

ELECTRICAL CONTRACTOR

POWER & INTEGRATED BUILDING SYSTEMS

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[Home](#) > Why You Should Know Zhang Yue•



It was an online phenomenon that went viral. With time-lapse photography that featured an inset image of digital clock tumblers racing through the hours, minutes and seconds of what was taking place in the main scene on the screen, an Internet audience all over the world witnessed a replay of something they otherwise would have never thought possible: A 30-story hotel was assembled out of massive factory-built modules in just 15 days (right up to making the beds in the guest rooms) in Hunan, China. •

Zhang Yue, founder and chairman of Broad Sustainable Building, was the visionary behind this incredible project. With a huge investment of capital, boundless amounts of energy, and no small measure of eccentricity, he drove it to successful completion. Like many billionaires, he is relatively unknown outside of his own province. But someday, Zhang may be globally revered as having been to building construction what Henry Ford was to automobile manufacturing. He has taken prefabrication to a new level, and in doing so, he gave us some reasons to look at it far differently than ever before. •

There is nothing new about the general notion of prefabrication. Zhang Yue and other innovators may be adding new technology to it, but it has been around for centuries. What deserves a fresh perspective, however, is the ranking of factors usually stressed as reasons for employing it instead of conventional build-in-place construction methods. •

When the subject of prefabrication comes up, most ECs will immediately associate it with labor-savings. Prefabrication, they believe, will reduce the number of labor-hours expended in the field. Not surprisingly, this kind of reasoning creates push-back from the field construction work force. Prefabrication, as they see it, will eventually rob them of their livelihood. Such a position fails to see the bigger picture, though. •

Prefabrication serves a higher purpose. The primary and leading justification for using it is a total reduction in resources that promotes the “triple bottom line” and, in turn, benefits people, the planet and profitability. The Zhang hotel provided safer working conditions (no one reported as much as a broken fingernail) with less material waste during manufacturing

and on-site. Much of the labor-hours still existed, just in a factory setting, with less time on-site. And, yes, it can yield more net income, but its ability to sustain affordable processes means the most. •

Dr. Xinyi Song, faculty member in the School of Building Construction at Georgia Tech, pointed out some of the most outstanding aspects of what was accomplished in the 15-day hotel building project, observing, "In addition to the exceptionally short project duration, the 328-foot-tall tower boasts higher energy efficiency thanks to features such as quadruple-glazed windows and 15--centimeter thick glass curtain wall insulation." All of that was achieved, she added, "with only 1 percent of the construction waste of a conventional building." Two hundred construction workers were on-site during the field erection, but in a massive shift of the total effort required, 93 percent of the work was prefabricated beforehand in the Broad factory. •

In our December 2012 column, we introduced the term "additive construction" as a philosophical cousin to additive manufacturing, suggesting a radically new way of going about field installation for service work. Avoid what is "subtractive." Make each step a positive move forward. •

Prefabrication falls right in line with that mode of thought. While most ECs commonly associate it with new construction projects, the fact is it ought to factor into the planning for every kind of work. It so happens that service work provides an excellent fit for the returns of prefabrication. Whereas prefabrication on the scale of erecting 30-story hotels dictates a multimillion-dollar investment, by contrast, as a function of a successful field service operation, it is a low-cost—but high payback—activity. It merely takes a little planning. •

Industry expert Perry Daneshgari stunned an audience of leading electrical contractors recently by imagining a cargo ship from China pulling into a West Coast port with a completely prefabricated high-rise building on board, ready to be off-loaded and field-assembled on U.S. soil. He made the strong case that, to remain truly competitive, our domestic construction industry must move into a new era of "industrialization" characterized by advanced methods of prefabrication and other preconstruction activity for large and important projects. •

If these futuristic concepts seem unrealistic, we propose that ECs also imagine ships arriving with pre-assembled smaller sections, designed and built overseas and used to update our building stock. We believe such prefabrication will increasingly be critical to success in electrical service work. Service-savvy ECs must make it an integral part of their operations.

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