

## Putting Prefab into Perspective

[Electrical Construction and Maintenance](#)

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The impact of prefabrication on productivity and profitability, as well as its effect on electrical estimation, was the topic of roundtable discussions at this year's MCA spring and fall electrical contractors' symposiums held in Omaha, Neb., and San Diego. Participants of these events came together to learn from each other by sharing real-world experiences. Interested in improving their company's productivity and profitability levels, these individuals represented many levels of the electrical industry, including owners, project managers, superintendents, general foremen, foremen, estimators, salespeople, warehouse managers, IT staff, office managers, CFOs, procurement managers, prefabrication managers, and service department managers.



Following are highlights from both meetings, which should help shed some light on streamlining the prefab process for electrical contractors.

### Spring 2009 roundtable

The focus of the spring symposium was profitability and prefabrication, with a special focus on how companies can better plan, monitor, and manage productivity in the shop and in the field. This event was hosted by Thompson Electric Co.'s Omaha Division.

Prefabrication is an outcome of project planning. Like the outcome of the job for which it is produced, prefabrication can succeed or fail, depending on the quality of the plan. Symposium participants started the session by discussing and brainstorming prefabrication, including — but not limited to — the tools and techniques used in this process. During the brainstorming session the following questions, related to the motivation and risks in doing prefabrication, were addressed:



*Why should a contractor consider prefabrication?*

The following items were cited as positive reasons for implementing this type of program:

- Eliminates the negative impact of weather and other trades.
- Provides an avenue for quicker learning.
- Stabilizes man-loading on projects — labor can go from prefab (planning phase) to the job site as well as provide a buffer for the “peaks and valleys of work” that affect your labor pool.
- Creates ownership in the job early on.
- Reduces mistakes and rework.
- Allows for correct billing.

*Why should a contractor be concerned with prefabrication?*

The following items were cited as potential obstacles when using the prefab process:

- Incorrect or incomplete specs and drawings.
- Field labor is unfamiliar with the process.
- Education — how to use it, how to think about it.
- Availability of material.



### *How can a contractor avoid the potential risks of using a prefab process?*

- Make sure every electrician on the job understands how to use prefab materials
- Rely on MEP coordination, through drawings, shared CAD files, etc.
- Understand BIM requirements.
- Allow other trades to review your plans for the building.
- Hold a coordination meeting upfront with other trades.
- Involve your vendors in the process early on, so they know what materials will be needed at the shop and at the project site.
- Conduct a post-project conference — review with vendors, and, if applicable, other trades.

In support of the group meetings and presentations, Kevin Lytle, vice president of TEC, led a detailed tour of his prefabrication facility. Tom Babb, TEC's Omaha shop manager, answered related questions on-site.

**Photo 1** shows a batch of pre-bent conduit on pallets, which was ready to be shipped to a data center project on which TEC was working. This was of keen interest to the participants, because the perception is that prefab cannot be used on “large” items. For example, prefab is often thought of in metal- or aluminum-clad (MC/AC) cable applications. However, Lytle revealed that if prefab is planned with a reduced installation time in mind, the opportunities for material packages are endless. **Photo 2** shows the same conduit section (ready for delivery) with the ends clearly marked for easy matchup at the job site.

### **Fall 2009 roundtable**

The topic for the fall session was the impact of prefabrication on estimation. This workshop was hosted by Baker Electric Co., Escondido, Calif. By the end of this session, the group developed an increased awareness for the need to use all available tools and processes that measure, report, and record job-site experiences affecting installation, in order to improve prefab estimating and planning procedures. The “takeaway” for all participants at this event was a keen understanding that prefabrication is not only about a facility or a location where work is performed, but also about proper planning and execution aimed specifically at increasing the predictability and consistency of specific tasks that improve system productivity. Key points discussed at this event included:

- Cost code development and content — who creates these, and what purpose do they serve?
- Relating labor hours expended to estimated labor units (by cost code, type of work, and other categories).
- Predictability of the laborer's time to perform all of the work associated with installation.



This discussion led the group to better understand the errors and limitations associated with using averages without ranges. This practice forms the basis of one-dimensional estimating, where the labor units are applied based on one dimension only — material quantities. Moving beyond one-dimensional estimation requires the use of processes and tools designed to detect and report system productivity, obstacles to productivity, and the impact these various obstacles have on work schedules. The group came to an agreement that measuring productivity impacts requires a baseline. At this point, several participants took an opportunity to share the ways they establish baselines for their measurements.

The group spent considerable time looking into various methods and practices used to plan site layout and raceway (large and small) and moved into tracking the plan. Matching installation plans in the field to production planning in the shop and tracking these for effectiveness/efficiency is being done using tools such as CAD and BIM.

In support of the group meetings and presentations at the fall event, attendees paid a visit to Baker Electric's prefabrication shop. To help facilitate a meaningful visit, Baker's representatives took the time to share the details of their project planning process, with specific emphasis on planning and coordination for prefabrication. Individual presentations focused on the following topics: introduction to the planning process; project planning and coordination between field foremen; and prefabrication methods, tools, and tracking.

Baker Electric representatives used **Photo 3** and **Photo 4** to help demonstrate how they engineered and built a power distribution system when retrofitting a school. The system was planned as a rooftop installation so as not to disturb the interior of the building. By thinking of the time that would be spent hauling material and equipment up and down a ladder (or using a lift to get on the roof) prior to the actual installation phase of the project, Baker Electric employees were able to build the system in the comfort of their own shop.

### **Lessons learned**

After compiling the feedback from these two symposiums, we learned that prefabrication is not a magic tool; it's a known environment to execute a plan consistently and predictably. It's also more difficult to take a prefabrication shop out of an operation that relies on it, rather than build one.

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## **Sidebar: Prefab Process Design**

The design of a prefabrication process has to take into account at least the following critical criteria for its success and optimization:

- The material flow (including from the vendor, within the prefab assembly, and to the job site)
- Assembly of standard parts
- Assembly of standard, but job-specific parts
- Assembly of job-specific parts

The off-site prefabrication has to be job independent and contribute to reduction of labor cost in material handling and labor waste on the job site.

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