

SUSTAINABLE PREFABRICATED MODULAR BUILDINGS

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ABSTRACT

Prefabrication and modularization are construction processes that the industry has used for centuries. Buildings can be constructed using modular 'parts' such as walls, frames, doors, ceilings, and windows, or a number of 'complete' prefabricated modular building units. Modular buildings (sometimes referred to as volumetric construction, or prefabricated buildings) are buildings made up of components manufactured on assembly lines in factories then assembled on site in a variety of arrangements.

The advantages of modular buildings over more traditional forms of construction include: (1) Speed of supply and installation, (2) Reduced cost (through supply chain management, economies of scale, reduction of waste and working in a controlled environment), (3) Improved quality control, (4) Reduced time on site, (5) Reduce disruption, noise and waste, (6) Reduced need for on-site storage, plant and other equipment, (7) Reduced labour costs, (8) Greater control over the full supply chain, (9) Continuous improvement through an effective feedback loop, (10) Extendibility, (11) The potential to de-construct for re-location, re-use or re-sale.

The aim of the paper is to present a study on a new structural system for houses, made of sea containers, in the way to replace the standard structure made by concrete and steel reinforcements and to reuse existing prefabricated steel units, framing in the circular economy concept. Shipping containers are manufactured exceedingly rigid and strong complying specifications for freight purposes. After ending freight spell at sea and road, shipping containers are just occupying huge spaces at ports and other places. Such a project was implemented near Timisoara, Romania. The paper presents the building process, collected data and the life cycle assessment of the building. This research investigates the recent usage of containers for home buildings and tries to see the potential for building industry. The results show that modular structure made of sea containers can be a very good alternative to the standard structure of housing because reduce time for execution, involve less qualified workforce, have the same resistance and reduce pollution.

