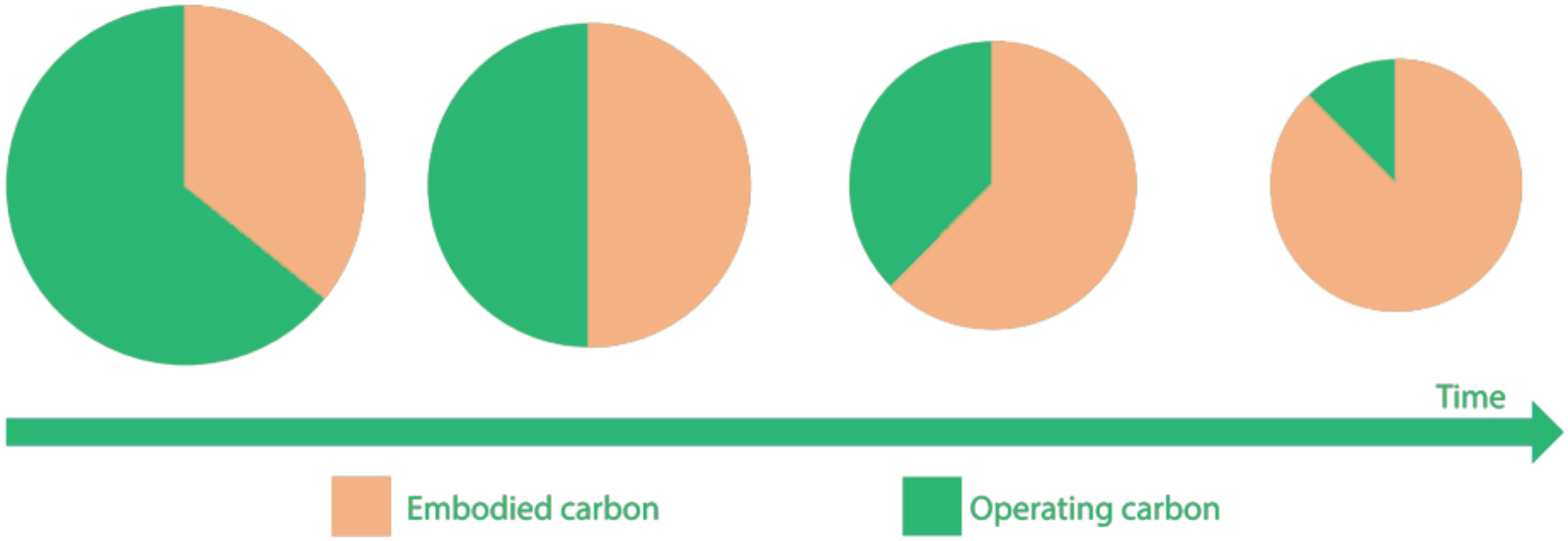

# *Driving Efficiencies With Software Tools and Automated Design*

June 2023

Toolbox®

# Sustainability

# Sustainability

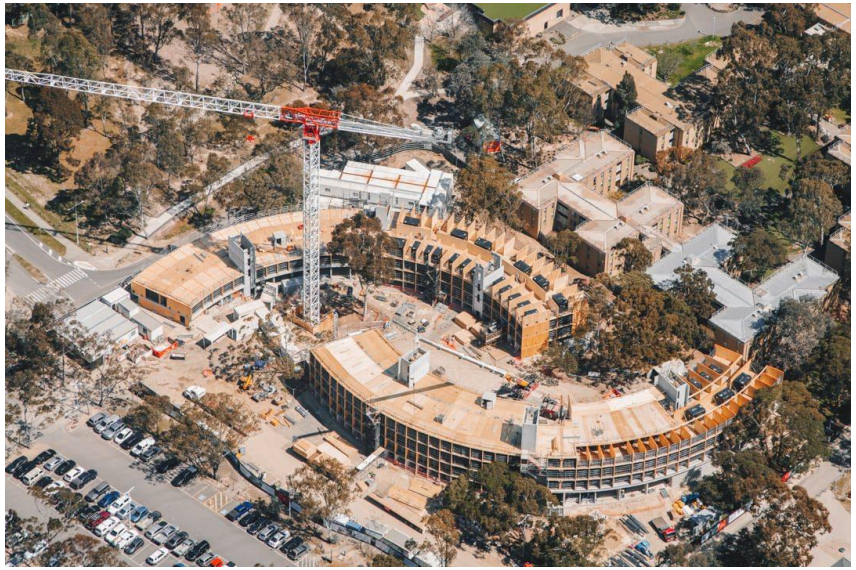


Toolbox

# Sustainability

# Sustainability


*25 King: Cred Lendlease*



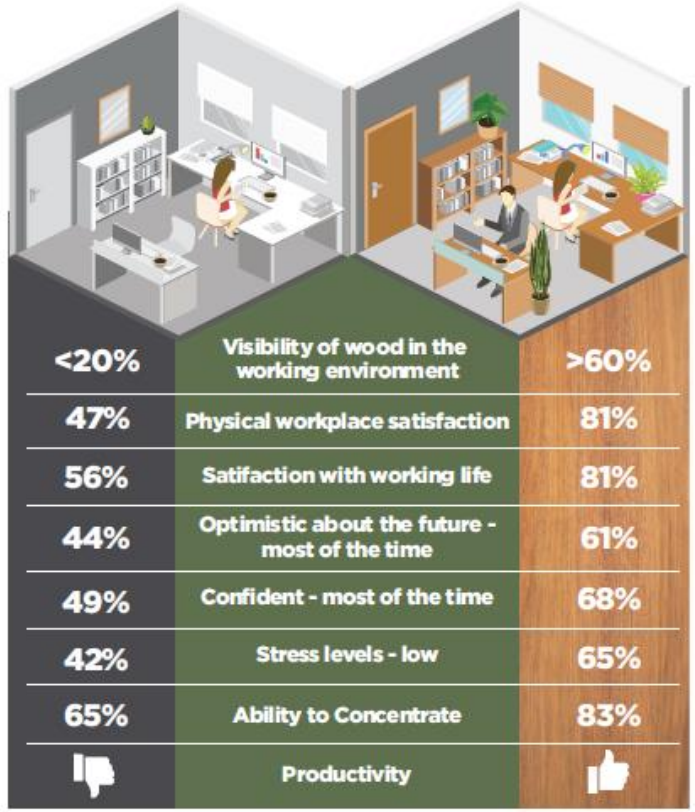
*Latrobe St: Cred TTW*

- 75% Reduction on BAU (biogenic included)

- 74% Reduction on BAU (biogenic included)

# Biophilia

# Biophilia


https://www.woodsolutions.com.au/wood-at-work

# Ethics Isn’t Enough

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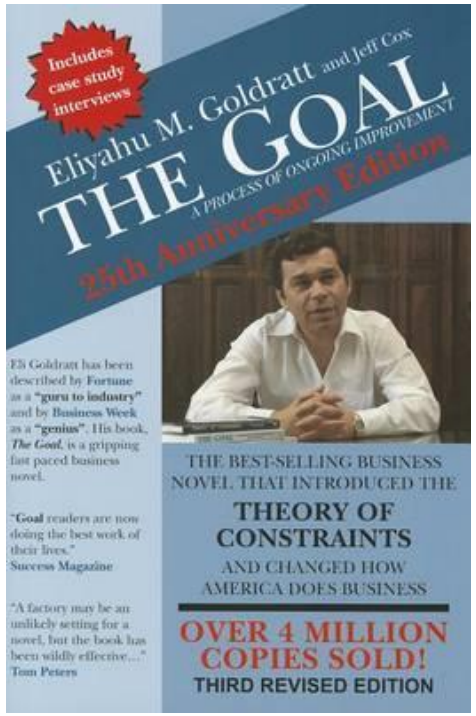
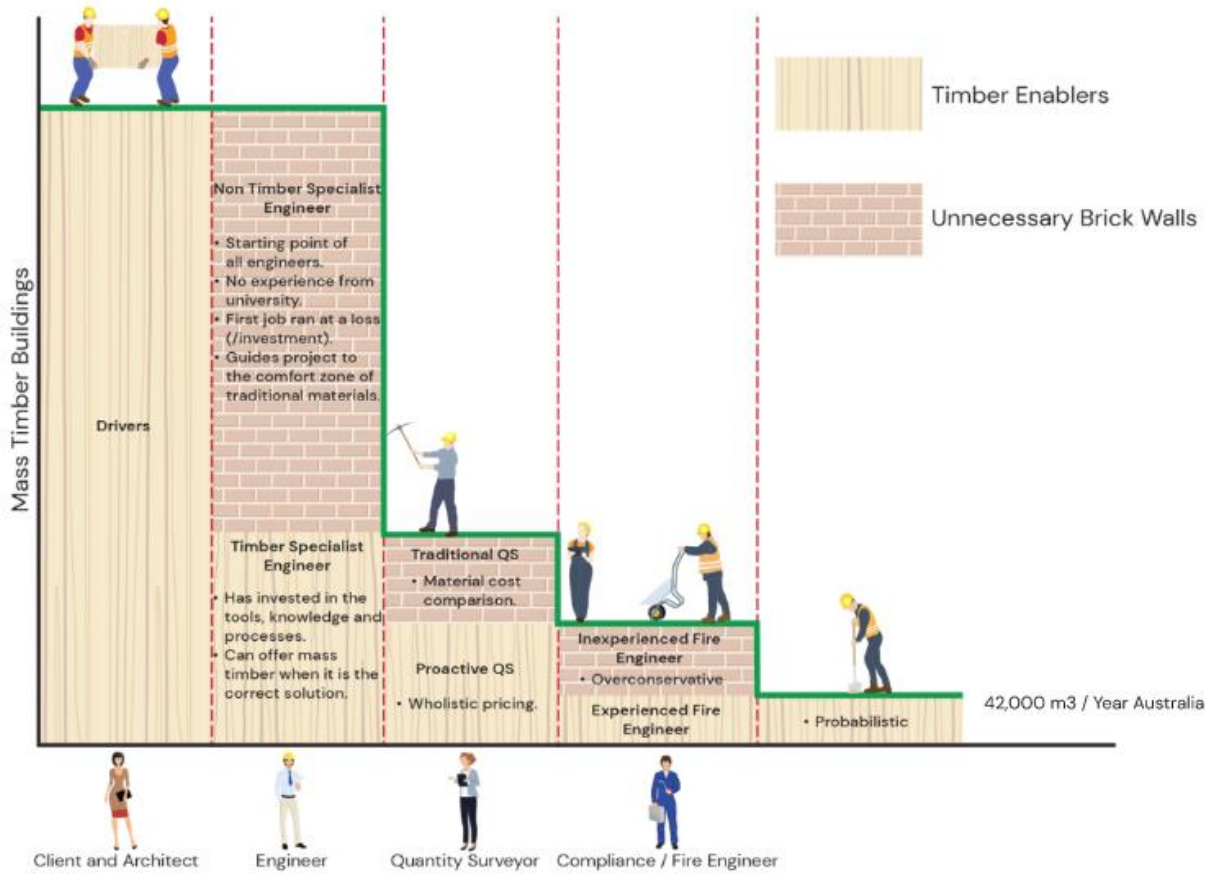
# Driving Cost Efficiencies

# Bottlenecks = Key To Efficiency




# Professionals

## 1. Design Process



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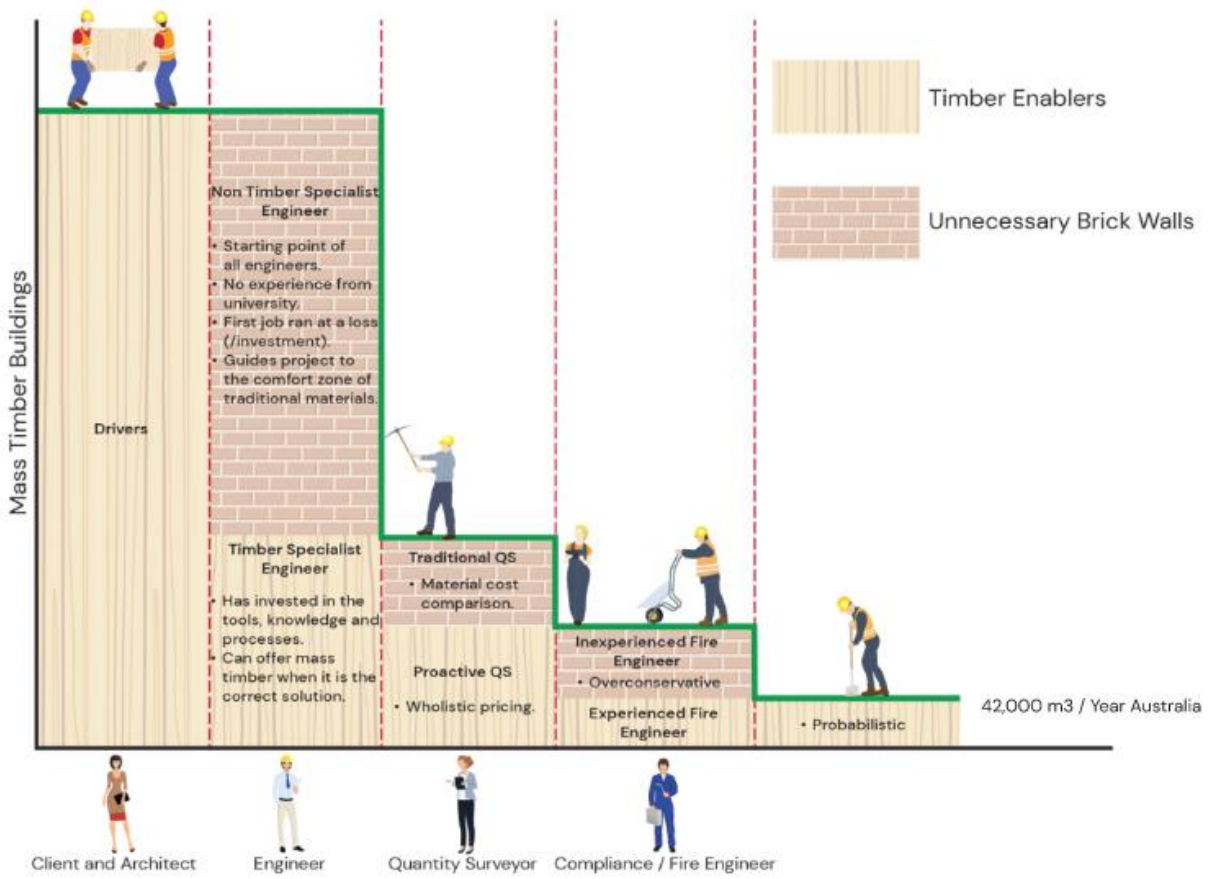
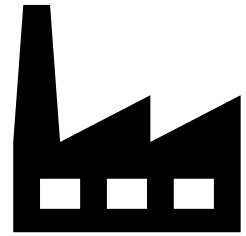
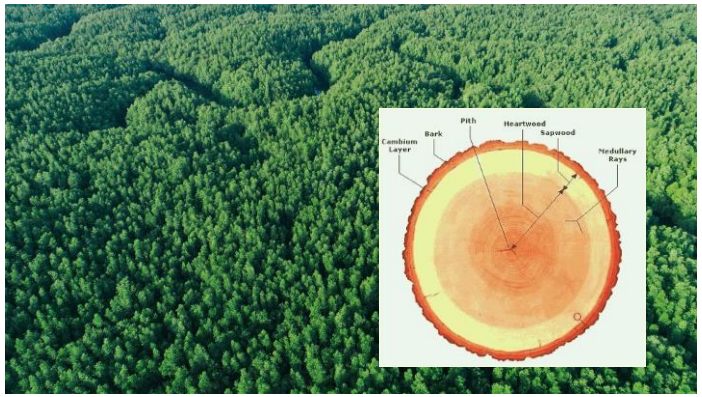


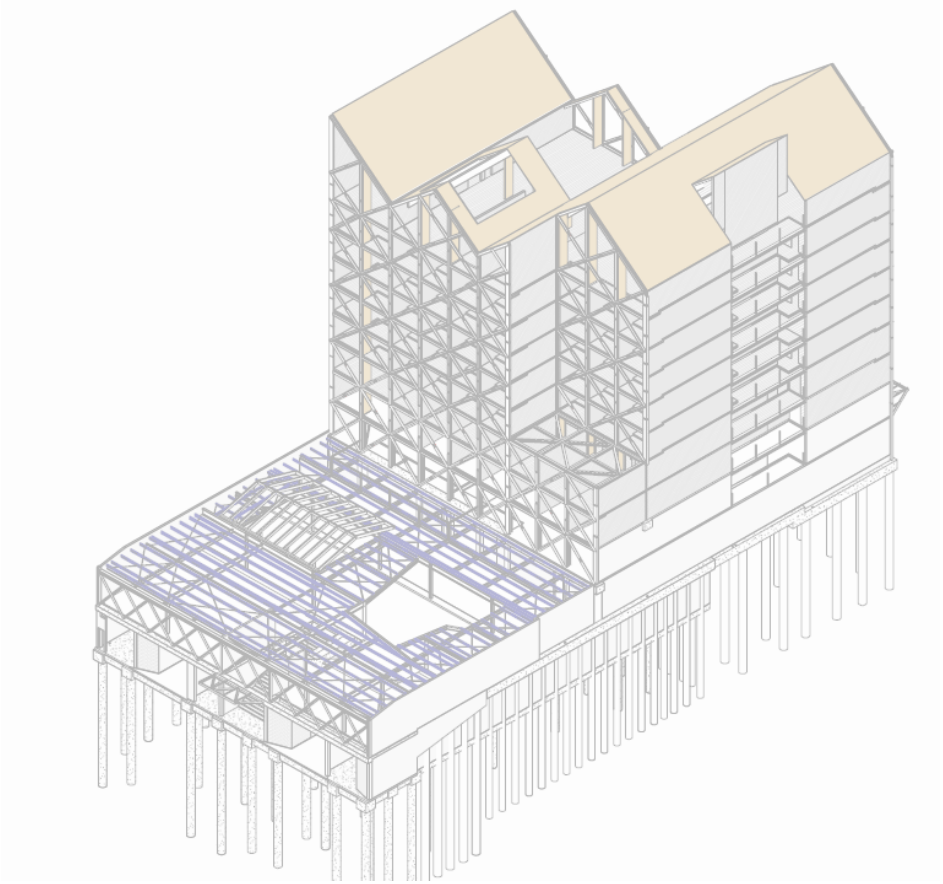

## 2. Supply Chain Capacities



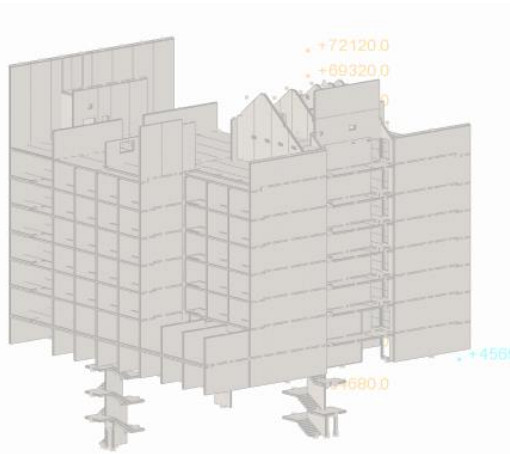
## 3. Land and Forest Utilisation



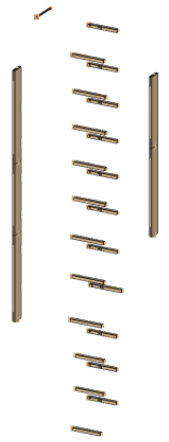
# Co-ordination and Shop Drawing



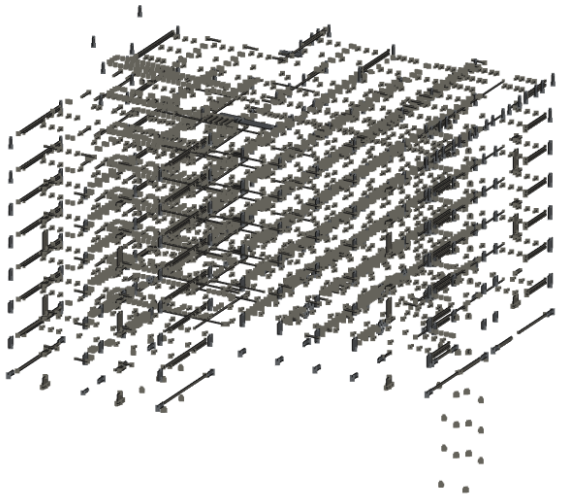
Building



CLT



GLT

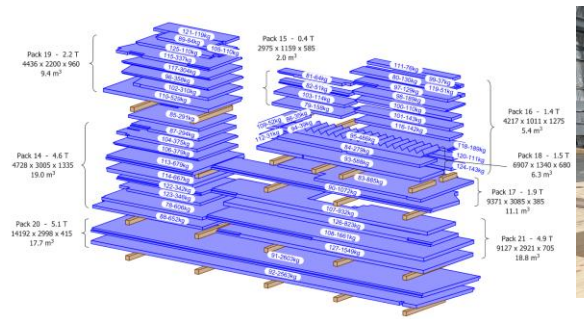


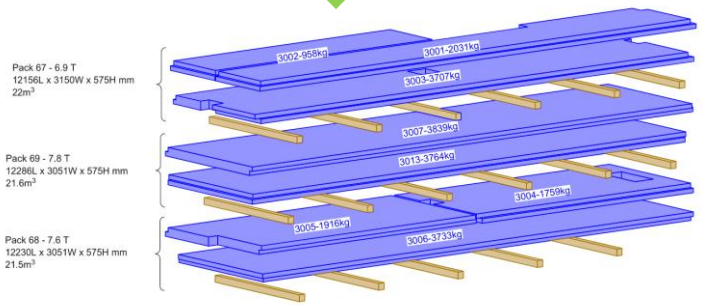
Steel

*Auckland City Mission*
*Image Credit: XLam*

# DfMA

## Design for Manufacture



# DfMA

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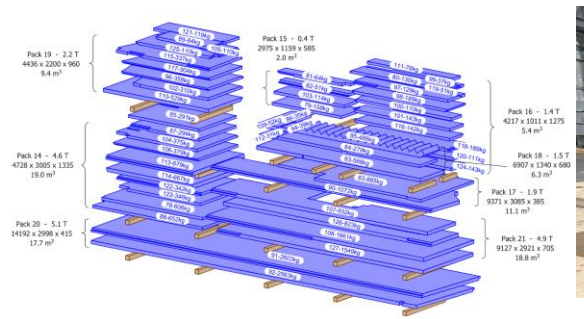
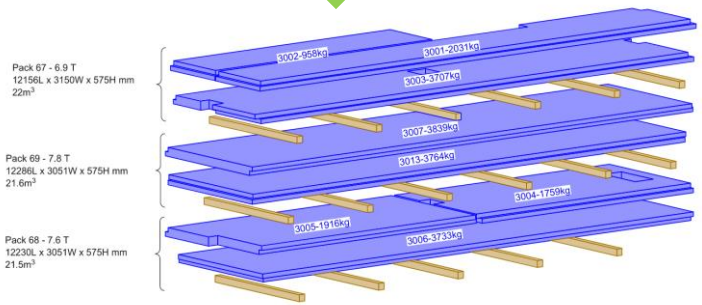
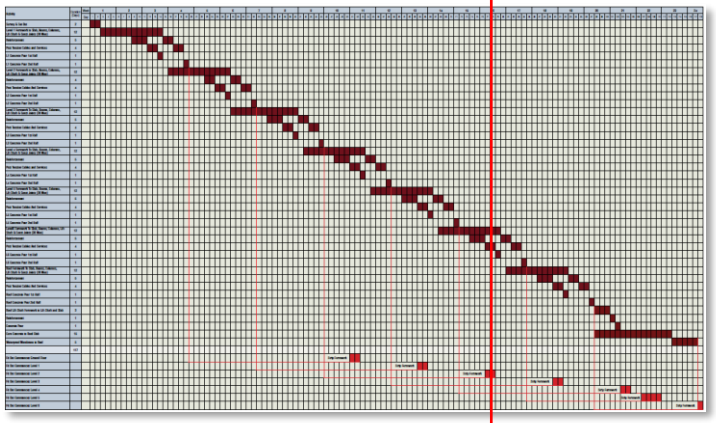
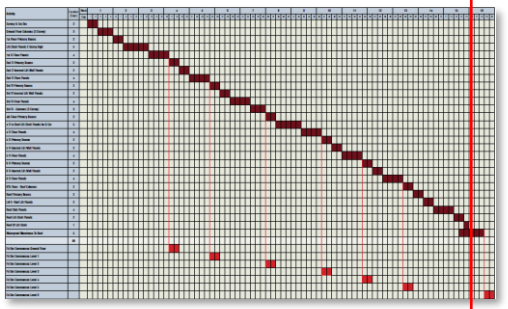



## Design for Assembly





# Design Paradigms

## Level 1 – The Shoehorn Approach

- Design paradigm of concrete construction

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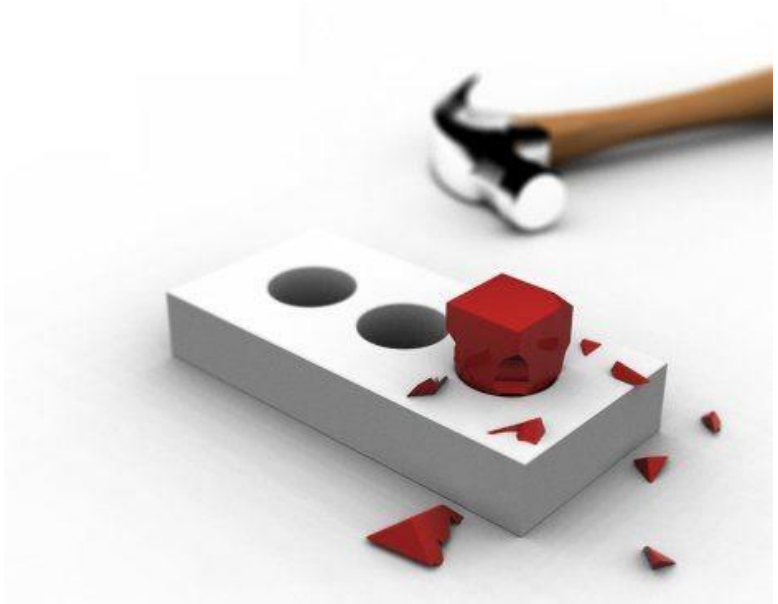
## Level 2 – Designing With Components

- Grids conducive for mass timber
- Square peg in a square hole
- Function follows form



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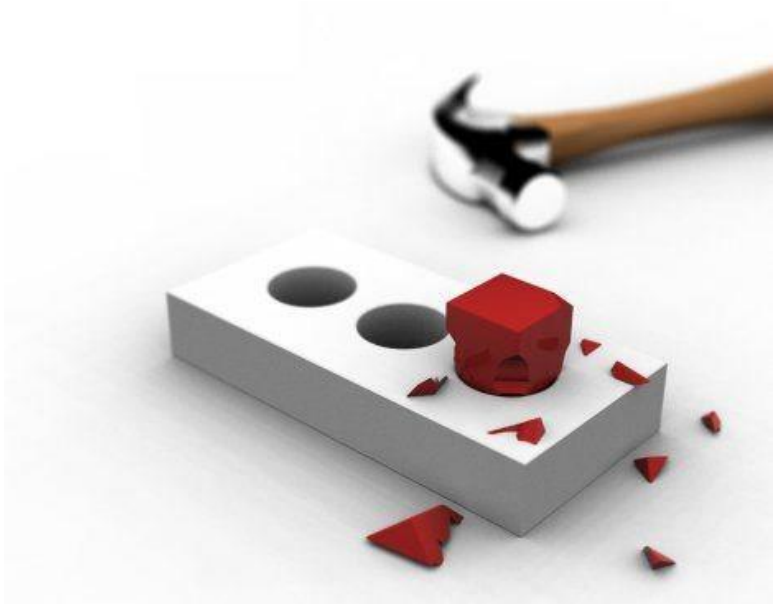


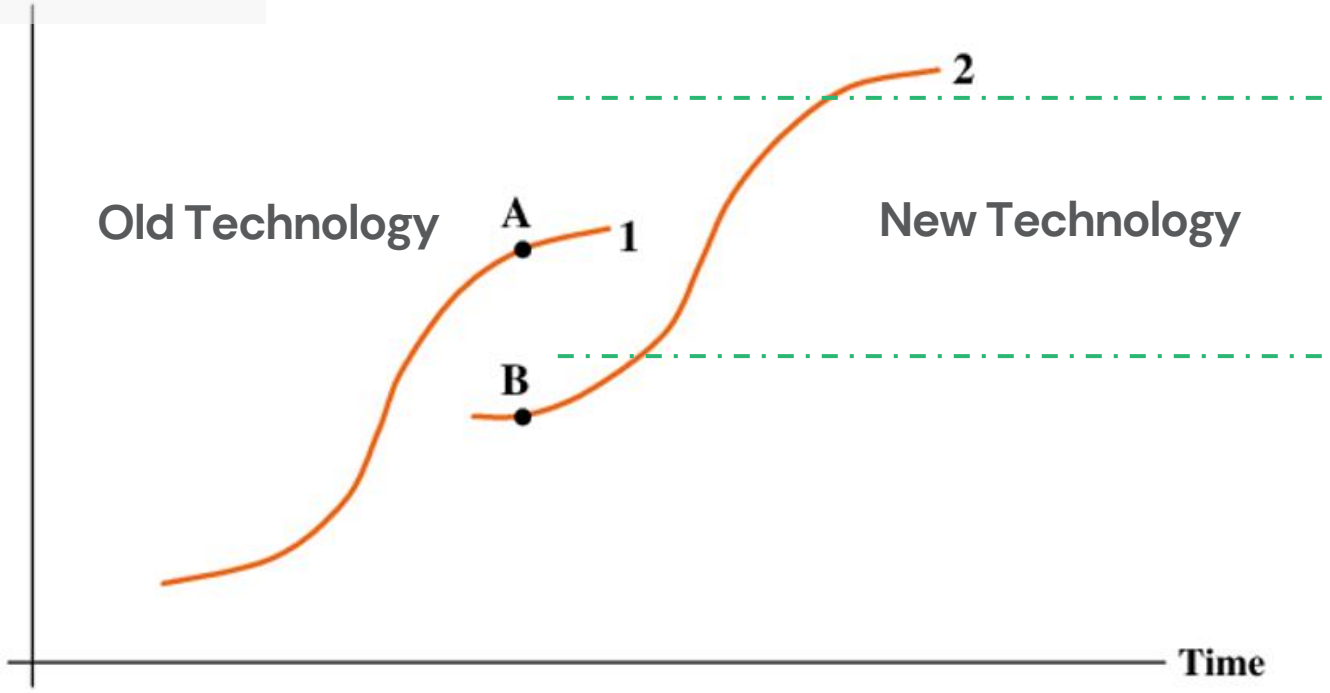
## Level 2 – Designing With Components

- Grids conducive for mass timber
- Square peg in a square hole
- Function follows form

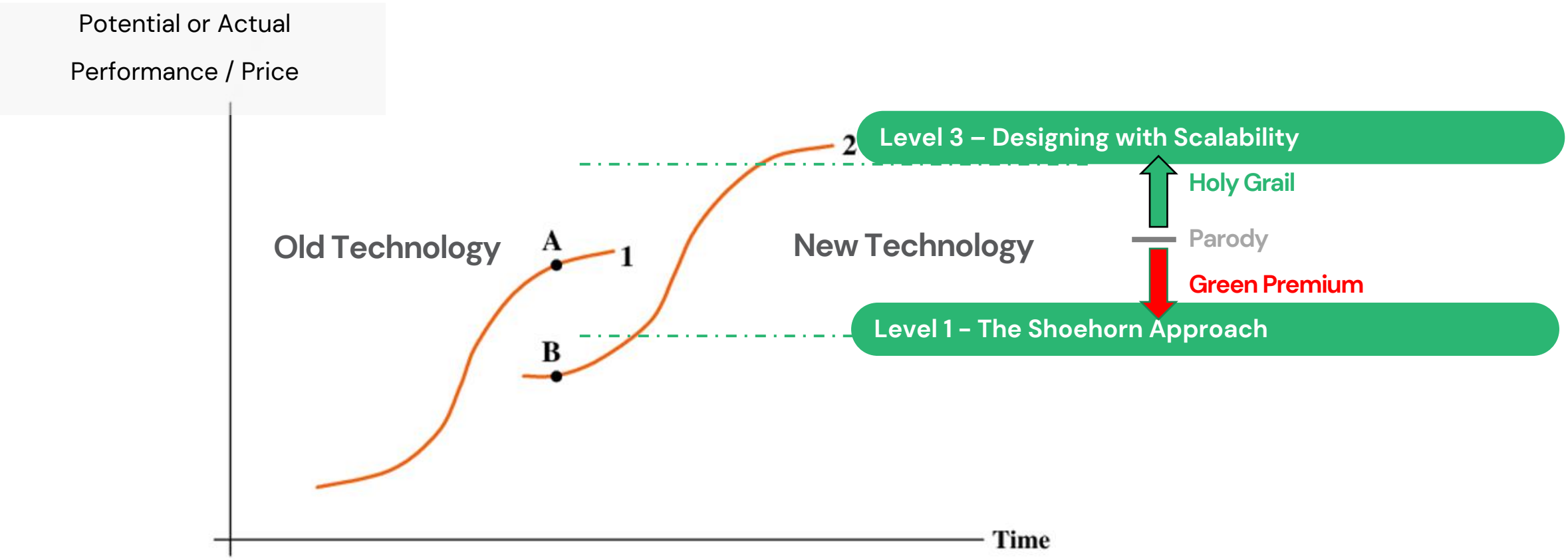
## Level 3 – Designing with  Scalability

- Designing with constraints in supply chain to alleviate bottlenecks
- Improves processes and most cost effective
- Replication eliminated in the supply chain

# Design Paradigms



# Design Paradigms



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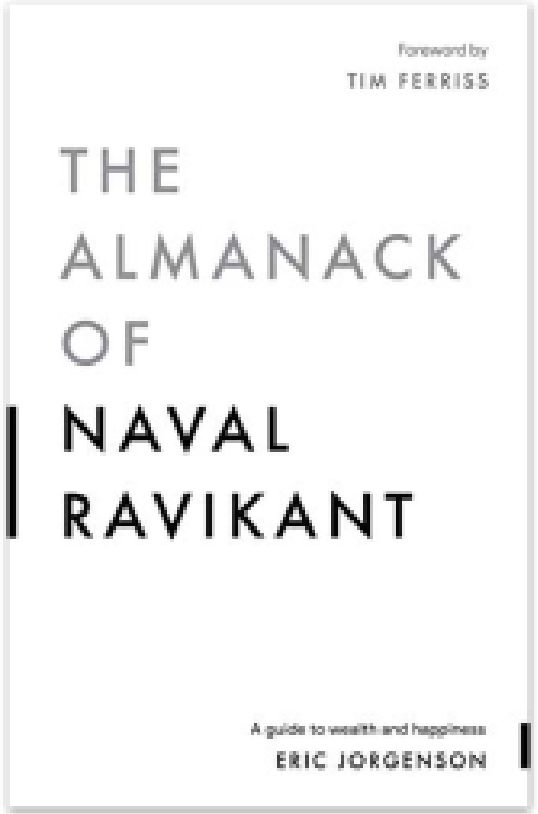
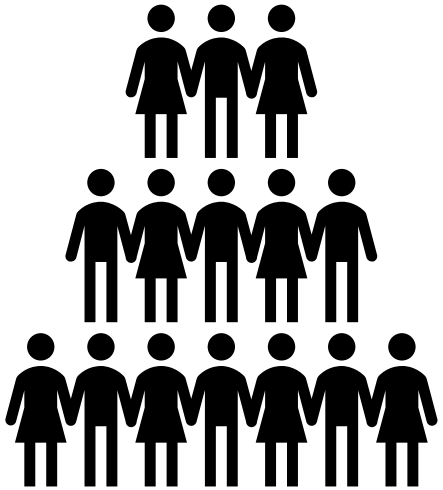
# Designing With Scalability


Foreword by
TIM FERRISS
THE
ALMANACK
OF
NAVAL
RAVIKANT
A guide to wealth and happiness
ERIC JORGENSON

# Leverage

People



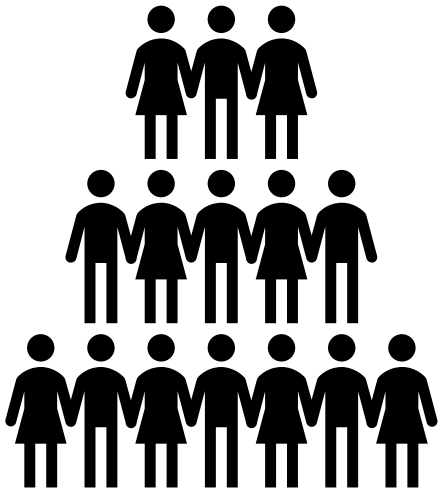
Henry Ford

Ray Croc

Sam Walton

# Leverage

People



Henry Ford

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Money

Warren Buffet

George Soros

Carl Icahn

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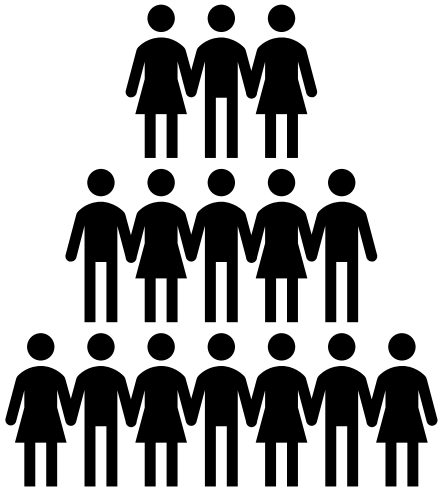
People



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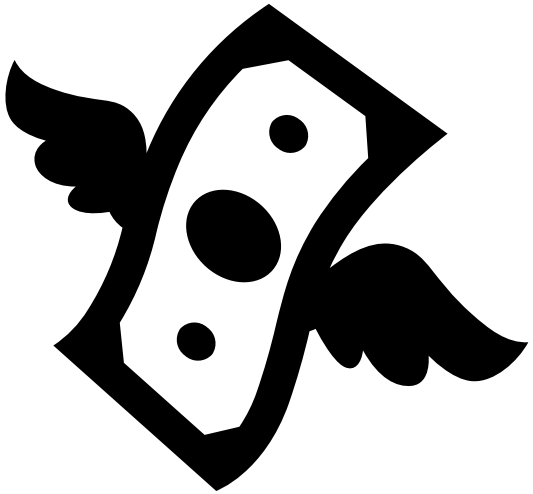

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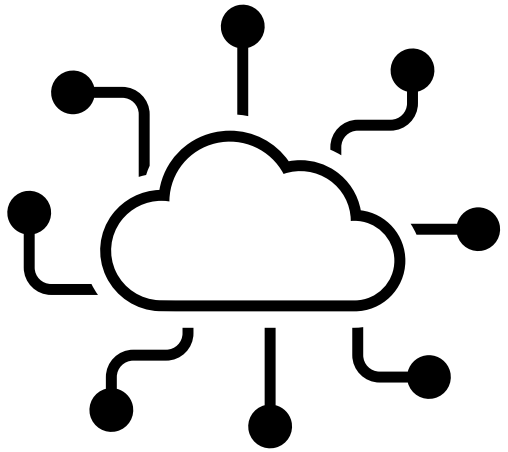
Zero Marginal Cost of Replication



Mark Zuckerberg

Larry Page / Sergey Brin

Reid Hoffman

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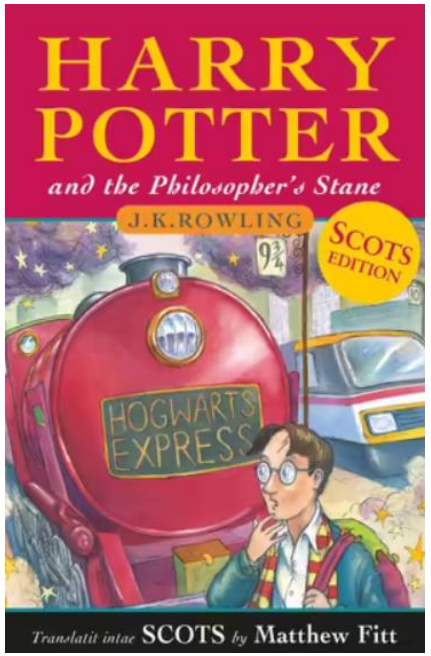
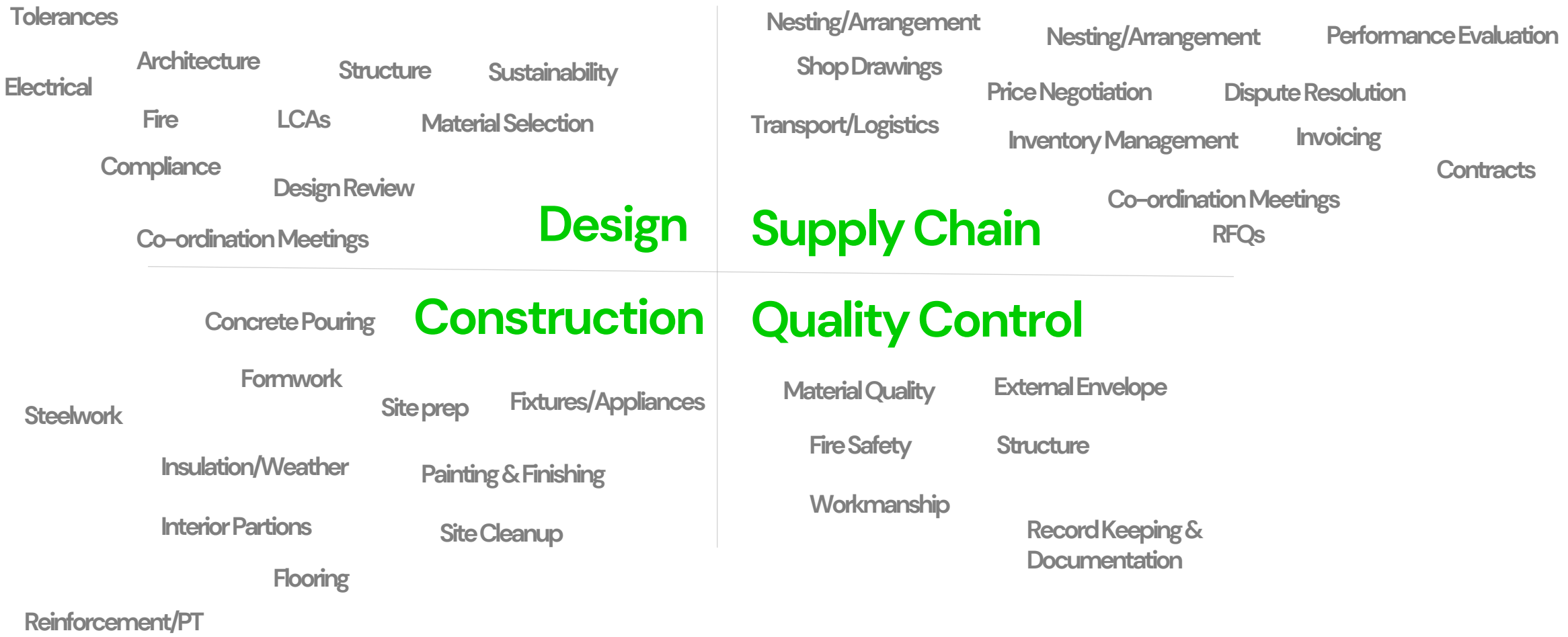
# Zero Costs of Replication




# Replication Costs in Construction




aws

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# Today

# Tomorrow?

## Deliberate Strategies

KATERRA

lendlease

Podium

## Emergent Strategies

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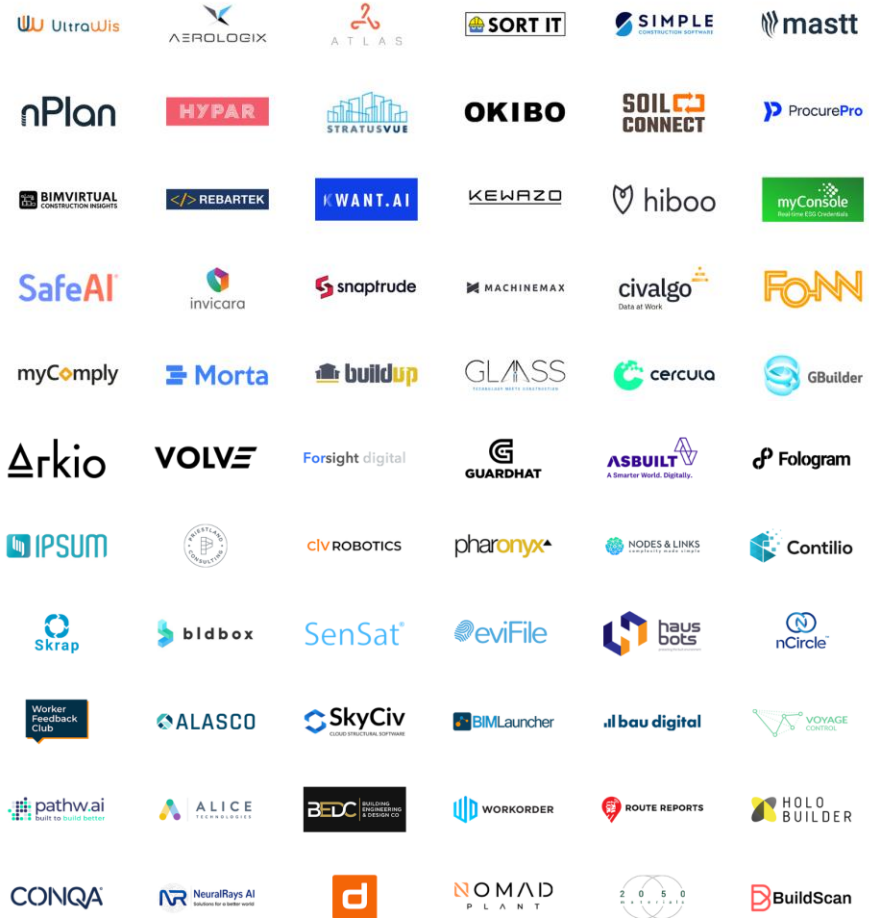


*Powered By*

Bard

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# Our Bit

# Timber Demand Infrastructure


- ***Approx 1/300 Engineers Are Mass Timber Specialists***
- ***It is difficult to become a mass timber specialist.***

**Problem 1**
This isn't taught at university. We need to provide the best education on the job.

**Problem 2**
Engineers are reinventing the wheel doing the same tasks. We can provide the industry infrastructure to make it cheaper for engineer's on the job, and reduce project design fees.

# Timber Demand Infrastructure

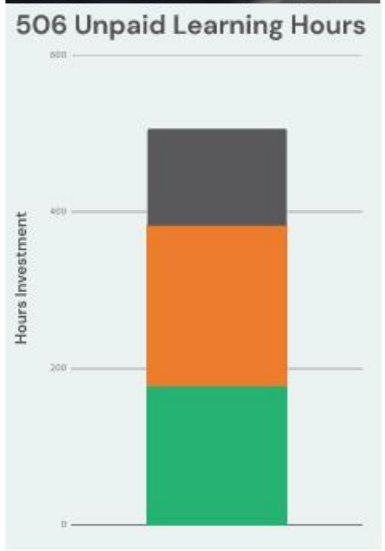
| | Approach | Design Tools Development (Hours) | Design Learning (Hours) | Geelong - Post and Beam | 240 Vic St - CLT Wall / CLT Floor | Pheonix Apartments |
|---|---|---|---|---|---|---|
| CLT Floor (Ambient) | Excel | 26.7 | 21.3 | ✓ | ✓ | ✓ |
| CLT Floor (Fire) | Excel | 17.3 | 21.3 | ✓ | ✓ | ✗ |
| CLT Wall (Ambient) | Excel | 26.7 | 21.3 | ✗ | ✓ | ✗ |
| CLT Wall (Fire) | Excel | 16.0 | 21.3 | ✗ | ✓ | ✗ |
| Mass Timber Beam (Ambient) | Excel | 23.3 | 4.7 | ✓ | ✗ | ✗ |
| Mass Timber Beam (Fire) | Excel | 2.7 | 4.7 | ✓ | ✗ | ✗ |
| Mass Timber Beam Penetration and Reinforcement | Excel | 10.0 | 4.0 | ✓ | ✗ | ✗ |
| Mass Timber Column (Ambient) | Excel | 9.0 | 8.7 | ✓ | ✗ | ✗ |
| Mass Timber Column (Fire) | Excel | 6.7 | 6.0 | ✓ | ✗ | ✗ |
| Mass Timber K-brace (Stability) | Excel | 1.3 | 5.3 | ✓ | ✗ | ✗ |
| CLT Floor Point Load (Ambient) | Excel | 4.0 | 7.3 | ✓ | ✓ | ✗ |
| CLT Floor Point Load (Fire) | Excel | 2.0 | 6.7 | ✓ | ✗ | ✗ |
| CLT Lintel Design | Excel | 9.3 | 8.0 | ✗ | ✓ | ✗ |
| CLT In-plane Strength (Shear Wall / Diaphragm) | Excel | 11.3 | 13.3 | ✓ | ✓ | ✗ |

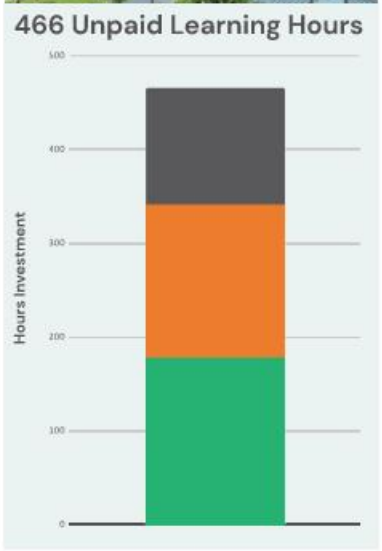
Post and Beam

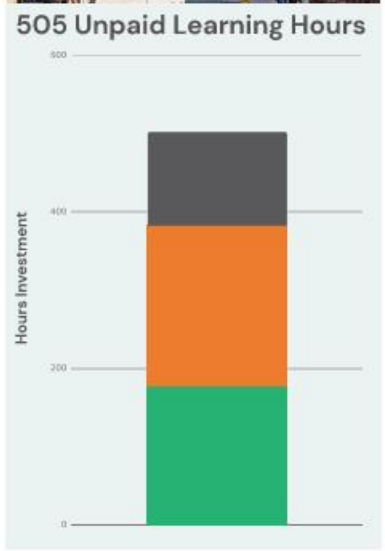
Light-frame Walls / Mass Timber

CLT Wall and CLT Floor

# Timber Demand Infrastructure




| | Cost | Design Fee | Net Profit |
|---|---|---|---|
| Full Journey | $160,100 | - | |
| Geelong - Post and Beam | $101,300 | $80,000 | -$21,300 |
| 240 Vic Street | $101,000 | $40,000 | -$61,000 |
| Phoenix Apartments | $93,200 | $60,000 | -$33,200 |

Table 5


Status Quo
Become A Timber Specialist
Learn Structural Analysis
124 Unpaid Hours
Develop Design Tools
178 Unpaid Hours
Learning Timber Design
204 Unpaid Hours
Toolbox

# CLT Floor Fire Calculator.

1. Overview.
2. Insert variables.
3. Review Calculations and Export.

# Team

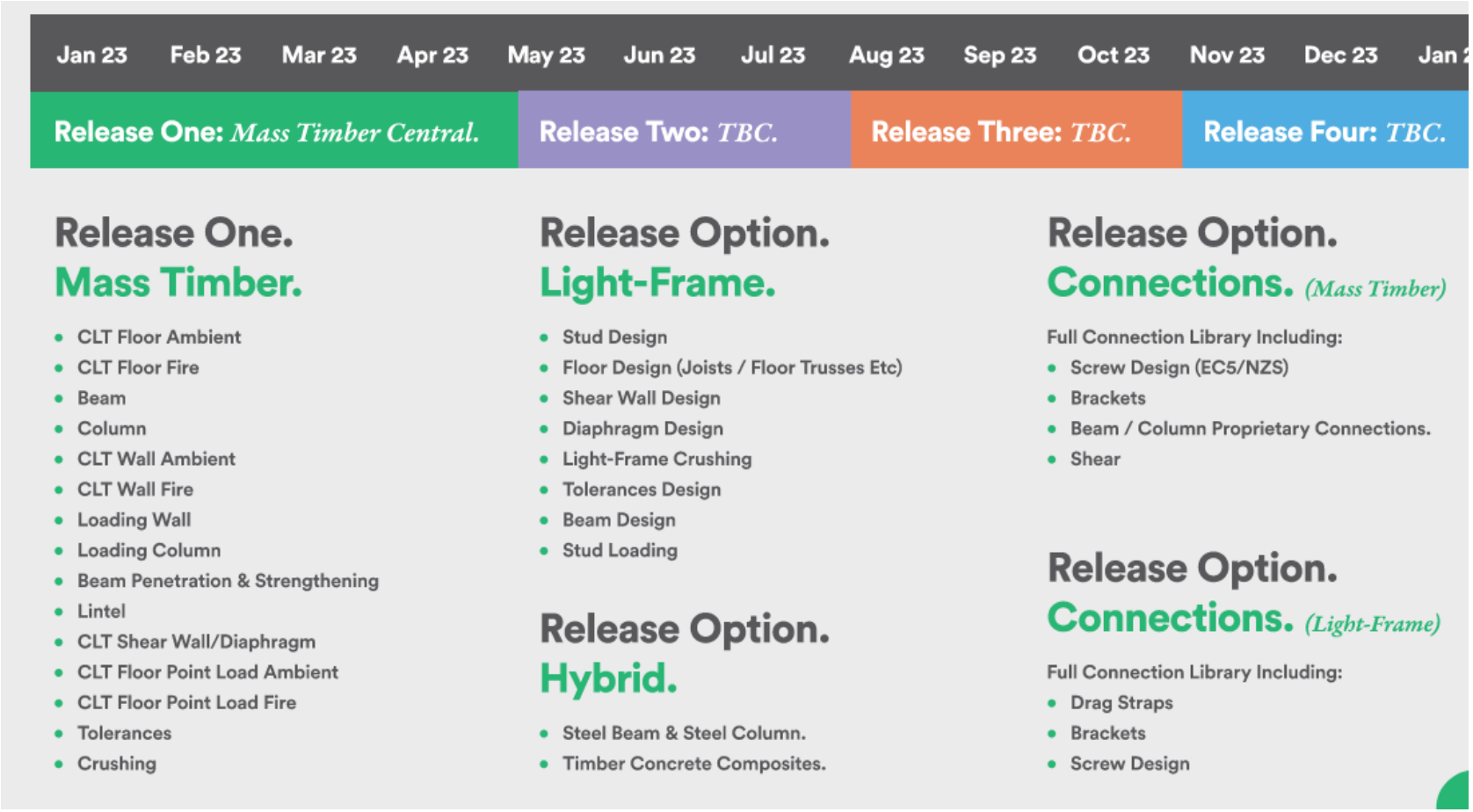

# Partnerships

## Suppliers

## Associations


## Investors

# Partnerships



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# Thanks ☺