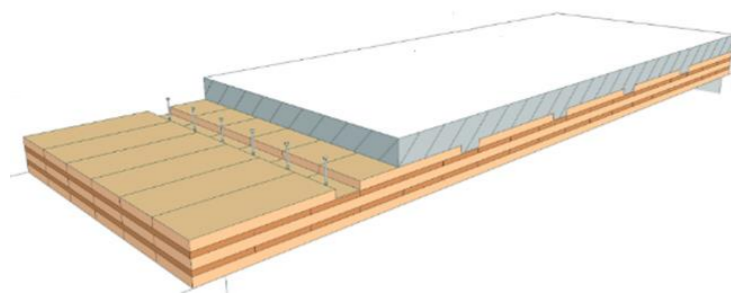


A structural lightweight concrete solution for a timber-concrete composite floor application

Introduction:

The hybrid composite of using timber and concrete referred as TCC structure as an attractive application for residential and commercial buildings. However, the drawback of using conventional concrete in such system is its heavy weight, weakening the benefit of using timber as lightweight structural material. Hence, using a lightweight concrete (LC) in TCC structure has increasing application potential.

However, due to limited available studies on such composite structure, the structural performance of timber-lightweight concrete composite system is still less known, resulting a lack of guidelines within current codes that define the specific use of LC within TCC structures.

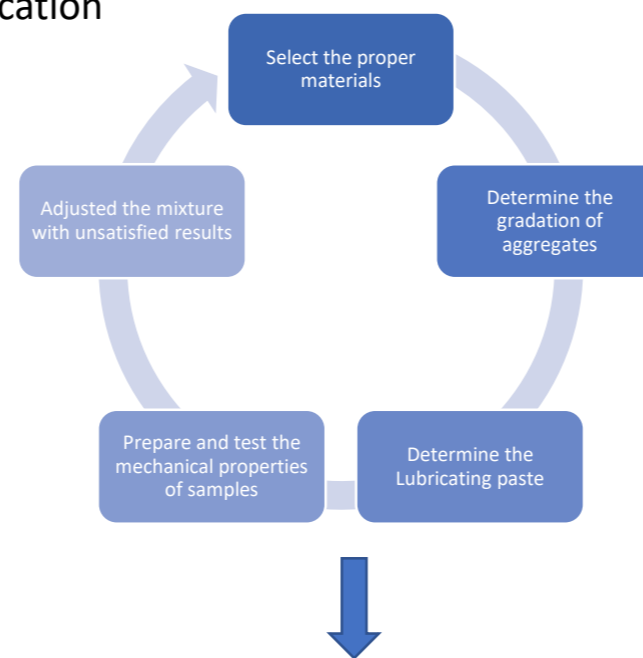


Research question:

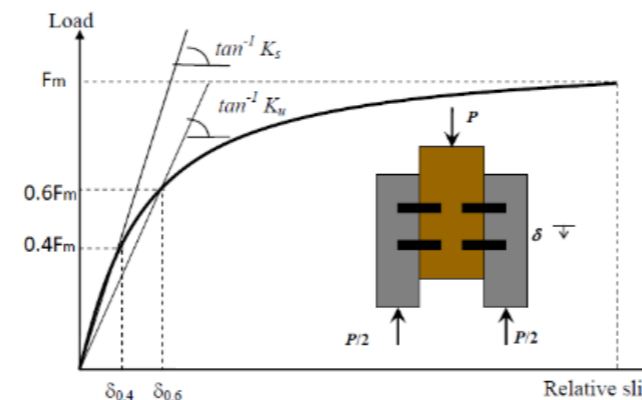
1. How does structural lightweight concrete affect the structural performance of the TCC floor system?
2. How to improve the performance of timber-lightweight concrete composite (TLCC) floor system through numerical analysis?

Methodology

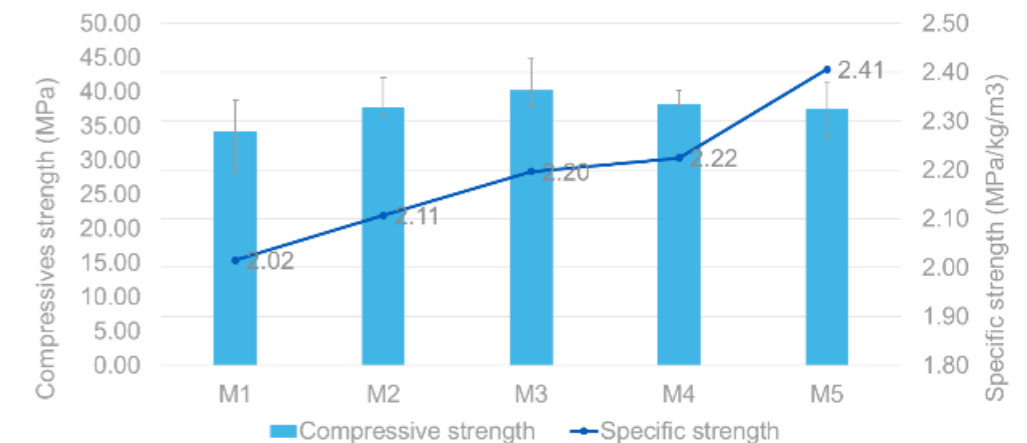
1. To develop the good mixture of structural lightweight concretes that can reach minimum strength 32MPa to meet the structural requirement for floor application



2. Investigate the effect of using structural lightweight concrete on the structural performance of TCC structure



Result and discussion:



Based on the experimental results, it is shown that the possibility of developing the mixture of lightweight concrete with minimum strength 32MPa for floor application.

Key findings:

- The properties and gradation of aggregates play the significant role in both strength and density of lightweight concrete
- Higher cement content can provide better strength and workability without much increased in concrete density
- Curing condition has significant impact on the strength of lightweight concrete

More Information

Tori TANG

Email: tiatang@student.unimelb.edu.au

Supervisors: Prof. Tuan Ngo; Dr Xuemei Liu; Dr Ali Kashani