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New NTU sports hall makes waves with innovative timber construction technology

Building process involves assembling parts pre-fabricated off-site, reducing on-site manpower needs by 25 per cent and structural construction time by 33 per cent

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by

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Building with Mass Engineered Timber

Singapore

THE Nanyang Technological University (NTU) on Monday officially unveiled its new S\$35 million sports hall called The Wave, the first large-scale construction project in South-east Asia to use Mass Engineered Timber (MET) - an innovative timber construction technology that reduced on-site manpower for the project by 25 per cent and structural construction time by 33 per cent.

This is because the building process involves assembling parts that were pre-fabricated off-site.

The adoption of such new technologies will set the scene for the construction sector in the coming years. Currently, only about 10 per cent of construction projects use such methods that boost productivity and efficiency; the government aims to increase this figure to 40 per cent by 2020, Minister for National Development and Second Minister for Finance Lawrence Wong said at the opening of The Wave.

"We have major infrastructure projects in the coming years . . . if we continue relying on existing building methods for all of these infrastructure, we will end up with a far larger pool of foreign workers than we can possibly accommodate in Singapore," said Mr Wong, adding that a "bottle-neck" will form that will cause projects to be deferred.

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But the use of new technologies such as MET can potentially allow "billions more in projects" to be carried out, with the same number of workers today, he added.

MET is much stronger than concrete or steel when comparing their weight-to-strength ratios.

This allows the 72-metre wave-like timber roof of NTU's new sports hall to be supported without any internal columns, opening up a cavernous space that can host three full-sized basketball courts or 13 badminton courts.

Close to 1,000 mechanised retractable seats have also been installed.

The Wave, which took 18 months to complete, also features walls with special metal coils that have chilled water flowing through them, cooling the air that enters the hall. In addition, each external wall has two layers with an insulating pocket of air between them.

NTU estimates that there will be energy savings of over 40 per cent as there will be no need for fans or conventional air conditioning to keep people in the sports hall cool.

Currently, three other smaller-scale local projects have adopted the use of MET: the Building and Construction Authority (BCA) SkyLab Visitor Gallery, Block 81 of the JTC LaunchPad @ one-north, and the Singapore Sustainability Academy.

Kang Choon Boon, managing director of B19 Technologies, a local SME which was the contractor for the project, reckons that costs for construction projects using MET will be at least 20 per cent less than those using concrete and steel as the technology becomes more common in Singapore.

Timber for The Wave was sourced from sustainable forests in Austria.

The usual maintenance checks for buildings will apply to the new sports hall.

"In fact, I would say that it needs less maintenance," said Mr Kang, adding that timber is "very lasting".

The timber used for The Wave has been treated for protection against termites, and has good fire-resistance properties due to its thick cross sections.

"But timber is just one solution," said BCA chief executive John Keung. "We have other kinds of building construction methods that are equally productive and probably sustainable. We are promoting this design for the manufacturing and assembly concept - try to do as much work as possible off-site in the factory."

For instance, the BCA is pushing for government land sales (GLS) projects to use innovative construction technologies such as MET.

"They can build faster, with less workers, and less disturbance to the neighbourhood," said Dr Keung.