



THE HONG KONG
POLYTECHNIC UNIVERSITY
香港理工大學



國家鋼結構工程技術研究中心香港分中心
Chinese National Engineering Research Centre
For Steel Construction (Hong Kong Branch)



green
building
award 2021
環保建築大獎



HKGBC
香港綠色建築議會



Announcement

We are honoured to receive
**Merit Award under Research and Planning Category of
the Green Building Award 2021**

for our research work on
Expandable housing by Modular Integrated Construction

as announced by the ***Hong Kong Green Building Council***
at the Virtual Award Presentation Ceremony on 28 April 2022.

Expandable housing by Modular Integrated Construction

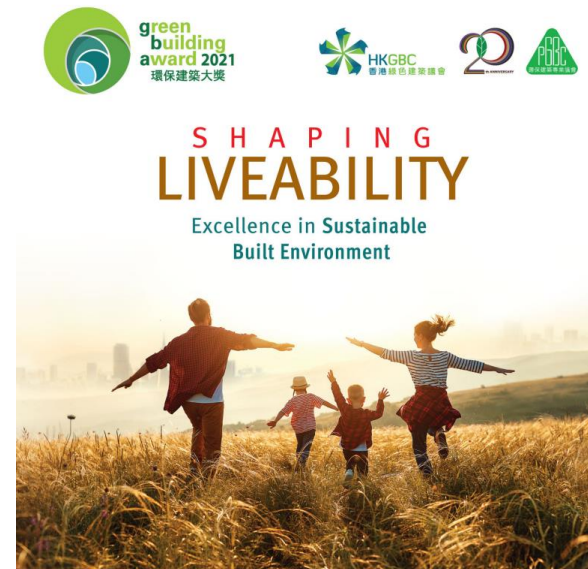
Principal Investigator: Dr. Calvin Luk (DISI)
Co-Principal Investigator: Prof. K. F. Chung (CNERC)
Co-Investigators: Ir Jiang Hao (CNERC)
Dr. Aria Yeng (School of Design)
Leigh & Orange Architects, Construction Industry Council and WSP Engineers.

Jury's Citation:

This research project has developed a design of expandable-retractable, reusable MiC system with engagement with various stakeholders and user groups, so as to better meet not only the different accommodation needs and configurations of transitional social housing, but also the module size limits for road transportation and on-site installation.

這研究項目研發的可擴展及收縮、可重用的組裝合成建築系統，獲得不同的持份者和用戶群組參與，不但能更有效地滿足不同的住屋需求和制訂過渡性房屋，也能靈活配合陸路運輸和現場安裝對組件體積的限制。

For details, please check out: <http://www.gba.org.hk/content.php?uid=28>





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RESEARCH & PLANNING CATEGORY RESEARCH

Organisers



MERIT AWARD

Expandable housing by Modular Integrated Construction



Client / Developer: Chinese National Engineering Research Centre for Steel Construction (Hong Kong Branch), The Hong Kong Polytechnic University

Project Team:

Principal Investigator

Jockey Club Design Institute for Social Innovation,
The Hong Kong Polytechnic University

Co-Principal Investigator

Chinese National Engineering Research Centre
for Steel Construction (Hong Kong Branch),
The Hong Kong Polytechnic University

Civil, Structural & Mechanical Engineer

Chinese National Engineering Research Centre
for Steel Construction (Hong Kong Branch),
The Hong Kong Polytechnic University

Architect

Leigh & Orange

Construction Technology & Design Engineer

Construction Industry Council

Sustainability & Building Services Engineer

WSP

Research Co-Investigator

School of Design, The Hong Kong Polytechnic University



Research & Planning Category 研究及規劃類別
Research 研究

MERIT AWARD 優異獎

Expandable housing by Modular Integrated Construction 組裝合成建築法的伸展式房屋



Team or Organisation Name
Jockey Club Design Institute for Social Innovation, The Hong Kong Polytechnic University

Client / Developer
Chinese National Engineering Research Centre for Steel Construction (Hong Kong Branch), The Hong Kong Polytechnic University

Location
Hong Kong

Commencement date
1 April 2019

Completion Date
9 June 2021

Principal Investigator
Jockey Club Design Institute for Social Innovation, The Hong Kong Polytechnic University

Co-Principal Investigator
Chinese National Engineering Research Centre for Steel Construction (Hong Kong Branch), The Hong Kong Polytechnic University

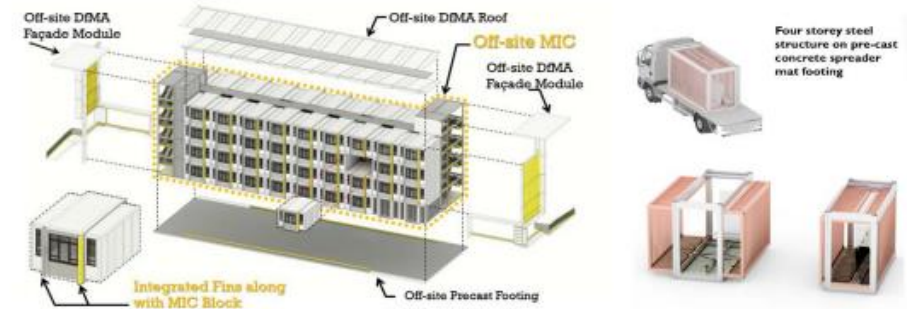
Civil, Structural & Mechanical Engineer
Chinese National Engineering Research Centre for Steel Construction (Hong Kong Branch), The Hong Kong Polytechnic University

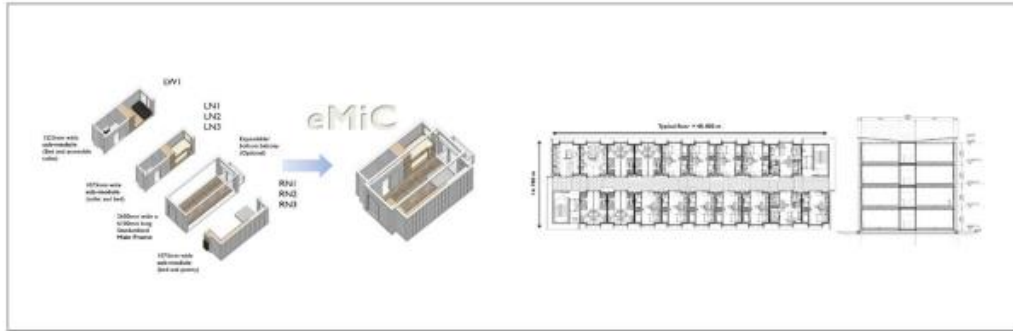
Architect
Leigh & Orange

Construction Technology & Design Engineer
Construction Industry Council

Sustainability & Building Services Engineer
WSP

Research Co-Investigator
School of Design, The Hong Kong Polytechnic University



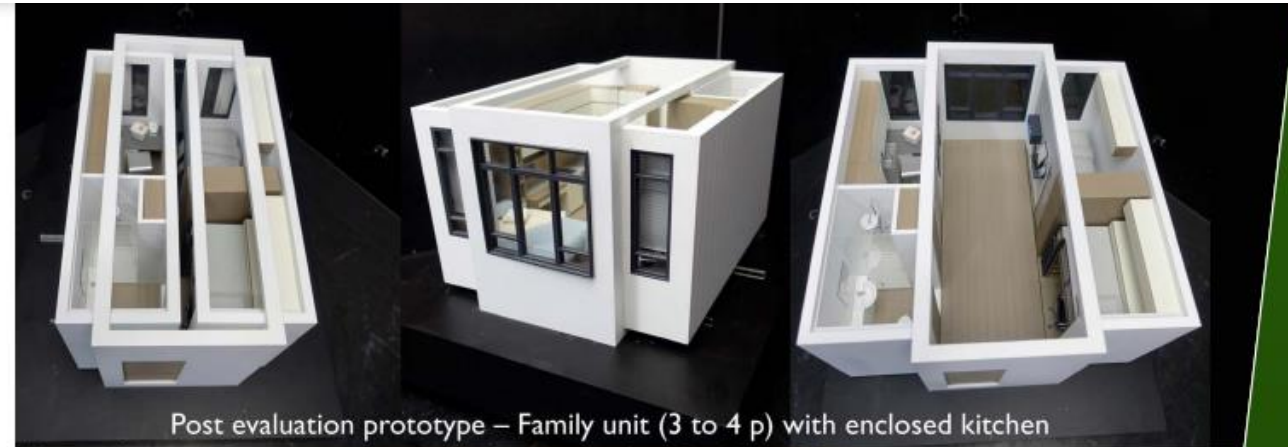


The recent adoption of Modular Integrated Construction (MiC) in Hong Kong represents a paradigm shift towards a higher quality, better safety and labour utilisation, and more socially and environmentally sustainable technology for the local building industry.

With the Government targeting to provide 15,000 transitional social housing units by 2023, research into MiC application in Hong Kong is necessary for the realisation of a more sustainable society. However, one of the critical factors in implementing MiC in this compact city lies with the module size limitation during road transportation, and sometimes the manoeuvring space available on-site, during installation. To address these fundamental issues, the concept of expandable modules is being explored to verify its feasibility and practical uses.

The research innovated a pragmatic solution in the form of an adaptable MiC building system prototype, with the capacity and flexibility to meet different accommodation needs, functional configuration, and terrain constraints. The reusable building system is also capable of operating off-grid on renewable energy. Additional requirements of expansion-retraction mechanism may potentially be offset by more efficient layout and installation procedures, offering greater useable floor areas ("double" walls eliminated), fewer construction joints, and reduced construction time when compared to regular MiC. Questionnaire surveys and focus groups were conducted, with various stakeholders and user groups, to identify key challenges and enhancements for potential community-wide application.

香港近年引入組裝合成建築法MiC，推動本地建築業的範式轉移，提高建築質素、工業安全及在社會、環境和科技方面的可持續性。政府亦訂立目標，於2023年提供15,000個過渡性社會房屋單位。在如此密集的城市應用MiC時，其中關鍵考慮包括路面運輸對組件大小的限制、地盤有否足夠操作範圍作組件存放及安裝等。本研究致力探索伸縮式組件的可行性和實際用途，並建議能靠再生能源獨立運作的MiC建築原型系統。組件矩陣不但可靈活滿足室內佈局不同需要、功能及地形限制，伸縮機關更進一步提高安裝和清拆過程的效率，比一般MiC較少施工接縫和重疊牆壁，足以抵銷機關等額外需求。此外，研究亦透過問卷及焦點小組吸取不同持份者及用戶組別的意见，找出關鍵問題及提出完善方案，以助擴展社區廣泛應用。



Post evaluation prototype – Family unit (3 to 4 p) with enclosed kitchen

