

3 September 2024

Are people who work in mass timber buildings happier, healthier and more productive?

Mass timber construction uses engineered wood components to create buildings, offering a structurally efficient, yet low carbon alternative to concrete and steel. It can be used for everything from high-rise office buildings and multi-family structures to houses and education facilities.

Its increasing popularity reflects its outstanding environmental benefits and building performance, but its impacts on the people who construct and work in mass timber buildings are less clear.

A recent project for Building 4.0 CRC – [Project #60 Mass Timber Wellness](#) – introduced an innovative empirical approach to explore the potential benefits of mass timber construction for people and organisations, focusing on the workplace.

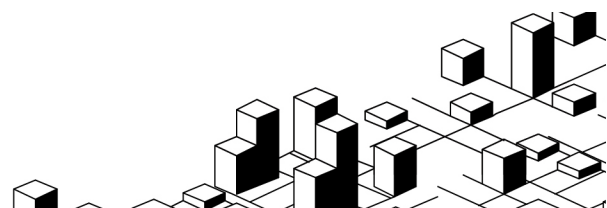
The research team introduced a more holistic mixed-method behavioural approach to studying the behaviour, wellbeing and productivity of people working in and on mass timber buildings. They integrated self-reported questionnaires, objective biomarkers (heart rate variability and hair cortisol) and indoor environmental quality measures (e.g. ventilation and air quality, thermal comfort, acoustics and lighting), to explore the impacts and benefits for both office workers and construction workers:

- The office workers worked in 3 different office settings: a controlled laboratory environment, an open plan office and an open plan office with a timber interior.
- The construction workers worked in a timber space (ICON, in Wellington St in Melbourne) for 3 months before moving to a building with a concrete structure.

The survey results revealed office workers' satisfaction with building image, thermal comfort and artificial lighting varied significantly, depending on the setting. For example, workers in the open plan office with a timber interior were more satisfied with temperature, air quality, lighting and overall comfort than those in the controlled laboratory setting. The low number of people who responded to the survey meant some factors were not significant.

The survey results for construction workers did not indicate a relationship between the building environment and workers' productivity, health or comfort. However, the objective biomarker data did show workers on mass timber construction sites had lower levels of cortisol (stress), which may improve worker productivity and general wellbeing.

This study highlights how wellness information can help policy makers, developers, business owners, construction professionals, timber industry stakeholders, environmentalists and research make more informed decisions. Next steps could include exploring how to combine biomarker and quantitative survey data to measure both wellness and productivity, both in offices and on construction sites. This kind of information would be instrumental to support broader adoption and use of mass timber construction.



More about Project #60

The research team applied a mixed-method behavioural approach to studying occupant behaviour, wellbeing and productivity. The analysis included descriptive statistics, *t*-tests, ANOVA and linear regression to compare differences between office settings and assess the relationship between environmental variables and overall satisfaction in indoor environmental quality, comfort, productivity and health. It also included heart rate variability and Hair Cortisol results.

The research team was led by Dr Stephen Whyte from Queensland University of Technology's School of Economics and Finance, and Deputy-Director of the Centre for Behavioural Economics, Society and Technology (BEST), and ARC ITTC Centre for Behavioural Insights in Technology Adoption (BITA). Other team members were Ryotaro Kaburagi, Victor Gan, Christhina Candido, Behnaz Avazpour, Dorsa Fatourehchi, Ho Fai Chan, Yue Dong, Uwe Dulleck, Sabine Finlay, Jin Zhou, Nick Hewson, Tong Li, Duncan Maxwell, Craig McNulty and Zoltan Sarnyai.

Partner organisations on the project were Sumitomo Forestry, Viridi Group, Monash University, University of Melbourne and Queensland University of Technology.

About Building 4.0 CRC

Building 4.0 CRC is a research initiative co-funded by industry partners and the Australian Government. It is tasked with revolutionising how buildings are designed, constructed and operated to build faster, safer, more sustainably and at a lower cost.

Building 4.0 CRC focuses on 4 research areas – Industrialisation, Digitalisation, Sustainability, and People, Practices and Culture – with a particular drive to create significant demonstration projects where industry, government and the community can experience first-hand those buildings created or retrofitted using innovation and new methods of construction.

Now in its fourth year (of seven), Building 4.0 CRC is working with industry and governments to achieve an 80% reduction in construction waste; 50% cut in CO2 emissions and a 30% decrease in production costs through the development of a more industrialised approach to building. It is also targeting the training of 7,000 apprentices in preparation for the new ways we will build in the future, and the development of an internationally competitive, dynamic and thriving Australian advanced manufacturing sector focussed on building.

To date, Building 4.0 CRC has been involved in 63 collaborative research projects, either active or completed, with another 40 in the pipeline.

