A Necessary Evolution: Three Companies Instigate Change via Offsite Construction

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Curated by Alison Keay and Christopher Nielson

Northeast Sustainable Energy Association (NESEA)
March 29, 2023
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HOLZRAUM SYSTEM | Passive House Accelerator
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- Health and Comfort
- High Performance
- Predictability and Expertise
- Cost efficiency via Library of Designs
Unity/Bensonwood panel production facility

Fully automated

Keene, NH
20,000 sf solar array offsets ~75% of energy use at factory

Keene, NH
Rapid on-site assembly

1-2 weeks typical
“Configured” floor plans

Allow for semi-customization

Add "bumps" or "connectors"

Choose from pre-designed layouts that plug and play into floorplan
Offsite manufacturing requires decisions upfront and robust communication systems.
3D model/virtual fabrication (VFAB)

Build it virtually before building it in real life

----> QC! <<<

Export files to CNC machinery
Dense pack cellulose machine

(Pink stuff is panel - to - panel connection)
Air & vapor control layer:

Taped Zip sheathing

(Never rains in the factory!)
Vapor & air control layer:

- Tapes at interior sheathing seams
- Gaskets between connections
Pre-formed exterior penetrations

Air sealing made easy(ier)
Pre-formed Penetrations

Just fill with foam once MEPs have run their materials
Collaborative Design to Manufacturing Delivery System

Architecture Energy Modeling
CPHC
Ilka Cassidy Founder

Heavy/ Mass Timber Production Design
CPHC
Steve Hessler Founder

Software Development
David Hessler Founder

BUILDINGENERGYBOSTON
Single Integrated Manufacturing Model
Data & Attribute Organization
It’s a Fan!

It’s a Spear!

It’s a Wall!

It’s a Tree!

It’s a Rope!

It’s a Snake!
### Issues for Hooper Residence

<table>
<thead>
<tr>
<th>Issue ID</th>
<th>Created On</th>
<th>Description</th>
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<tbody>
<tr>
<td>#2</td>
<td>1/22/21, 10:57 AM</td>
<td>Test Hooper Issue</td>
</tr>
<tr>
<td>#31</td>
<td>1/22/21, 1:06 PM</td>
<td>Window Collision</td>
</tr>
<tr>
<td>#22</td>
<td>1/23/21, 6:55 AM</td>
<td>need details for all @ home in center of foundation</td>
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<tr>
<td>#33</td>
<td>1/27/21, 9:38 AM</td>
<td>Build house now to have call</td>
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<tr>
<td>#37</td>
<td>1/28/21, 3:06 AM</td>
<td>Builder scope makers on columns - connection method</td>
</tr>
<tr>
<td>#38</td>
<td>1/28/21, 10:42 AM</td>
<td>what does this equipment?</td>
</tr>
<tr>
<td>#42</td>
<td>1/21/21, 8:40 AM</td>
<td>Garage main door - rough opening</td>
</tr>
<tr>
<td>#52</td>
<td>1/21/21, 7:52 AM</td>
<td>request for header framing substitution</td>
</tr>
<tr>
<td>#53</td>
<td>1/21/21, 4:25 AM</td>
<td>how to nail framer onto side?</td>
</tr>
<tr>
<td>#54</td>
<td>1/21/21, 5:33 AM</td>
<td>threaded stud at midpoint bottom side of garage doors (steel beam)</td>
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<tr>
<td>#55</td>
<td>1/21/21, 7:10 AM</td>
<td>need connection at bottom of post - master bathroom balcony beam</td>
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<tr>
<td>#57</td>
<td>1/21/21, 7:45 AM</td>
<td>need all of connector at this location</td>
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<tr>
<td>#58</td>
<td>1/21/21, 8:08 AM</td>
<td>Three way Out. Connection 1st cut framing for upper level (sawdust)</td>
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<tr>
<td>#59</td>
<td>1/21/21, 9:34 AM</td>
<td>Cut Cut @ Replica - report for safety</td>
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<tr>
<td>#61</td>
<td>1/21/21, 4:19 PM</td>
<td>Framing center @ fascia rem window</td>
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<td>#62</td>
<td>1/21/21, 7:15 PM</td>
<td>Steel plates need to be notched into b.s. at per.</td>
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<tr>
<td>#65</td>
<td>1/21/21, 7:26 PM</td>
<td>Balcony framing lag bolts on record</td>
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<td>#68</td>
<td>1/21/21, 8:12 PM</td>
<td>Elevations of plates on thermal break connection</td>
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<tr>
<td>#70</td>
<td>1/25/21, 8:59 PM</td>
<td>curtain track channel - should it be cut a bit lower?</td>
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<tr>
<th>Type</th>
<th>Status</th>
<th>Assigned To</th>
<th>Perspective</th>
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**Nearest Comment**

- Talks to Luke, he said that since RSA isn't responding to it well just to make it a smaller door no change required, closing the issue.
- OK. Notch plate into bottom of beam for flush bottom connection. Do not overcut notch.
- See forwarded email from RSA's response to this morning. Column cap will be shop welded. Stiffer plate will have to be field welded.
Enabling better buildings by making holistic building simulation common place
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Thank You