The plug and play city: how shipping containers are changing infrastructure

By Morgan Saletta   29 Aug 2016

We often take for granted our access to vast quantities of inexpensive goods manufactured overseas. And we often overlook the unassuming innovation that has made this global industrial revolution possible: the shipping container.

While the shipping container was conceived in the 1950s by American businessman Malcom McLean, it was only widely adopted after the US military used containers to supply its war effort in Vietnam in the 1960s.

After the Vietnam war, container ports were built in Japan and then the rest of the world. Old ports, such as in New York, were devastated, while ports such as Oakland, in California, became the new centres of globalised shipping.

German developer Jörg Duske has built student accommodation out of recycled shipping containers. Holzer Kobler Architekturen

With containerisation went the old wharf-side communities of dockers and labourers, previously employed to hoist cargo with ropes and pulleys. This fundamentally changed not only the urban fabric of port cities but the very dynamics of globalisation.

With more than 18 million in the global fleet, shipping containers have become an ubiquitous icon of globalisation.

At the same time, shipping containers have become a surprising part of modern urbanisation, infrastructure and the built environment. Here, their boxy and bland uniformity has become a tableau for creativity, innovation and experimentation.

Plug-in cities

Container architecture has roots in both mid-20th-century modernism and an entirely different approach to architecture and urbanism that emerged in the new millennium.

Cities in the Air, Arata Isozaki 1960.

Antecedents to today's container architecture can be seen in Yona Friedman's La Ville Spatiale, the work of Japanese Metabolists, such as Arata Isozaki, and the Plug-in City of Peter Cook and the Archigram Group.

These architects imagined vast mega-structures to support countless mobile, transportable and containerised units.

In the early 2000s an entirely different approach to architecture and urbanism was emerging. This DIY and experimental approach had more in common with Christopher Alexander – architect and father of the Pattern Language movement in design and construction – than high modernism.

It is also extremely diverse, including parklets, tactical urbanism and the pop-up retail phenomenon.

The shipping container slotted into this movement nicely. Whether it's a container bar, a pop-up retail shop or beer garden, a garden shed, a prepper's bunker or entire university dorms, the shipping container has become a common feature of the modern built environment.

Plug-and-play infrastructure

Much has been made of the use of containers in architecture, even though their suitability for long-term living is widely debated. Less explored is the way containers and containerisation have been transforming infrastructure.

There is great need for easy access to infrastructure, from medical facilities to water treatment around the world. The shipping container is an appealing option, being rapidly deployable, scaleable, transportable, plug-and-play and a turn-key solution.

Again, the military has been at the forefront of many of these innovations, as have the oil, gas and mining industries, where containers are used for housing, sanitation, cooking and power generation.

But innovative approaches to containerised infrastructure are rapidly expanding outside the military and energy sectors.

Interest in containerised green energy is growing. In fact, fully containerised biogas plants using methane generated from landfill or agricultural waste are a mature industry.

Containerised solar and wind power generators are also generating a lot of interest. Green Tech Africa, for example, is aiming to provide solar power to sub-Saharan Africa through systems including containerised solar power and storage systems.

At least two companies – Uprise Energy and Natural Power Concepts – are developing portable wind turbines that deploy from containers. This, in turn, has attracted interest from Oshkosh Defense and the military.

All in a box

Innovative approaches to containerised infrastructure have expanded outside the energy sectors.

Clinic In A Can builds fully equipped, customisable, solar-powered containerised clinics. These clinics have been deployed in the developing world, remote areas and in disaster relief missions.

At least one hospital in the US purchased Clinic In A Can's isolation unit to cope with potential patients infected with Ebola or another highly infectious disease.

A more surprising use of containers is food production. Motivated by the farm-to-table ethos, the owners of The Farmery, a food truck in North Carolina, partnered with Williamson Greenhouses to develop the Crop Box.

This is a complete hydroponic growing system using super-efficient LEDs. It can produce the equivalent of one acre of lettuce inside a single container. Students at Stony Brook University are using a similar system, built by Freight Farms, to grow over a thousand heads of lettuce a week for the campus.

A Freight Farms container.Freight Farms

Inside a Freight Farms container.Photo by: Chris Rank/Bloomberg

Farm From a Box offers a different business model and vision. They have packaged the core components and tools needed to set up the equivalent of a two-acre farm in a single turnkey farm kit in a shipping container.

Water purification and sewage treatment are another two infrastructure services that have been containerised, with systems on offer from many companies.

Residential-scale treatment facilities such as one offered by Biokube seem like they might offer an attractive solution to cities such as Rio de Janeiro with well-publicised sewage treatment problems.

Containers are also providing scaleable solutions for digital infrastructure as well, from solar-powered internet cafes in refugee camps and developing cities to the rapidly growing market for data centres in the developed world.

The Dell Solar Learning Lab, a Zubabox built by Computer Aid International in Cazuca, a suburb of Bogota, Colombia.SixZeroMedia/Computer Aid

An IBM portable and modular data centre.IBM

These are just some of the innovative and emerging infrastructure services that are being containerised and deployed, not only in the developing world, but in our own backyards.

This isn't the containerised vision imagined by Archigram or the Metabolists, but it certainly is reminiscent of it, in a Through the Looking Glass way. Not a plug-in city built around a centralised infrastructure, but plug and play infrastructure providing real solutions for a rapidly urbanising planet.

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