CASE STUDY:

Improving Project Delivery with Prefabricated Bathroom PODs

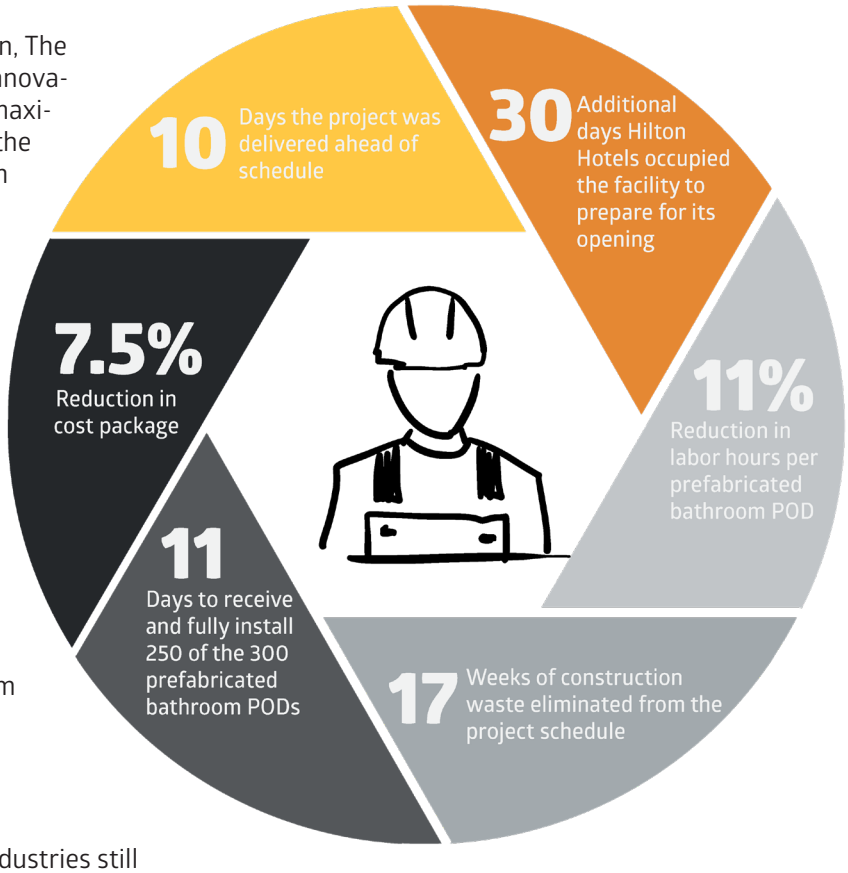
The Weitz Company utilized "modular, component-based design" to significantly reduce the eight wastes in construction with an innovative, purpose-built approach to the construction experience.

The Weitz Company delivered the Hilton Des Moines Downtown Hotel with an approach that can improve the future of the construction industry. Utilizing "modular, component-based design" as its value proposition to significantly reduce the eight wastes in construction that provide zero value to owners, architects and contractors, Weitz was able to positively impact and innovate the build experience for a community waiting nearly 15 years for a convention center hotel vision to become reality.

Upfront Planning

During contract negotiations and conception design, The Weitz Company knew there had to be a uniquely innovative factor in the design-build package that could maximize the repetitious nature of this project. During the early stages of the project, prefabricated bathroom PODs became the lynch pin to a much bigger concept that took extensive upfront planning and coordination.

With the client, Hilton Hotels and a sub-contractor base all being first-time users of modular bathroom PODs, Weitz facilitated mockups, site visits, quality control inspections and multiple code review sessions to give the entire team a high level of confidence and a "why wouldn't we attitude." This was essential because, on paper, prefabricated bathrooms do not provide a clear value to a project due to the increased material costs and upfront design challenges. But the substantial advantages became known after The Weitz Company project team diligently planned and executed installation of this modular component.



On-site Labor Hours

Stressed labor markets with active construction industries still recovering from the last recession represent ideal opportunities to implement modular, component-based build strategies. By prefabricating 300 of the 330 bathrooms for the Hilton Des Moines Downtown in an off-site, factory setting through virtual 3D coordination, Weitz was able to accelerate schedule by creating parallel paths of construction without affecting the local workforce availability.

To quantify the exact impact on labor hours, Weitz conducted a time study comparing the prefabricated bathroom shop hours plus on-site installation hours against the time it took to install 30 traditional bathrooms built 100 percent on-site. The outcome indicates 11 percent of the labor hours required to traditionally build bathrooms can be eliminated by installing bathrooms as a modular component. The largest "waste" providing zero value came from eliminating 9.25 hours of material distribution for each bathroom.

For this project, reducing the hours to install the bathrooms by 11 percent was approximately 2.5 man years of labor and a 7.5 percent reduction in this project's cost package. And, not to be overlooked were the residual bonuses of enabling better planning with subcontractors, improving efficiencies and simplifying the number of deliverables a superintendent must monitor to one object.

Safety & Quality

Prefabrication decisions based solely upon the monetary benefits can be short sighted. There are significant non-monetary factors associated with prefabrication, especially with respect to safety and quality.

By moving large portions of the work into a controlled environment, several variables that can create inefficiencies and hazards during construction are eliminated. Material laydown, jobsite waste, strenuous activities/movements and weather delays are all alleviated by prefabricating in a factory setting and planning accordingly for Just-in-Time Delivery.

In the case of the Hilton Des Moines Downtown, 84 percent of work performed for the bathroom PODs was in a prefabrication shop. This not only improved the oversight and reduced the safety risks associated with each build component, but it allowed the Weitz project team to plan for the small batch delivery and installation, eliminating congestion on-site and material trip hazards with products being stored on wheels.

Additionally, the client benefited from having prefabricated materials built consistently with tighter tolerances and coordinated to withstand lifting, moving and transportation. This led to a more consistent, quality installation and fastening. Specifically, by utilizing factory controls, Hilton received a tighter grout joint in the prefabricated bathrooms, which they deem a four-star hotel quality product.

Schedule

Outside of budget, the schedule of a construction project is what gives every client the most anxiety. Any delay will raise costs and could jeopardize future revenue – not to mention threaten reputations.

While the prefabricated bathroom PODs were 1 of 12 modular building components at the Hilton Des Moines Downtown, it was the path most integrated and critical to the project's tower schedule. After topping out on May 12, 2017, the project team flipped the building from a structure to dry wall installation starting in less than eight weeks — a 10-week difference compared to conventional projects. Upon setting the first 50 bathrooms PODs to sequence and establish flow, it only took 11 days to install the other 250 prefabricated PODs.

OFF-SITE PREFABRICATION

JUST-IN-TIME DELIVERY

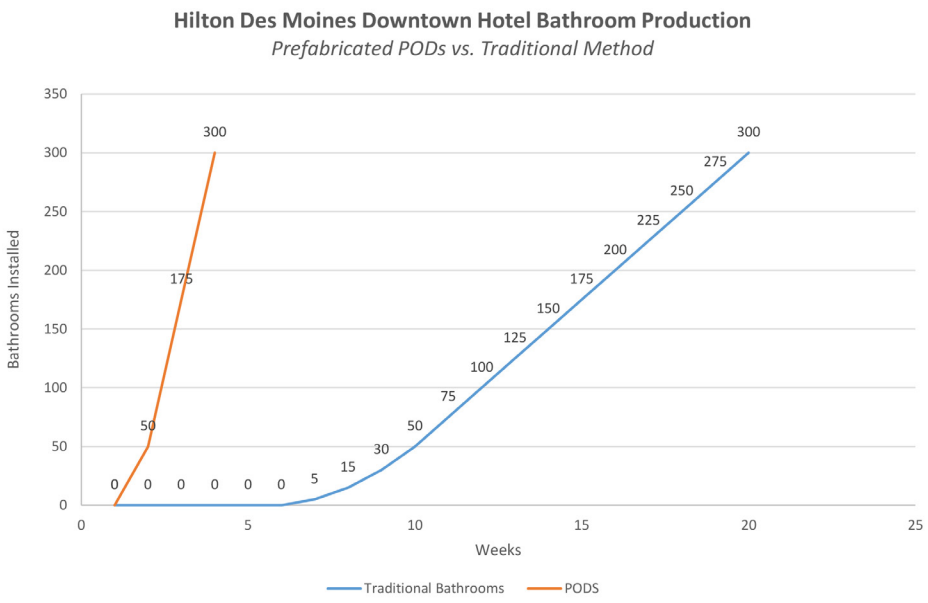
UNWRAP — INSTALL — CONNECT

4-STAR FINISHED PRODUCT

This significantly accelerated the schedule of the project to drive value back to the client in three specific ways:

1. The pace in which the PODs were installed and connected to other prefabricated components created 14 weeks of savings in comparison to installing bathrooms traditionally with equal resources. In total, 17 weeks of construction waste were eliminated from the project schedule by prefabricating the bathrooms (as illustrated by the gap between weeks 3 and 20 in the graph).

2. By flipping the building so quickly and allocating man-power to levels 1 and 2 of the hotel earlier, Hilton was able to occupy the facility 30 days sooner than planned. This enabled a larger window to hire and train employees in addition to receiving, placing and testing operating supplies and equipment in preparation for the grand opening.



3. The project will be delivered 10 days ahead of schedule without a chaotic, stressful completion due to the upfront planning.

Summary

Successfully implementing modular construction elements into a project takes experience, upfront planning and a solution-oriented team. When done right and used as an innovative solution, it can remove chaos from a project and create an extremely positive impact on labor, safety, quality and schedule. Some common pain points that burden owners can be alleviated, and additional opportunities are enabled to help owners achieve goals that stretch beyond the project's schedule and budget. It all translates to an enriched customer experience.

If you would like to learn or understand more about the prefabricated bathroom PODs at the Hilton Des Moines Downtown or the entire modular component based design process, please contact Weitz Project Manager Ben Bunge at ben.bunge@weitz.com.

ABOUT THE WEITZ COMPANY

As the sixth oldest A/E/C firm in the United States, The Weitz Company has forged its reputation on constantly seeking new construction innovations and technologies that provide clients with predictable, reliable and collaborative services. From first interaction with clients through project closeout, Weitz focuses on delivering value and eliminating waste during the construction process. It's a discipline that encompasses all of today's fundamental build qualities, and Weitz team members work diligently to align and elevate these practices to meet the specific needs (and wants) of every client. The end result is a project experience that is impossible to duplicate. **For more information, visit www.weitz.com.**