Best Practices: Prefabrication for Electrical Contractors

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Introduction

Prefabrication, preassembly, modularization, and off-site fabrication are all forms of prework. Prework refers to construction activities that occur away from the job-face (i.e., the final location of the constructed item). As the construction industry continues to face challenges such as labor shortages, fast-track project demands, and increasingly complex projects, contractors are adopting innovative approaches to construction, such as prework.

To provide a basis for classification of prework, the Construction Industry Institute developed the following definitions:

- **Prefabrication**: a manufacturing process that generally takes place at a specialized facility, where materials are joined to form a component part of a final installation. Prefabricated components often involve the work of a single craft.
- **Preassembly**: a process where materials, prefabricated components, and/or equipment are joined together at a remote location for subsequent installation as a sub-unit; generally focused on a system.
- **Modularization**: a major section of a plant resulting from a series of remote assembly operations and may include portions of many systems; usually the largest transportable unit or component of a facility.
- **Offsite fabrication**: the practice of preassembly or prefabrication of components both off the site and onsite at a location other than at the final installation location.

In terms of electrical construction, the most common form of prework is prefabrication. The growing use and interest in prefabrication among electrical contractors was the driving force behind developing this document of “best practices.”

1.1 Use of Prework in the Construction Industry

The use of prework in the industrial sector almost doubled in 15 years during the 1980s and 1990s. Based on a survey of 29 construction professionals, the average use of prework in terms of percent of overall project work increased from 14 to 27 percent. The sectors with the most
significant increase in the use of prework were piping, structural assembly, mechanical, equipment, ironwork, instrumentation, and welding (Figure 1.1). Approximately 40 percent of electrical contractors responding to the survey were using prework.

The reasons these contractors gave for the increase in the use of prework were cost, schedule, and workforce issues. Other research has also documented the benefits of prework, such as shorter construction time, decreased construction cost, and increased quality.

### 1.2 Benefits of Prework in Construction

The use of prework is increasing because prefabrication, pre-assembly, and modularization are strategies that have the potential to:

- Significantly reduce project duration
- Improve productivity
- Reduce labor needs and costs
- Improve safety

The end result is that prework can increase profit within a company. The use of preassembled products may not always lead to a reduction in capital costs, but many of their other advantages have an indirect cost benefit that can outweigh an initial cost premium. Some indirect benefits are less lost and wasted material, more efficient use of manpower, less investment in expensive tools, less trash/scrap at job site, fewer miscellaneous materials to distribute at the job site, and increased opportunities to provide training for apprentices and new employees. Impediments to prefabrication and preassembly are additional pre-project planning and project coordination; increased transportation difficulties; greater inflexibility; and more advanced procurement requirements.

For electrical contractors, there are still opportunities to achieve some or all of the benefits of prefabrication. The purpose of this document is to present a series of “best practices” for prefabrication for electrical contractors who wish to start a prefabrication process or improve an existing prefabrication process.

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