



Structural Feasibility of ISO Shipping Containers for Core-dwelling Housing

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Abstract

The increment of the magnitude and frequency of natural disasters and mass human migration activities around the world has pushed the needs of rapid construction for post-disaster reconstruction and re-urbanization. Reusing ISO shipping container for building architecture stand a chance to maximize rapid shelter solution and minimize carbon footprint at the same time. Modifications on the ISO shipping containers to suit to core-dwelling housing needs, such as door and window openings, will generate further stability issues on the container in resisting building loads. A research aims to investigate the feasibility and structural integrity of modified ISO shipping containers into core-dwelling house was carried out, collaborated between Swiss Federal Institution of Technology Lausanne (EPFL) and Universiti Teknologi Malaysia (UTM). This paper reports on the outcomes from workshop, field trip and experimental investigation.

Keywords: Modular construction, ISO shipping container, post-disaster reconstruction, tropical climax, structural integrity, lateral stiffness.

1 Introduction

The advancement of science and technology continually brings improvement to the living standard of people around the world. Architects and engineers are pushed to rethink the current ecosystem of construction industry to find better design. From the engineers' perspective, the needs for innovation in steel design are discussed [1] and summarized into five main themes: i) integration, ii) modular construction, iii) novel joining methods and connections, iv) material advances and v) education opportunities.

Inspired by automobile industry, modular construction focus on the innovation of modules preassembled with wall panels, heating and ventilating system, plumbing, lighting and electrical wiring [2-3]. Interchangeable parts and sewing mechanism can be produced for house renovation and maintenance. Such practice could reduce the construction time and passive impact to the environment. At the same time, off-site manufacturing of the building modules would increase the quality control, optimise material usage, which leads to sustainable construction.

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