
PREFAB
CAN BE
FAB
ON
COMMERCIAL
PROJECTS

New processes and technologies have long enabled massive productivity gains. For the agricultural industry, it was the cotton gin in 1794. The automotive industry points to the groundbreaking introduction of Henry Ford's assembly lines in 1913. The advent of the personal computer and the internet in the 1970s and 1980s made a wide-ranging impact on efficiency. Doing more in less time is a perpetual goal, but the construction process doesn't always follow the most efficient approach.

For some commercial projects, an option is gaining ground: prefabricated building solutions, where building elements — including structural; architectural; and mechanical, electrical and plumbing (MEP) systems — are constructed off-site in a controlled environment and assembled on-site.

Prefabrication has been a time-saver in areas of construction for more than 100 years, but it recently emerged onto the commercial scene. It can be faster, safer and more affordable, especially when deployed as part of an integrated team approach.

"It's no secret that traditional construction can be inefficient," says Greg Carlson, vice president of the Construction/Design-Build Group at Burns & McDonnell. "For certain commercial projects, prefabrication is a new way of thinking about the building process, one that can produce better results for the client and a safer environment for the builder."

BENEFITS TRIFECTA

With prefabrication, elements of a structure — everything from framing to mechanical and electrical systems — are constructed in a controlled environment. An entire building, down to the tiles and kitchen appliances, can be built in a warehouse, then assembled at the final location. This approach is optimally used for repeatable projects, such as restaurant chains and office buildings, where the creation of multiple, identical building elements can be streamlined.

Increased speed — The prefab process relies on clockwork efficiency, where materials are precut to exacting specifications, sections are built to code by the manufacturers and workflows are tightly controlled. Weather unpredictability is eliminated, reducing delays. These and other measures can shave roughly 25-30 percent off the total project development timeline, according to research cited on modular.org.

Better quality — Modularization helps reduce the learning curve. On a typical job site, a worker might be facing a task for the first time. With prefab, a worker concentrates on the same task, and that specialized knowledge results in higher-quality work. A well-lit, climate-controlled warehouse also can be a better environment than outdoor job site conditions for paint, concrete and other materials to cure. Prefabricated items can include repetitive components, such as restroom modules in a multistory office building or precast panels for a building exterior.

Enhanced safety — Prefab solutions can reduce on-site labor by 75 percent, shifting the work to a controlled indoor environment. That leads to significant safety gains, especially considering prefab elements are built on the ground instead of at a great height. (Falls are the leading cause of construction-related fatalities, according to the Occupational Safety and Health Administration.)

"Modularization is economical and sustainable," says James Isom, a commercial construction manager at Burns & McDonnell. "There is less

wasted time and fewer wasted materials in a controlled construction environment. And, in a time when manpower shortages are increasing, a 70-degree warehouse used to create prefabricated construction elements can be a more attractive workplace than in the rain and snow."

WHERE PREFAB MAKES SENSE

Isom often hears the common misconception that modular solutions are at odds with customization and craftsmanship. "These are still buildings we're crafting; we're just taking a fresh approach to putting them together," he says. "Modular solutions today are sophisticated and customizable — they refer to a process, not a specific facility type."

Comprehensive prefab solutions work for office development, tenant finishes, data centers, restaurant chains, retail stores and hotels — anything with a more standardized layout or any repeatable function. On a recent rollout of quick-serve restaurants, the prefabrication approach cut the schedule in half from 16 to eight weeks. The savings in on-site labor allowed the client to opt for higher-quality materials. The process also accommodated differences in exterior sheathing required by local codes, providing the tailored solution the client needed.

Modularization also can work on a smaller scale for nearly any type of project. "Big plumbing skids are often prefabricated and shipped on-site," Carlson says. "We can develop elements of a high-rise or simply prefab wall units. In many ways, prefabrication is already common; we're just seeing more opportunities to take it further for the client's benefit."

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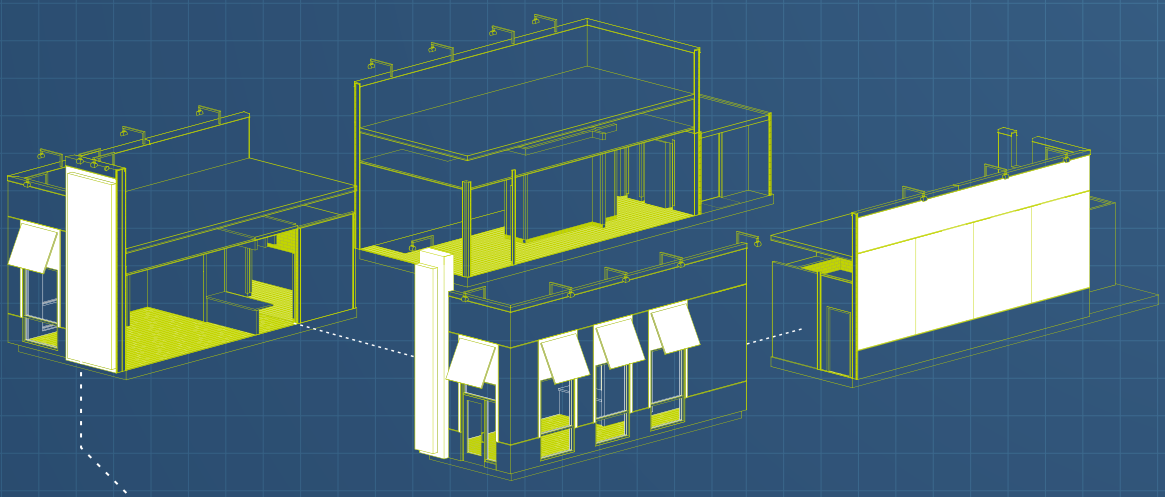
>
> *JAMES ISOM*



To optimize the schedule and value savings of off-site prefabrication, this quick-serve restaurant needed help in strategically redesigning various building elements while maintaining customer experience and franchisor branding standards. Using an integrated team approach, it's doing so for several stores nationwide.

INTEGRATED TEAMS FOR GREATER PRODUCTIVITY

Designing for prefabrication demands a nuanced method, one that is greatly enhanced with an integrated approach — where a single team delivers solutions across several specialized areas.

"When the same people are in control of design and construction, that enhanced collaboration delivers the elevated levels of accuracy and efficiency these projects demand," Isom says. "We're building in one place and assembling in another, so there is no room for mistakes."

From day one, the project team designs for modularization in the building information model (BIM). For instance, the team must plan where four individual modules will meet within the final structure to make sure structural columns, MEP systems and other building elements line up. At the same time, the connecting seams are artfully concealed, so the building looks unified rather than made from parts.

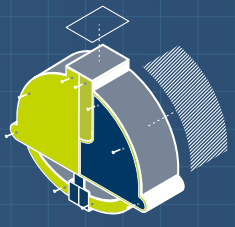
The BIM provides accurate information for procurement, reducing material waste. Laser scanning the building elements in the warehouse and comparing them to the model allows the building to come together as designed. Project phasing is planned to maximize efficiency because many tasks now can happen concurrently.

The speed to market is a boon to clients.

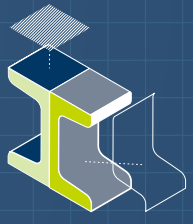
"No matter what business our clients are in, they want their building faster so they can start generating revenue," Carlson says. "Prefabrication allows us to deliver that speed — plus higher quality and lower costs. For the right project, it's the dramatic jump in construction efficiency the market has been seeking."

PREFAB BUILDING SOLUTIONS CAN:

REDUCE THE DEVELOPMENT TIMELINE BY **25-30 PERCENT**



REDUCE ON-SITE LABOR BY AS MUCH AS **75 PERCENT**



REDUCE WASTE BY **70-90 PERCENT**

Information from modular.org

Read more about the cost, time and safety benefits of prefabricated building solutions at **burnsmcd.com/FabPrefab**