وزارة التعليم
Ministry of Education

الملحقية الثقافية السعودية في لندن
Saudi Arabian Cultural Bureau in London

Newcastle University

International Society for Industrial Ecology

International Ecology Day 2021

21ST Jun 2021

12:00 - 14:00 (UK Time)

Integration BIM and MFA to assess the environmental impacts of building materials selection at the design stage

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Outline

- Aim of this presentation
- Background and Challenges
- Integration process
- Preliminary results
- Recap
- Next steps

Aim of Presentation

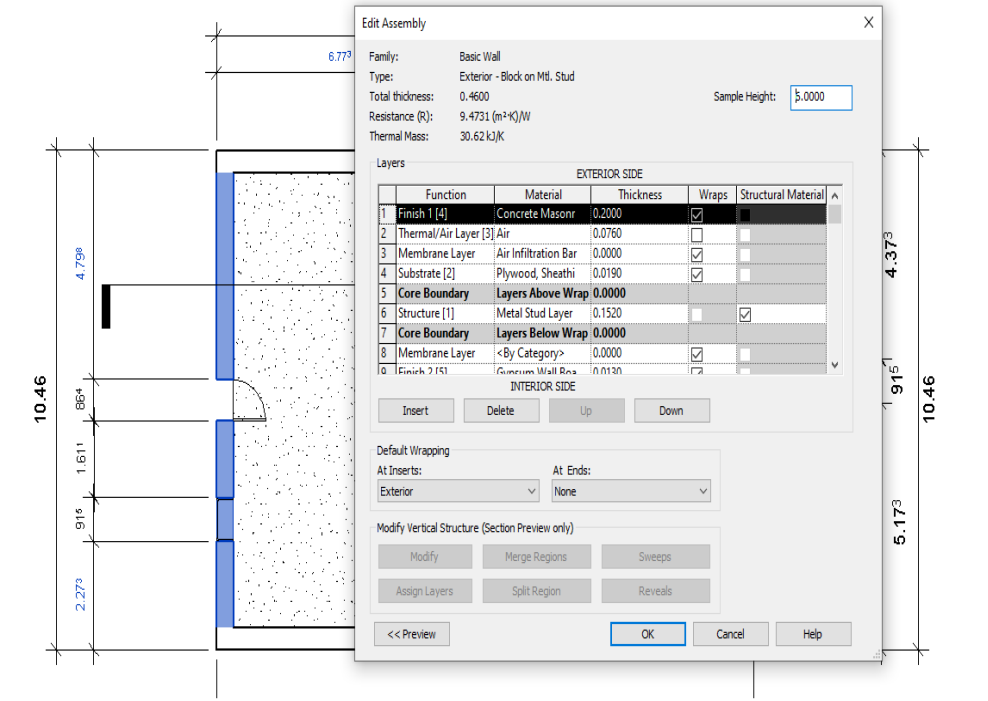
- Present my Current research work
- Describe the Project Aim
- work in progress (2 year left for my PhD)
- I want to connect with others and learn from you

Background

- **Buildings** are responsible for more than **40%** of global energy use and **18%** GHGs (IPCC 2013).
- In the UK, **30-70%** of **CO_2** emissions reported from buildings in 2015 (UKGBC 2015).
- **Materials** used in buildings have significant **impacts** to **environment** (Meex et al. 2018; Heeren et al. 2015).

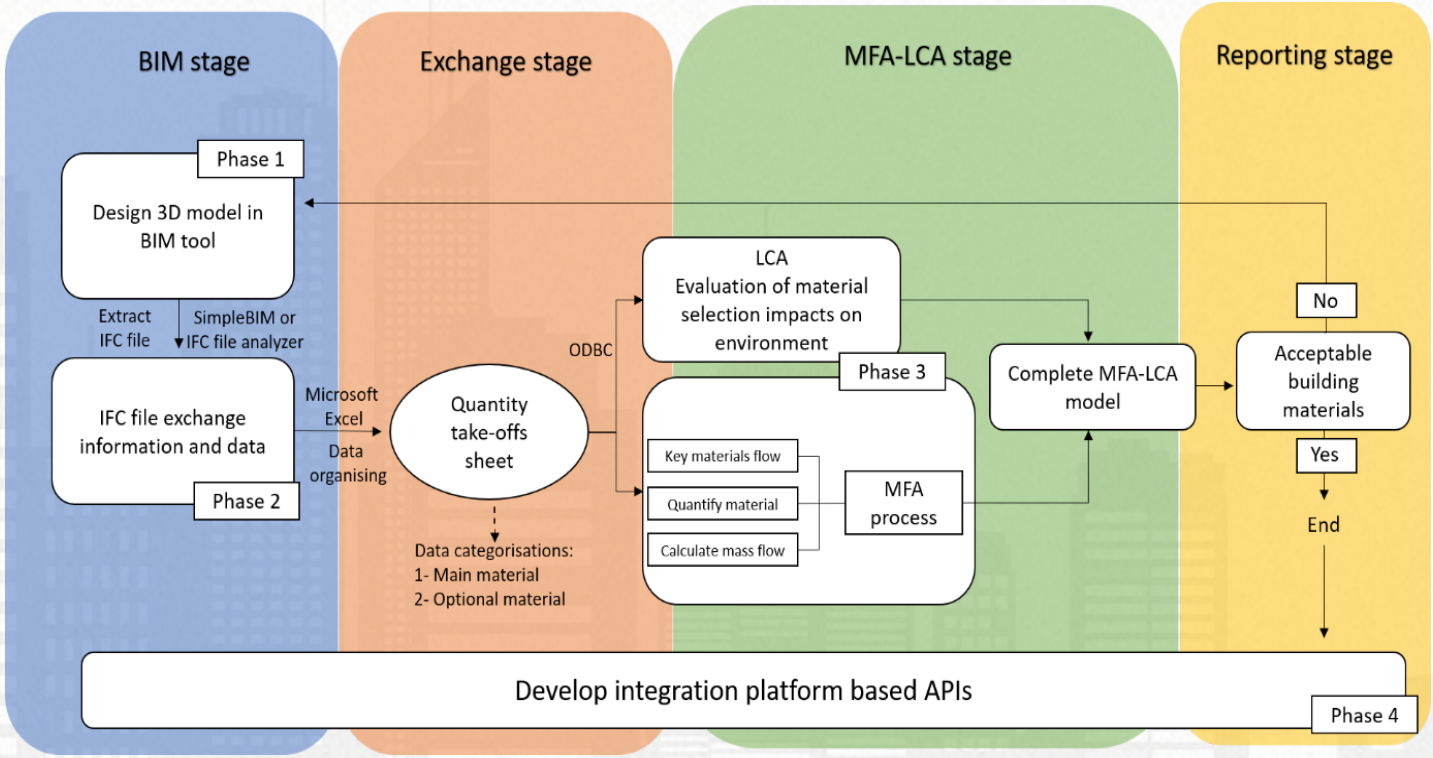
Challenges

- Material selection challenges Architects (Haruna et al. 2020).
- No tool or data for environmental materials (Meex et al. 2018).
- Architects and designers left alone.



Integration process

- The integration is 4 stages process
- Process started from BIM stage.
- Revit is BIM software and Umberto is MFA-LCA software

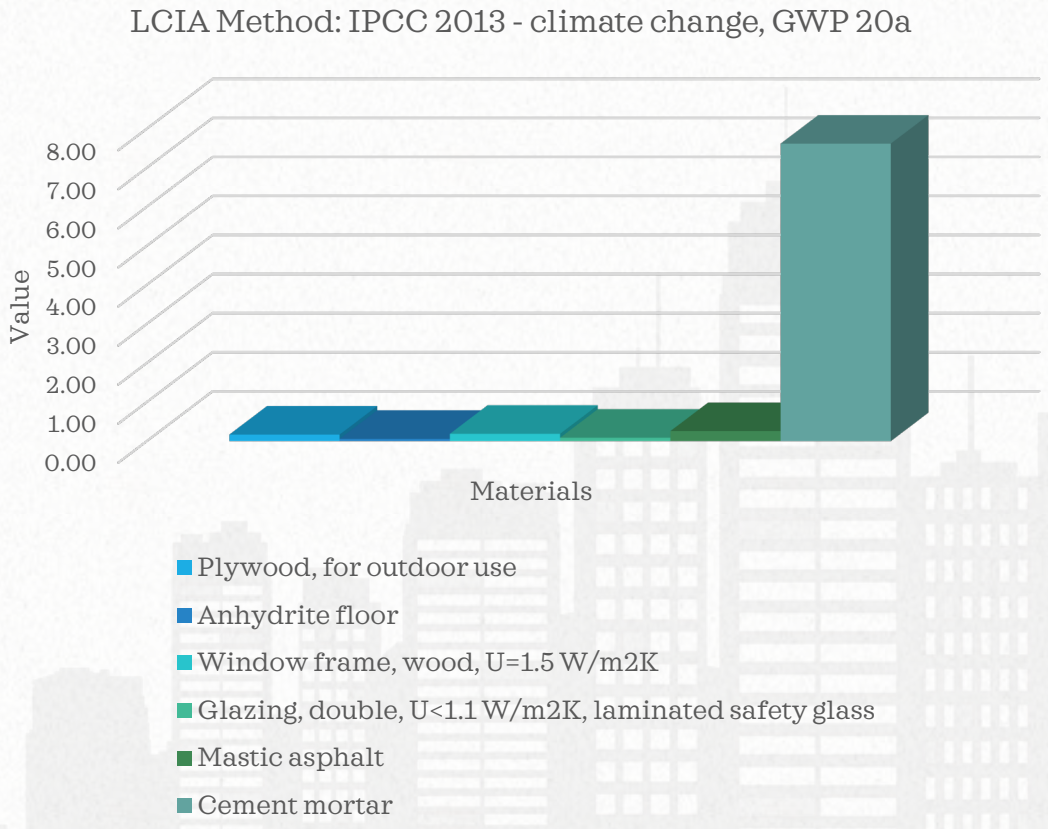


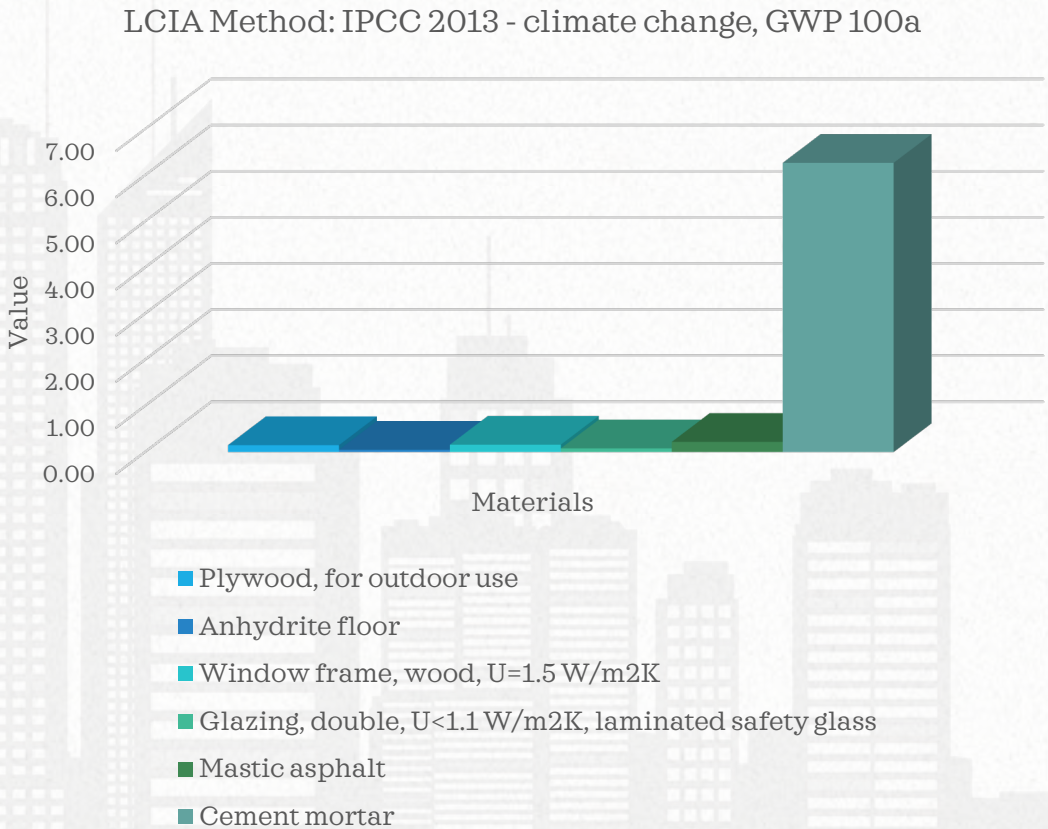
Preliminary results

- One Room building
- Generic material used
- Sizes and dimensions are estimated
- Design by Revit software

Building Materials					
Product	Unit	Name	Type	Amount	Total
Wall	mm	Basic Wall:Generic - 250mm	STANDARD	806647mm	806647
Door	mm	M_Single-Flush:0864 x 2032mm:202080	STANDARD	1755mm	1755
Window	mm	M_Fixed:0915 x 1830mm:202158	STANDARD	202158mm	202158
Floor	mm	Floor:Generic Floor - 400mm:201837	STANDARD	201837mm	201837
Roof	mm	Basic Roof:Generic Roof - 300mm:201975	STANDARD	201975mm	201975
				Total	1414372

Preliminary results





Recap

- Building materials impact environment
- There is no tool to specify environmental building materials.
- Architects and designers are alone in specifying building materials
- The integration of BIM and MFA will help selecting building materials.
- Selection environmental materials at design stage.

Next steps

- Still have two years for my PhD
- Connect with others with same interest
- Materials selection process is still a gap need to fill
- Design stage can reduce environment impacts
- Need more work with LCA
- Project case study

Thank you so much for your attention

Newcastle University

For contact and collaboration

Acknowledgments:

- I would like to thank the ISIE and my sponsor
- A special thanks and gratitude to my supervisors for their continuous support and guidance
- Lastly, I am grateful to my family and fiancé for all encouragement and love.

Any Questions ?

SCAN ME

References

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