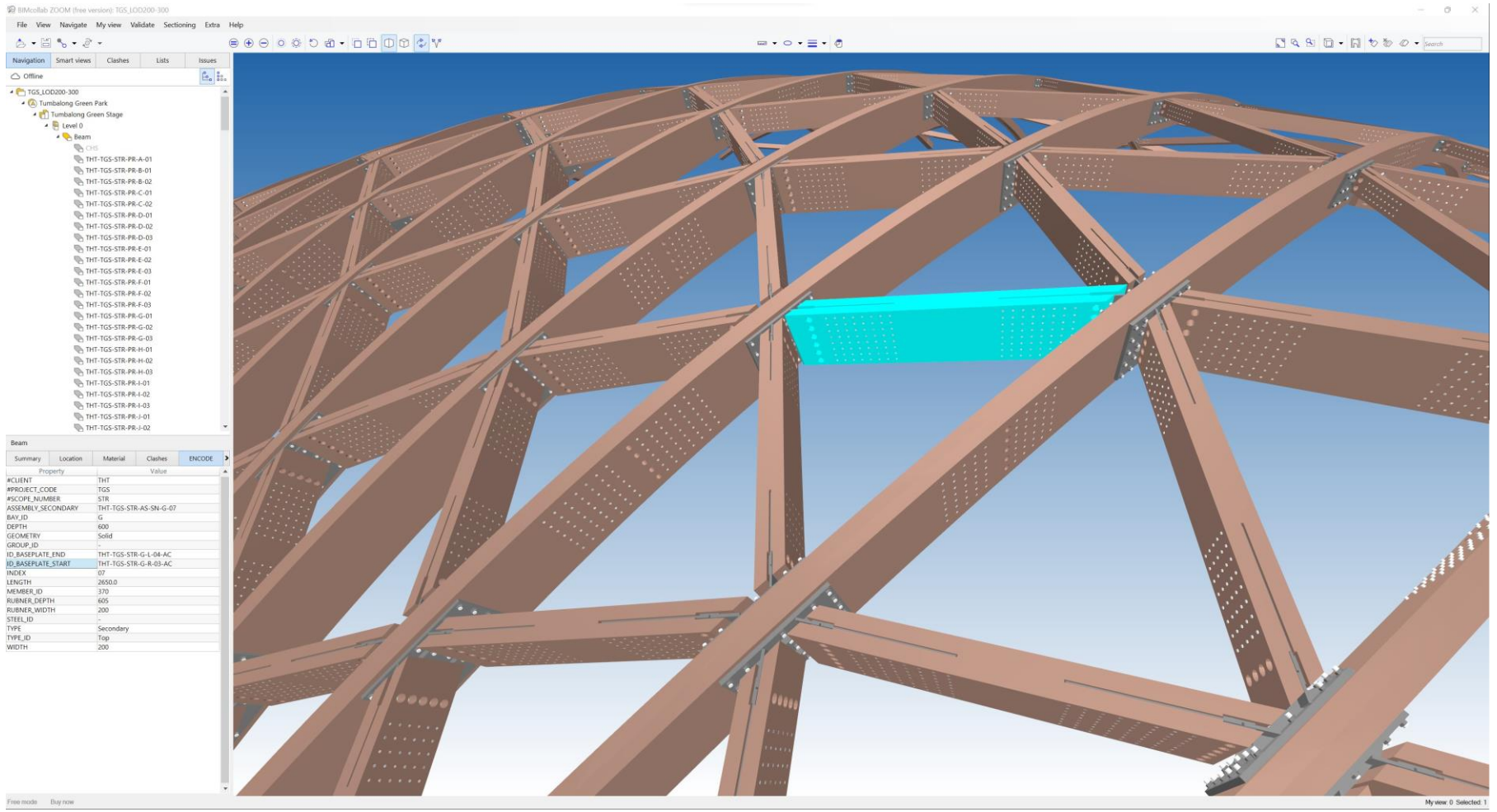
Metrics & Tables

Output

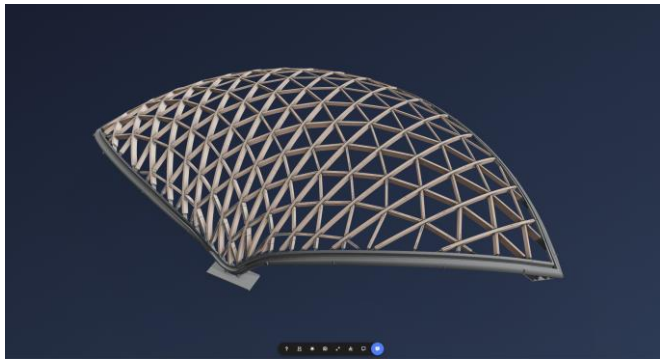
Machine Code



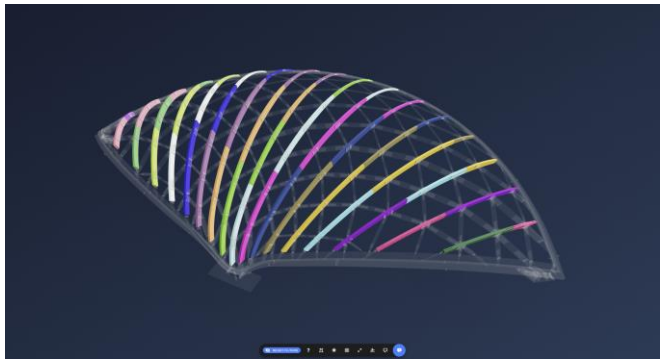
Data Exchange | IFC



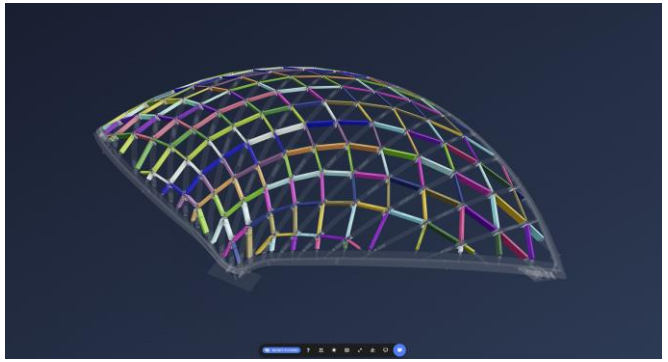
Web-Based Model – Data Access



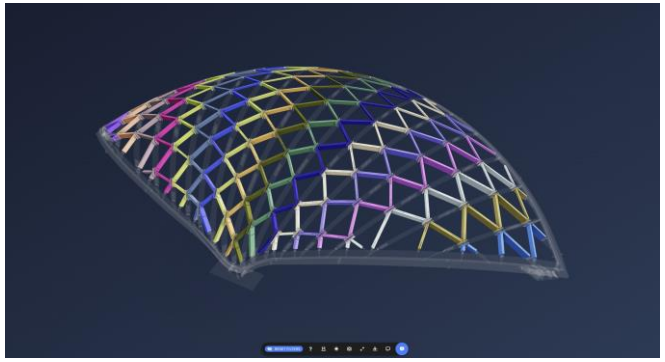
Overall Model



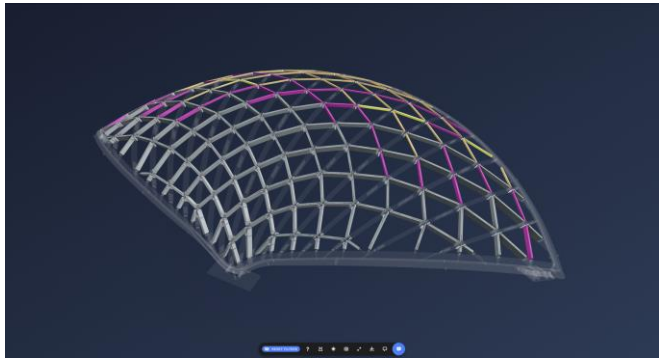
Primary Beams



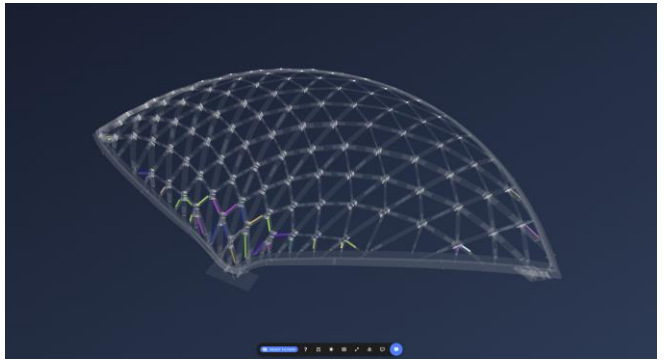
Secondary Beams by Part Name



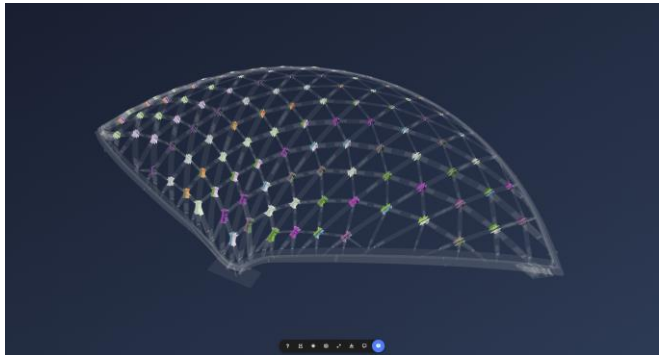
Secondary Beams by Bay



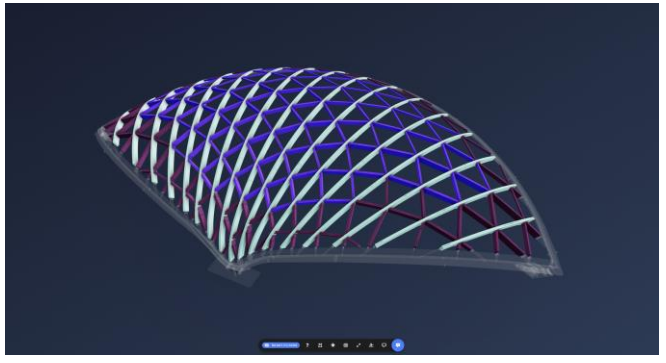
Secondary Beams by Width



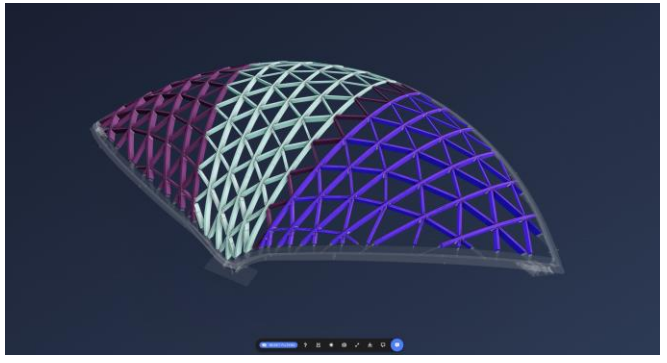
Cladding by Assembly



Steel Connection by Assemblies



Fabrication by Batch



Secondary by Containers and Installation


THEO
AVON


WORLD TOWER
MERITON
STEVEN
BARTLETT
THE BUSINESS & LIFE
SPEAKING TOUR
FRIDAY 5 APRIL
ICC SYDNEY THEATRE
BOOK NOW AT TICKETEK
ENCODE

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2024

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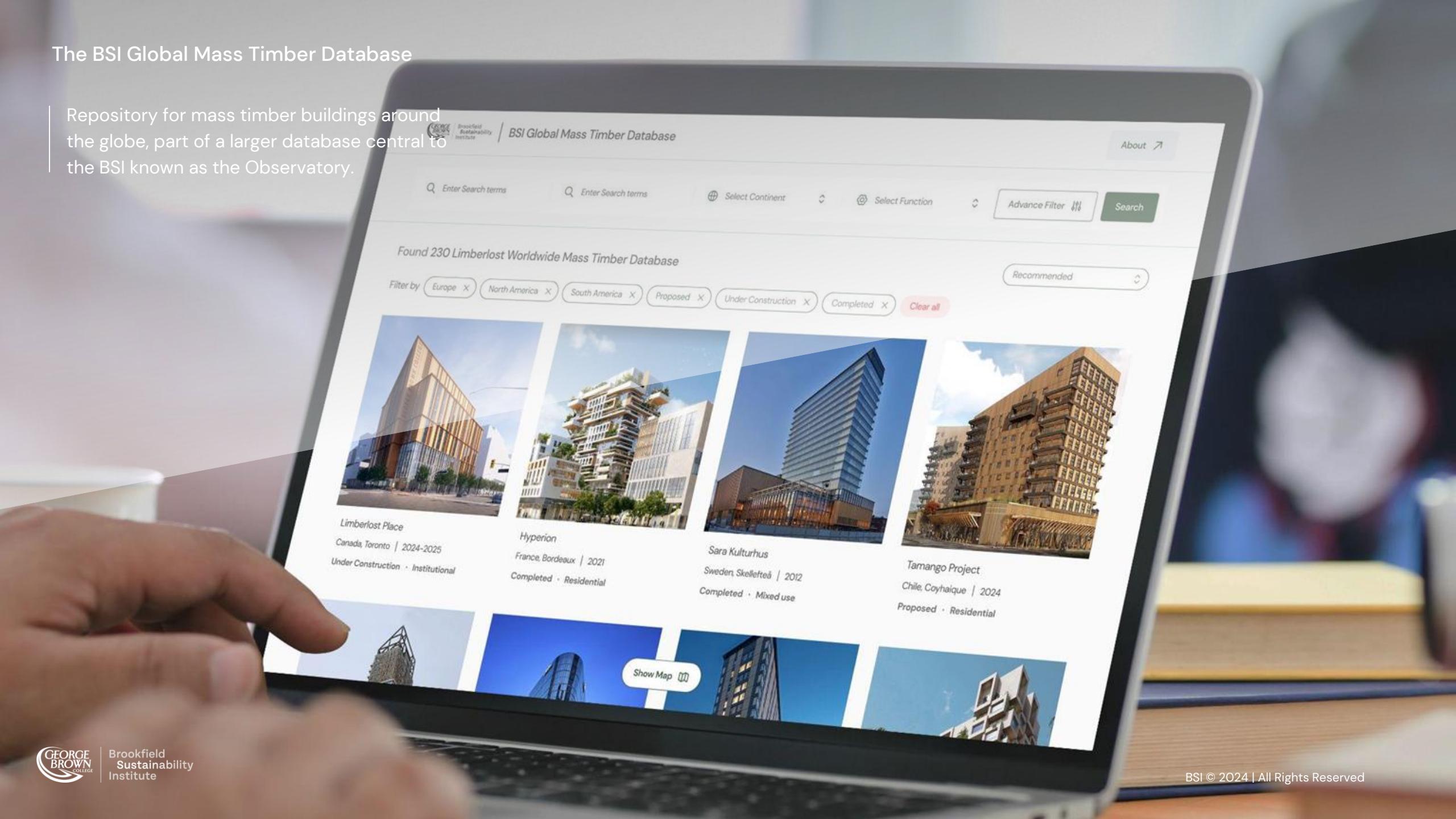
Introducing the BSI Global Mass Timber Database

May 29, 2024

Luigi Ferrara
CEO & Chair

The BSI Global Mass Timber Database

Repository for mass timber buildings around the globe, part of a larger database central to the BSI known as the Observatory.



01.

Global Database

Covers mass timber buildings around the globe, ensuring that as a collective we can have clear sight of the state of mass timber around the globe.

02.

Rich Information

Thorough resource for mass timber buildings, with up to 20 data points, vibrant descriptions, and architect renderings and sketches.

03.

Centralized Source

Choosing data points with user groups in mind, ensuring that all pertinent information related to each building can be found within one source.

04.

Designed for Accessibility

Our platform is designed to ensure that every user, regardless of expertise, can access and understand mass timber insights effortlessly through a user-friendly interfaces and assistive features for enhanced readability and accessibility.

05.

Ease of Use, for Everyone

Our platform is designed to ensure that every user, regardless of expertise, can access mass timber insights effortlessly with the help of a layered filtering systems showing users only what they can actually handle.

06.

Global Mass Timber Insights

Explore mass timber trends and projects worldwide, including white papers that bring you insights from various countries, showcasing how mass timber is used in diverse architectural contexts.

Project Detail Example

Brookfield Sustainability Institute | Global Mass Timber Database

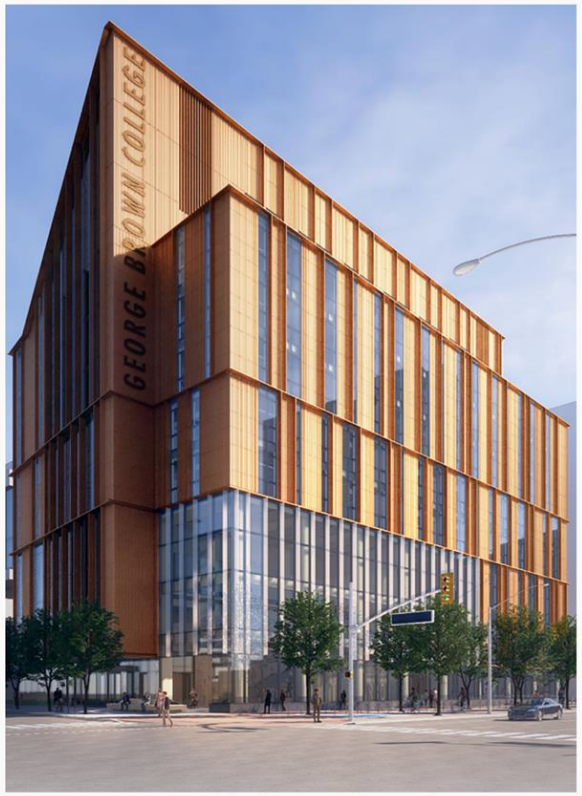
← Back | Home

Limberlost Place

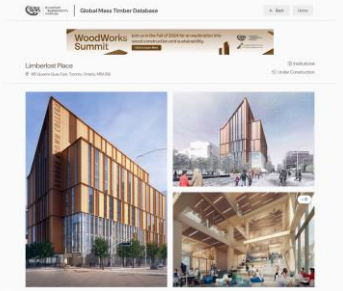
185 Queens Quay East, Toronto, Ontario, M5A 1B6

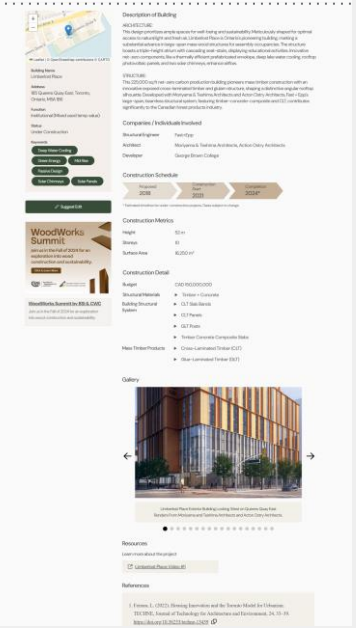
Institutional

Under Construction

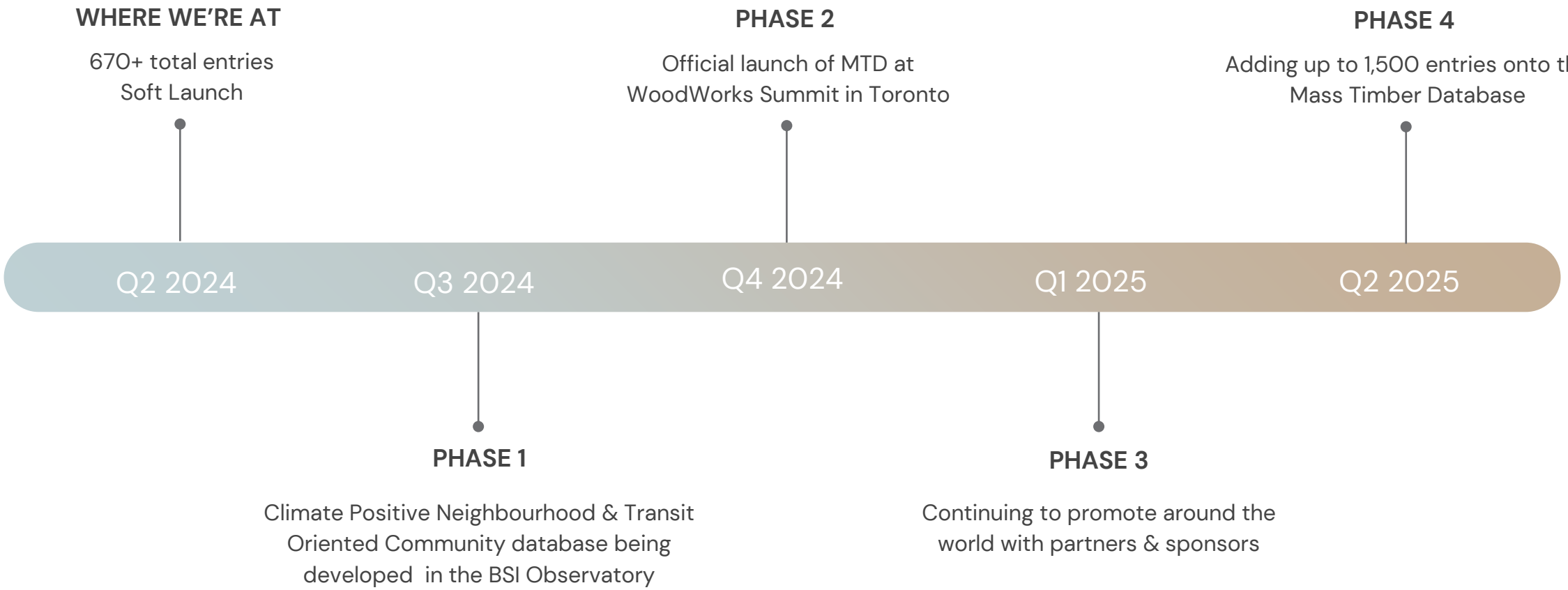


Description of Building





Timeline



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the art of timber engineering

Please reach out to us with your projects and ideas by emailing me,
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