THE EMERGENCE OF MASS TIMBER IN THE US FIGHT AGAINST CLIMATE CHANGE: FROM FORESTS TO CITIES

SUSAN JONES, FAIA
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usa
THE EMERGENCE OF MASS TIMBER IN THE US FIGHT AGAINST CLIMATE CHANGE

UNITED NATIONS ECONOMIC COMMISSION FOR EUROPE, CANADA

NOVEMBER 5, 2018

ATELIER JONES
The emergence of mass timber in the US fight against climate change.

Sustainable forests
restorative thinning
small-diameter timber
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3-ply  7,028 SF = 22 panels
      = 27,411 board feet

5-ply  4,091 SF = 13 panels
      = 20,385 board feet

**total**  4,091 SF = 35 panels
            = 47,796 board feet
CLT w/ exterior wood cladding
fossil fuel consumption (MJ): 12,395
GWP (tonnes of CO₂ Eq.): 0
Acidification potential (moles PF H⁺): 210
Human Health Criteria (Kg of 10 micron pm): 7
Eutrophication potential (g of Nitrogen Eq.): 199
Ozone depletion potential (mg of CFH-11 Eq.): 1
Smog potential (Kg of NOₓ Eq.): 29

2x4 STUD w/ exterior wood cladding
fossil fuel consumption (MJ): 12,456
GWP (tonnes of CO₂ Eq.): 1
Acidification potential (moles PF H⁺): 215
Human Health Criteria (Kg of 10 micron pm): 9
Eutrophication potential (g of Nitrogen Eq.): 218
Ozone depletion potential (mg of CFH-11 Eq.): 1
Smog potential (Kg of NOₓ Eq.): 26

CONCRETE w/ vinyl siding
fossil fuel consumption (MJ): 39,128
GWP (tonnes of CO₂ Eq.): 3.2
Acidification potential (moles PF H⁺): 875
Human Health Criteria (Kg of 10 micron pm): 13.6
Eutrophication potential (g of Nitrogen Eq.): 1,280
Ozone depletion potential (mg of CFH-11 Eq.): 20.8
Smog potential (Kg of NOₓ Eq.): 208
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emerging design territories: the hypernational

UC Berkeley

Fall Architecture Lecture Series

production logics

1) GLUE ADDED AND FIRST LAYER PLACED

2) GLUE ADDED BETWEEN SUBSEQUENT LAYERS

3) COMPLETED ASSEMBLY IS PRESSED
prefabrication

logics
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1820 41st Ave. NE.

Courtyard

Alley

41st Ave. NE

White CLT interior

CNC routed pine wood screens

Dark shou sugi ban pine cladding

Standing seam metal roofing

Building circulation core

Double height office area surrounded by circulation core

Double height office area surrounded by circulation core

Circulation core

Kitchen

Double height office area surrounded by circulation core
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performative carbon copies
1 SQUARE FOOT OF FLOOR ASSEMBLY

<table>
<thead>
<tr>
<th>Building</th>
<th>Timber Floor with Concrete Topping</th>
<th>Steel composite Floor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volume</td>
<td>Timber: 0.625</td>
<td>Steel: 0.03125</td>
</tr>
<tr>
<td></td>
<td>Concrete: 0.25</td>
<td>Steel composite: 0.427</td>
</tr>
<tr>
<td>Mass</td>
<td>Timber: 20.625</td>
<td>Steel: 1.03</td>
</tr>
<tr>
<td></td>
<td>Concrete: 37.5</td>
<td>Steel composite: 192.15</td>
</tr>
<tr>
<td>CO2/mass</td>
<td>Timber: 0.57</td>
<td>Steel: 4</td>
</tr>
<tr>
<td></td>
<td>Concrete: 1.15</td>
<td>Steel composite: 1.15</td>
</tr>
<tr>
<td>CO2 emiss</td>
<td>Timber: 11.75</td>
<td>Steel: 154.5</td>
</tr>
<tr>
<td></td>
<td>Concrete: 21.37</td>
<td>Steel composite: 192.15</td>
</tr>
<tr>
<td>Total</td>
<td>33.12</td>
<td>364.65</td>
</tr>
<tr>
<td>Ratio</td>
<td>1</td>
<td>10</td>
</tr>
</tbody>
</table>

Source: University of Washington Arch 503 Studio
Nov. 2016

Carbon Savings
UW Center for Wood Innovation
Susan Jones | UW Arch 503 | Fall 2016
grow your city!
architect as advocate
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UNITED NATIONS ECONOMIC COMMISSION FOR EUROPE, CANADA NOVEMBER 5, 2018

regulatory action
real life

testing
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photos: Jason Smart, American Wood Council

data driven results
The emergence of mass timber in the US fight against climate change

United Nations Economic Commission for Europe, Canada, November 5, 2018

Atelier Jones

Up to 18 story buildings

Business Occupancy [Group B]

*Building floor-to-floor heights are shown at 12’-0” for all examples for clarity in comparison between 2015 to 2021 IBC codes.
type 4A protected
type 4C majority exposed
MASS TIMBER

Design and Research

embracing risk

Susan Jones
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THE Emergence of mass timber in the US fight against climate change

UNITED Nations economic commission for europe, Canada  November 5, 2018  ATELIERJONES

Afforestation
THE EMERGENCE OF MASS TIMBER IN THE US FIGHT AGAINST CLIMATE CHANGE: FROM FORESTS TO CITIES

UNITED NATIONS ECONOMIC COMMISSION FOR EUROPE SEVENTY-SIXTH SESSION OF THE ECE COMMITTEE ON FORESTS AND THE FOREST INDUSTRY VANCOUVER, BRITISH COLUMBIA NOVEMBER 5, 2018

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