



CTBUH Research Paper

ctbuh.org/papers

Title: Debating Tall: Modular as Homogenizing Force?

Authors: Shonn Mills, Director, Ramboll Group
Philip Oldfield, Senior Lecturer, University of New South Wales

Subjects: Architectural/Design
Construction
History, Theory & Criticism
Urban Design

Keyword: Modular Construction

Publication Date: 2016

Original Publication: CTBUH Journal, 2016 Issue I

Paper Type:

1. Book chapter/Part chapter
2. **Journal paper**
3. Conference proceeding
4. Unpublished conference paper
5. Magazine article
6. Unpublished

© Council on Tall Buildings and Urban Habitat / Shonn Mills; Philip Oldfield

Modular as Homogenizing Force?

The persistent interest in prefabricated modular construction has now turned into high-rise reality, though the results have been inconsistent. Earlier experiments with the approach resulted in monotony that most would rather not see again. With a goal of improving both construction efficiency and the urban habitat, we now ask, “If modular volumetric construction became common practice, would that increase the potential of skyscrapers to homogenize cities?”

NO

Shonn Mills

Director, Ramboll Singapore

Prefabricated modular construction is one of the key technologies that will improve the efficiency and cost-effectiveness of tall buildings. “Modular” is a broad term used to describe technology that facilitates off-site manufacturing. It can describe simple stick-frame systems, such as precast concrete or prefabricated bathroom pods, up to and including fully prefabricated and prefinished volumetric construction (PPVC).

To be effective, PPVC modular in particular does require design rigor, adhering to a set of geometric constraints and adopting a massing approach that uses a combination of rectilinear units, which limits some designers.

Any technology/material carries the potential to become a building that lacks character or reference to place. The biggest opponents of PPVC fear a nightmare-renaissance of the Soviet housing estates that still disfigure many Eastern Bloc countries. But PPVC, like any new technology or tool, is really only limited by the imagination of the designer.

In the future, PPVC will no doubt be widespread, but not exclusively used in high-rise developments. In the future, it will be commonplace to see a hybrid of conventional materials (site-constructed concrete and steel) and modular technologies like PPVC. Good designers will utilize the flexibility of conventional construction materials to create the interface between high-rise and the ground plane, fostering a unique sense of place and

response to the surroundings. PPVC modular will likely be employed above the ground plane where the benefits of repetition can be exploited to the fullest. Future designers will use the modular units like building blocks, assembled to respond to the environmental conditions and clad to give a unique response to each particular site.

PPVC modular is a new technology that will improve tall buildings’ efficiency and cost-effectiveness. Imagination and good design will create unique innovative high-rise solutions that employ a hybrid of conventional and modular PPVC typologies.

YES

Dr. Philip Oldfield

Senior Lecturer, University of New South Wales

Prefabrication has long been seen as a potential driver for dynamic high-rise architecture. Since the mid-20th century, we’ve been shown visions of vibrant modular cities, with plug-in architecture, adaptable towers, and exciting skylines, fueled by prefabricated construction. And yet the potential of these visions has yet to make the transition from architectural theory into practice.

The common image of a prefabricated skyscraper is of repetitive social housing blocks that litter cities around the world, where every unit façade and window are the same, regardless of sun path, view, context, or comfort. In practice, the benefits of prefabrication have been focused on construction logistics, speed, and safety. While clearly commendable, the benefits of prefabrication on tall building aesthetics and sustainability remain unproven. In the

high-rise world, prefabrication has become synonymous with drab one-size-fits-all repetition, rather than unique and responsive architecture. For this to change, two main things need to happen:

First, the prefab paradigm must shift from “mass standardization” to “mass customization.” How can we use prefabricated components and modules to create architectural variety, interest, and contextual response, rather than stacked repetition? This has started to be achieved in detached low-rise housing, but has yet to make the jump to larger, more complex buildings.

Second, we need to look at the opportunities prefabrication provides for high-rise adaptation and disassembly. We are building more skyscrapers than ever before, and yet technologies, lifestyles, and materials are developing at a rapid rate. A tower built today could feasibly last hundreds of years, and yet its design may be out-of-date in mere decades. Prefabrication can provide a solution, by allowing towers to be constructed as a series of “modules” or “elements” that can be easily replaced as they become obsolete, or as changes to function or program are required.

While this is not a new idea, current procurement routes and construction logistics make this challenging. Kisho Kurokawa’s 1972 Nagakin Capsule Tower, for example, (see “Debating Tall,” CTBUH Journal 2015 Issue II) was designed with a series of residential “capsules” that could be replaced again and again over time, as technologies evolved. Almost 45 years later, the initial capsules remain, with most abandoned and deteriorating, a symbol of the lost potential for prefabricated skyscrapers.