Skills & Knowledge for Sustainable Construction in Leeds

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Performance gap

Embodied Carbon

Zero carbon in use

Flexible and adaptable buildings

Accessibility

Low impact materials

Water efficient

Supporting good employment

Flood resilient

Supporting good health

Etc, etc...

Accessibility

Supporting good health

Etc, etc…
Who influences whether or not sustainable construction happens?

Lots of research on sustainable design
Lots of research on what building users want and do

But that’s not the same as what happens.
Manufacturers → Merchants/Wholesale → Construction Firms → Building users/clients
Figure 3: The home energy retrofit system
Manufacturers → Merchants/Wholesale → Construction Firms → Building users / clients
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Construction Supply Chain Network?

Key:
- Potential selection pressures
- Conventional linear model of supply chain

Owen et al, 2017 eceee
A workshop to “get the system in the room” at Leeds College of Building 23rd January 2018

Developers, trainers, train-the-trainers, suppliers, researchers, architects, builders/contractors, council officers …
Three themes emerged:

- Whole Building Performance
- Social Value
- Lean Manufacture
Whole Building Performance

Building performance expertise for the trades – on site toolbox talks, for example achieving quality and good airtightness through communication and awareness between trades.

Clerk of works role – a formal set of competences so that someone has the overview.

Image sourced from: Roberts et al, 2005
## Whole Building Performance summary

<table>
<thead>
<tr>
<th>What skills?</th>
<th>Who should learn?</th>
<th>How can we deliver it?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overview of need for good building performance – climate change, health etc</td>
<td>Builders/ trades people for toolbox talks</td>
<td>Toolbox talks on new sites pre, during and post builds</td>
</tr>
<tr>
<td>Practical issues and common challenges</td>
<td>Managers for higher level ‘clerk of works’ type top-up</td>
<td>Online / virtual tools with pics and quizzes</td>
</tr>
<tr>
<td>Air-tight factors and thermal bridging</td>
<td></td>
<td>One-week intense courses</td>
</tr>
<tr>
<td>Air movement</td>
<td></td>
<td>Higher level university courses for clerks of works</td>
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<tr>
<td>Measuring building fabric</td>
<td></td>
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</tbody>
</table>
Social Value

• What do you get from “slow” construction?
• LATCH is the inspiration – one to one training
• Can projects deliver social benefits through employment, skills development, community building as they are carried out?
• Small is valuable and effective the challenge is to replicate not to grow.
## Social Value summary

<table>
<thead>
<tr>
<th>What skills?</th>
<th>Who should learn?</th>
<th>How can we deliver it?</th>
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</thead>
<tbody>
<tr>
<td>Communication</td>
<td>All trades</td>
<td>NVQ additions</td>
</tr>
<tr>
<td>Awareness of other trades</td>
<td>All levels of construction professions</td>
<td>Formal courses</td>
</tr>
<tr>
<td>Respect of quality and</td>
<td></td>
<td>Continuous learning</td>
</tr>
<tr>
<td>performance – and why!</td>
<td></td>
<td>Time on social enterprises in apprenticeship</td>
</tr>
<tr>
<td>Choice of materials</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Collaboration</td>
<td></td>
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</tbody>
</table>
Lean Manufacture

• Quality principles and processes
• ‘Engineering’ precision
• Minimum waste
• Learning and continuous improvement
• Breaking down barriers between trades – upskilling whilst de-skilling to multi skill on-site.

Image sourced from: @CituUK on Twitter
## Lean Manufacture summary

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<th>What skills?</th>
<th>Who should learn?</th>
<th>How can we deliver it?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lean principles:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Efficiency</td>
<td>New entrants</td>
<td>Blended approach: Some on the job, some classroom, minimal e-learning</td>
</tr>
<tr>
<td>- Less waste</td>
<td>New entrants</td>
<td>- New entrants: College</td>
</tr>
<tr>
<td>- Accuracy</td>
<td>Existing offsite manufacturing staff</td>
<td>- Existing staff: on the job delivered by factory managers, line leaders etc</td>
</tr>
<tr>
<td>Manufacturing processes</td>
<td>Individuals new skills research evidence highlights</td>
<td>Industry apprenticeship routes</td>
</tr>
<tr>
<td>Digital technologies</td>
<td></td>
<td>Ambassador talks by lean specialists</td>
</tr>
</tbody>
</table>
What’s “for Leeds” about all this?

Building performance – not much

Social Value – works with the grain of Leeds tradition of activism

Lean Manufacture – Leeds-based firms Citu, Ilke Homes, Bauman Lyons and others are investing heavily in offsite/modular building manufacture

Image sourced from: Leeds-list.com
What next?

• SRI briefing note: http://www.see.leeds.ac.uk/research/sri/briefing-notes/
• Hopefully – continuation project with a developer
• Leeds College of Building
  T levels
  South bank campus / city lab
• Leeds Beckett ongoing technical / performance research
• Offsite Housing focused Impact Accelerator Project
Thank you for listening!

Questions welcome.

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