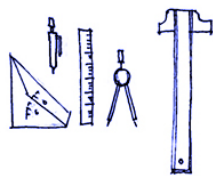
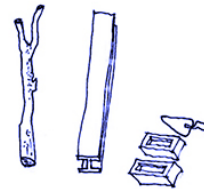


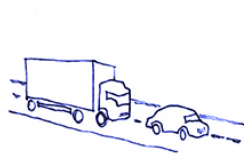
Technology and Equality in Construction



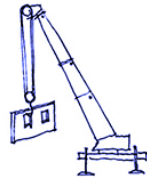
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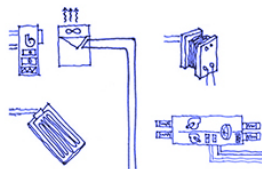
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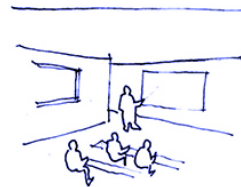
TRANSPORT



BUILD



SYSTEM



USE

Beyond the Ceiling, 2019

The following article was co-written written by engineer Dan Cash with architect Zoë Berman and as a blog on Beyond the Ceiling.

In the past few years, the challenges of gender inequality and discrimination that women face in their working lives has been brought into focus. Within the wider context of growing levels of awareness, the construction industry is a working environment that continues to be widely male dominated and lacks diversity. Recent data on the gender pay gap put the construction industry bottom of the pile when it comes to pay equality (1).

This week an analysis of the New Civil Engineer 100 Awards 'Diversity Leader of the Year' (2) found that only 2 of the 9 firms nominated have female engineers in leadership positions. This isn't diversity and it means that there will be bias - unconscious or otherwise - in the decisions made in these organisations, that impact on infrastructure, design and the direction of thinking on projects. Such statistics rightly shine a light on the lack of female presence in design and managerial roles. But building sites themselves are even less diverse. It is unfortunately not uncommon to come across inappropriate comments being made towards women; the atmosphere of sites is often overtly macho and welfare facilities and safety equipment that enable women to work on site is often lacking or non-existent. We've recently visited sites where all the sites boots were in all male sizes and the women's loos was used as a storage cupboard. Another site did have site boots in sizes 4-7 - but, all of these were bright pink.

There is scope for new forms of technology to play a role towards making improvements in the diversity of delivering buildings. In a recent discussion on volumetric modular manufacturing, we learned how an offsite manufacturing facility had a much higher ratio of female operatives than on a typical on-site set up. Room-sized modular elements are moved along a production line, and teams add components and finishes, until the completed assembly is ready to send, from factory to site. Improvements in gender equity is an unanticipated benefit of design for manufacture and offsite assembly. The offsite environment was described as organised and collaborative.

Factory environments offer improvements in working conditions and welfare, improvements in safety and everyone - regardless of prior experience - is given from-scratch training from the outset, to operate relatively new machining systems.

Within offsite manufacturing hubs, the perceived requirement for physical strength becomes a secondary issue. The out-of-date assumption that men are more physically suited to vocational site work becomes academic, as offsite assembly systems are set up to literally pass on the heavy lifting to machines and robotic methods. This opens up this line of work to many people who otherwise might have been excluded from site work.

The growing focus on pre-assembly methods stands to open the industry in positive ways - creating more equal, open and safe working spaces and tapping into a wider set of skills regardless of gender or physical ability. There is plenty of evidence that suggests gender-balanced work environments are more positive places to work than homogenous ones. In economic terms, widening opportunities for more people to enter the construction stands too to help address the considerable labour shortage the industry faces.

There are concerns around the swing towards volumetric, pre-assembled modular construction systems as a concept - and the problems these systems bring in terms of increased need for transportation, the challenges around the scale of investment needed in off-site factories and the financial sustainability (as discussed in a past blog - [THE DASH FOR OFFSITE](#)). However, the benefits that exist, in creating more equitable work places should be embraced. We should learn from these more organised models of construction and the working environment they create and explore how the application of technology and automation can lead to improved equality across all types of construction.

The industry is lagging well behind others when it comes to diversity, in all its forms. We must move fast to overcome this, and campaign at a range of levels for design and realisation of projects to be supportive of all people. What is good for women, is good for everyone.

The newly formed Part W Collective (3) seeks to raise greater awareness of these very issues. There is scope for technology to be used to contribute towards fairer, more varied and more open models of delivering buildings. Offsite construction might not hold all the answers to how we should build; but when it comes to equality in delivery, it could give us some clues.

1. <https://www.theguardian.com/news/ng-interactive/2018/apr/05/women-are-paid-less-than-men-heres-how-to-fix-it>
2. <https://twitter.com/stonestair/status/1116621779869425664>
3. <https://www.part-w.com/>

