

An overview of the latest buzzword

Design/Build: Good for Owners, Good for Designers



This 161,000 sq. ft. distribution facility, built by CON/STEEL Alliance member Cutler Associates, is one of many constructed for Unisource using the CON/STEEL design-build system throughout the country.

By Mark Thompson, P.E., CSP, CPE

Design/build has developed into a buzzword for the building and engineering communities over the last few years, and as more and more people become familiar with the method, it is developing a considerable following. The design/build method gives one entity all project responsibility. Architectural and engineering design, as well as construction services, come from one team, providing cost and time savings in addition to increased quality control.

Often design/build projects are built on a fast-track basis where construction begins prior to the completion of the design phase. When compared with traditional design-bid-build contracting, design/build is

33% faster according to the Design/build Institute of America (DBIA).

This method has been touted as beneficial to building owners for many reasons: controlled schedule and budget, early knowledge of costs, improved risk management and reduced administrative burden. Further, the design/build entity must settle all questions internally, thus generating less finger-pointing and refereeing for the owner. However, despite limited publicity on the matter, design/build is an asset of equal magnitude for engineers as well.

Engineers cannot downplay the importance of employing a system that is advantageous to owners. After all, engineering is a service industry, so if it benefits the client, it benefits us.

But what's really in it for engineers?

The engineer utilizing design/build truly becomes part of the process from concept to construction. Because engineers must collaborate with the constructor and owner, they produce more buildable designs. Working directly with the construction team allows engineers to more clearly see the project from the builders' point of view. This facilitates communication and innovation; thus the entire team benefits from the mutually beneficial relationship.

"Engineers who are active in integrated services delivery recognize that design/build is the one process that encourages innovation," said Jeffrey L. Beard, executive director of DBIA. "According to the Civil Engineering Research foundation, design/build is the ideal model for moving innovation, whether it is products, services, or means and methods, into practice."

Although the design/build method stems from a team process, the responsibility and technical control of the project design still belongs to the engineer of record. The contractors' input thus enhances both value engineering and creative design.

Need proof?

Since 1966, LJB Engineers & Architects has worked with private and public clients to exceed their engineering needs. Our work with clients throughout the United States has helped us gain the experience of more than 70 million sq. ft. of civil engineering projects, 60 million sq. ft. of industrial facility space, and 50 million sq. ft. of commercial facilities.

Our 30-year history has given us broad experience with design/build and allowed us to utilize the method in many special niches. Each of our departments has used the design/build system to deliver quality projects using progressive and innovative means.

For example, the CON/STEEL division of LJB, an alliance of general contractors in North, South and Central America, has completed more than 700 projects totaling more than 50 million sq. ft. in its 30-year history. Working on a strictly design/build basis, CON/STEEL has completed buildings ranging from schools to auto shops, from recreation centers to massive distribution and retail facilities.

Michael Sugrue, P.E., structural engineer and LJB principal, sees the biggest asset of design/build to be the relationships that develop within the teams. "When you get such close interaction with contractors, you are forced to consider the ramifications of your design," he said. "You are able to tailor your designs to the particular contractor or owner, as well as balance the architectural vision with the reality of construction."

Unisource, one of the world's largest distributors of paper products, has chosen three CON/STEEL Alliance members for construction of their facilities. Jeff B. Forrest, real estate manager for Unisource, said his company benefits from the application of the design/build system.

"The ability to start the project quickly was simple using the design/build system," said Forrest. The usual problems that stem from the adversarial relationship inherent in the traditional design/bid/build process were eliminated using the design/build system, he said.

The advantages of design/build can turn a complex, time-consuming project into a manageable success. LJB's industrial division used the method to complete a \$23 million



Using the design-build system, the small town of Pataskala, OH, was able to reconstruct the deteriorating Creek Road Bridge at 45% below the estimated price and in 1/6 the time of the projected schedule.



The James Ranch bridge was converted from an old railroad line into a walking and bike path using the design-build method for an Ohio County park district.

project for a large automotive manufacturing facility. The project consisted of five parts totaling 200,000-sq. ft.. The single story braced frame and roof truss facility was comprised of three separate expansions, a renovation area, and a small security guard building.

This project truly showcased the reduction in time possible with the design/build system. The design/build team was able to compress a three-year schedule into a two-year plan, obviously saving one year's worth of construction costs.

But more importantly, the shortened schedule allowed the owner to gain a year's worth of production time. Any cash premium paid for accelerated construction was dwarfed by the opportunity costs of an additional year's production. Money owners paid for the overtime hours of workers involved to fulfill an accelerated schedule.

Using the design/build system also allowed LJB to deliver a \$27 million facility for a major insurance company under a very tight schedule. The 284,000-sq.-ft. braced steel frame



The original three-year schedule on this 200,000 sq. ft., \$23 million facility for a major automotive manufacturer was cut to 2 years thanks in part to using the design/build system.

seven-story office with an attached two-story conference and training center was completed in only 14 months.

According to Jack Kroger, senior project manager for the facility, the team was designing and building in the same week. Kroger said, "We could not have done it in the time frame we were given under the normal bid process. When you have such time constraints, you have to get the major players on board and inputting necessary information immediately, and that's what we were able to do with design/build."

Kroger also added that design/build projects can be immensely successful when everyone plays their role and produces, even the owners. "Involving the owner in the design/build team lets them know that they are a vital part of the system. They can truly be a decision-maker, not just a messenger."

Design/build is just as successful with smaller projects. In 1998, the LJB Safety Department designed and installed a fall protection system using the design/build method. The construction team installed two overhead fall protection monorail beams and additional platforms.

Mark Stemmer, P.E., director of the Safety Department, finds many advantages to using design/build. Not only is the process, when done correctly, streamlined and more efficient, but it also enables all parties to

collaborate for increased effectiveness. When design and construction options are presented, owners, designers, and contractors can quickly assess the feasibility of each alternative.

Design/build in the public sector

Design/build has received even more attention lately, as the public sector has become more accepting of the method. Since government facilities are built with taxpayer dollars, agencies have been accustomed and expected to accept the lowest bid. But the newly discovered benefits of design/build are changing the old ways.

In 1998, the LJB Architecture Department was instrumental in the first design/build project ever for the City of Oakwood in Ohio. The government officials realized the advantages of design/build and chose the method to consolidate two municipal vehicle service facilities. The \$5.3 million, 45,000-sq. ft. project was successful because of the flexibility and functionality of the design/build team.

"Because we went the design/build direction and worked so closely with the contractor, we were able to analyze all parts of the project and determine which areas to attack to save money," said Tom Boardman, Jr., RA, of the Architecture Department. He added that by using design/build, it was easy to put real numbers with specifications so the

city could make informed decisions quickly in order to keep the project within budget and on schedule.

The LJB Bridge Department also has used design/build in the public sector by completing a steel bridge for the Greene County Park District. It was the first bridge LJB delivered using the method, and it came in under-budget and on schedule. The project involved converting an old 120' single-span railroad bridge into a walking and bike path.

Mark Henderson, P.E., director of LJB's Bridge Department, sees the biggest advantage of design/build in the ability to be creative and innovative in designing projects. Likewise, design/build is conducive to implementing new technologies, he says.

"When you're dealing with something new, you can't use generic plans or codes," he said. "You have to know the capabilities of the builder, so you can work together to deliver the project effectively."

Similarly, using the design/build system, LJB's CON/SPAN division helped a small Ohio village replace a deteriorated bridge quickly and efficiently. The design/build team worked together to produce a bridge 86' long - 30' longer than the original bridge. The project finished 45 % below the original cost estimate and was completed in 60 days instead of one year. The result was a bridge that was completed in 1/6 of the time, saved the Village \$183,000, and blended well into its park setting. The project team was able to complete the bridge so quickly and cost-effectively since the design-build and CON/SPAN systems allowed crews to destruct the existing bridge and prepare the site while the bridge's components was being constructed off-site. The precast bridge was erected in just one day. This dramatic cost and time savings, as compared to the conventional bidding process, helped CON/SPAN win the 1999 DBIA Award for best civil project under \$15 million.

According to Bill Lockwood, P.E., of LJB's CON/SPAN division, "Design/build is becoming more and more the delivery method of choice. Successful design/build occurs if there is true partnership between client, contractor and engineer, characterized by trust, free flow of communication, frank discussion, and true commitment to solving problems."

The Bottom Line

It is clear from our experience and from reported industry trends that design/build is a viable method for a multitude of projects and personnel. It provides countless advantages to engineers, but the true advantage of the method is its focus on the needs of the client. Design/build is a win-win-win situation—a win for the owner, the contractor and the designers.

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