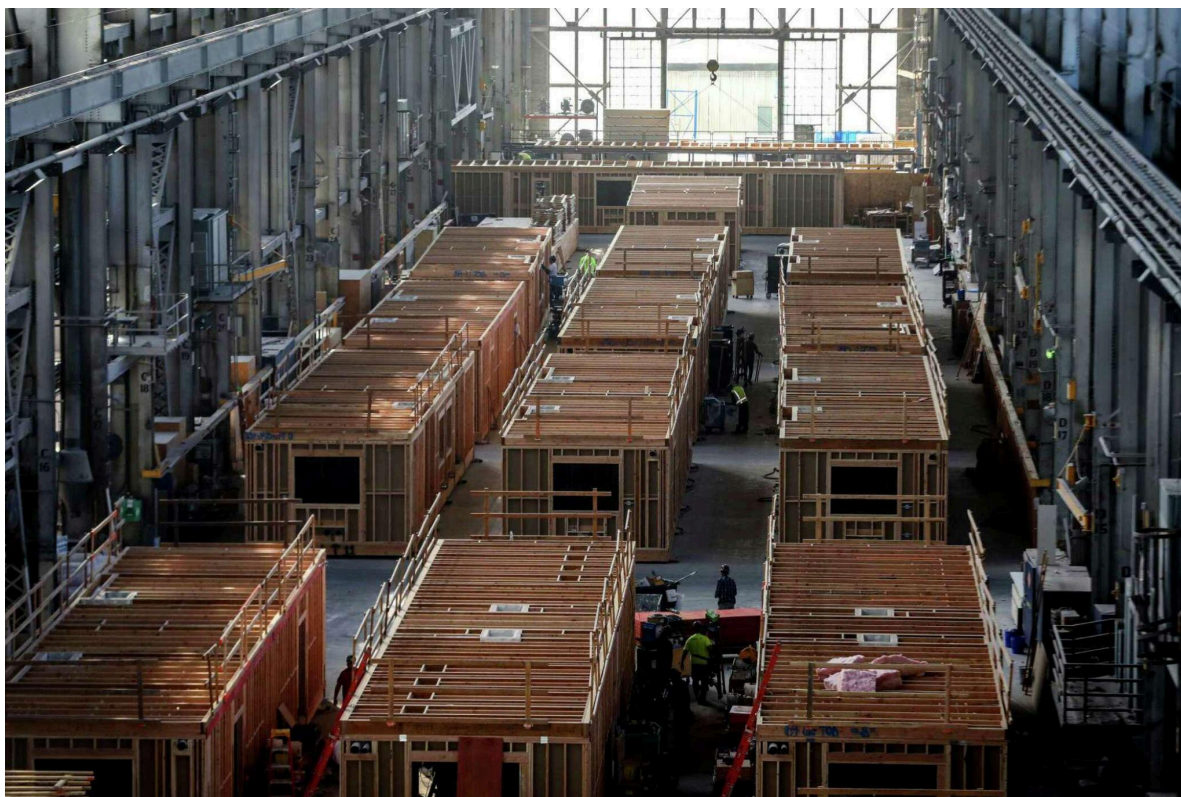


Modular Construction for Affordable Housing

Affordable housing can be built faster and cheaper with modular construction than with conventional construction



*Modular housing units under construction at Factory OS
(Photo courtesy of San Francisco Chronicle)*

The Impact

Modular construction can help address the crisis of affordable housing in the San Francisco Bay Area by accelerating construction time frames 20% to 50% and reducing construction costs 20% compared to conventional construction. Additional benefits of modular construction are more predictable unit cost and reduction of waste.

Description

Prefabricated construction has been around for hundreds of years and is a broad term applied to building components made in a factory and assembled on site. Modular construction is a type of prefabricated construction specifically referring to self-contained units that are assembled in a factory and connected to each other on site. The focus of prefabricated construction in the US has shifted from components for single-family houses to modular units for high-density housing. US companies focused on prefabricated construction are Factory OS in Vallejo, Calif; United Hope Builders in East Palo Alto, Calif.; Blokable in Seattle, Wash.; and CRATE Modular in Los Angeles. While the technologies they

employ vary, the companies all provide prefabricated panels that can be assembled or modular units that can be stacked to simplify construction on site. At Factory OS, housing units built on an assembly line include everything found in a finished conventionally built unit, from plumbing and electrical wiring to bathtubs and built-in cabinets. The units are transported to the site and set by crane onto a foundation or stacked on another unit.

Where It's Been Implemented

The Navigation Center in Redwood City was opened by the County of San Mateo in April 2023. Modular units arranged in two- and three-story rows provide 240 units of safe, temporary, living spaces for individuals and couples who were previously unhoused or at risk of losing their housing. The project was designed by The Office of Charles F. Bloszies, with the modules built by Silver Creek Industries and XL Construction serving as the General Contractor. The Navigation Center is LEED Silver certified; sustainable features include photovoltaic panels, EV chargers, and green infrastructure.

Factory OS, located on Mare Island in Vallejo, has built 2,400 housing units for 20 developments as of 2022. The majority of the units were built for nonprofit customers developing affordable housing, and about half of the units provide supportive housing for previously unhoused people. Developments constructed with units built by Factory OS include Eden Housing's Blue Oak Landing in Vallejo (75 units) and Mercy Housing's Tanahen in San Francisco (145 units).

Key Drivers

The Bay Area has an ongoing and increasing shortage of affordable housing. The reduction of existing affordable housing stock and the slow creation of new affordable housing stock both contribute to the shortage. The number of affordable rental housing units in the Bay Area dropped by 24% from 2012 to 2017. Many factors contribute to the slow creation of new affordable housing stock, including some related to the current state of the construction industry. Construction productivity in the US has barely increased since 1945, according to a 2017 report by the McKinsey Global Institute. Meanwhile, according to The New York Times, the number of residential construction workers, including high-skilled workers such as plumbers, carpenters, and electricians, is decreasing and the cost of construction is increasing throughout the US. In the Bay Area construction costs increased an astonishing 30% from 2015 to 2018.

Housing built using prefabricated construction can be cheaper and faster to build than housing built using conventional construction. Any savings realized from prefabricated construction can be passed on to renters and homeowners alike.

Key Factors for Success

For affordable housing built with modular construction to be successful, design decisions must be made early and confidently, and proper financing needs to be in place. A major difference between conventional and modular construction is that for modular construction design, decisions must be made at the very beginning of the process. Any changes made during construction are difficult and costly. Another difference is that modular construction requires larger down payments at the beginning of the process than conventional construction requires. This can discourage developers who rely on low-income housing tax credits for funding from considering modular construction, since tax credits must be used within strict timelines. One approach to encourage modular construction is for the company providing the modular units to finance the down payment so developers don't need to take on that risk.

Key Obstacles

One of the biggest obstacles to building affordable housing, especially in the Bay Area, is the availability of land. Restrictive land use policies present additional obstacles that include allowing only single-family homes, prohibiting manufactured housing or modular construction, and imposing certain design standards.

A major obstacle to building affordable housing with modular construction in San Francisco comes from the opposition of traditional building trade unions. The unions have concerns about local money being given to outside companies instead of local labor. They also object to less-trained and lower-paid workers in modular housing factories doing specialized work that, in conventional construction, is usually done by someone who has gone through apprenticeship and is paid more. In San Francisco, four local unions (electricians, iron workers, sheet metal workers, and plumbers) joined together and created the Honest Builders Coalition to protest factory-built housing in San Francisco. This in part led to the San Francisco Labor Council prohibiting the use of public funds for factory-built housing manufactured outside of San Francisco.

An additional obstacle to building affordable housing with modular construction is negative perceptions and stereotypes about prefabricated housing. Another is delivery difficulties. Delivering modular units to remote areas can be expensive, and dense urban areas can be challenging for large delivery trucks to navigate.

Timeline to Implementation

Factory OS housing units, mostly studio units, went from design to occupancy in about a year and cost \$350,000 per unit.

Return on Investment

Mercy Housing's Tanahán development in San Francisco took half the time and cost 30% less to build compared to conventional construction. The building was completed within 3 years and the cost of each unit was \$400,000, notably below the city's average of \$600,000 per unit.

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