

Unions Electrical Workers are not Against Prefabrication

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Unions are vital part of growing and expanding construction industry. What union electrical workers get out of the industry depends on their readiness and competitiveness to advance the existing work methods. Prefabrication is one of these methods and many researches indicate its benefits in terms of time, cost, quality and safety. But, electrical union workers have not fully utilized these benefits & there are limited information available on the prevailing best practices of prefabrication specific to different local unions jurisdictions. Accordingly, this paper identifies the prevailing best practices of prefabrication feasible to union electrical workers. The intended audiences are union electrical workers and union electrical contractors. The study is performed by conducting survey to collect the necessary data from union electrical workers who are working under local union 613. The questions are designed to evaluate union workers attitude towards prefabrication and mainly focus on listing and comparing most useful prefabrication practices. The study helps to bring a common understanding among union electrical workers on implementation of prefabrication and it open doors for continual improvement on prevailing best practices. Ultimately, these may significantly alter union electrical workers competitive position and make them more sustainable.

Keywords: Unions, Union workers, Prefabrication, Best practice, Electrical

Introduction

Prefabrication is a manufacturing process, generally taking place at a specialized facility, in which various materials are joined to form a component part of final installation. Prefabricated components often involve the work of single craft. The actual prefabrication can occur any place (on- site or off-site), where there is space to complete the work. (Bogus, S., Jones, C. and Rounds, J., 2009).

Several researches indicate the benefit of prefabrication in terms of quality, cost, time and safety. Prefabrication creates better working conditions and decrease safety risks at both the worker and company levels, which improve the quality of projects. (Bogus, S., Jones, C. and Rounds, J., 2009) (Hanna A., Michail G. and Iskandar K., 2017) (Khaleghian, H., Shan, Y. and Lewis, P., 2016). Also, few researchers identified the best practices of prefabrication related to electrical contractors, supply chain and labor union relationship. (Said, 2015) (Hanna A., Michail G. and Iskandar K., 2017). But, there are still limited resources on best practices of prefabrication which are specific to union electrical workers. Also, some electrical union workers are unsure about the benefits of prefabrication and not eager to deal with electrical works involving prefabrication. In addition to this, one research indicates labor union relations and agreements can either motivate or discourage construction and electrical contracting companies to adopt prefabrication and industrialization approaches. For example, resistance of the local electricians' union may constrain contractors to prefabricate building systems outside of the project premises. (Said, 2015). Hence, it is important to evaluate how much union electrical worker favor prefabrication by identifying the prevailing best practices of prefabrication currently implementing in local union 613. The findings help for better understanding of the prevailing best practices of prefabrication in the eyes of union electrical workers. Ultimately, these may be applied to improve union electrical workers competitive position.

Background

International Brotherhood of Electrical Workers (IBEW) is the oldest and the largest electrical union in the world. It represents approximately 800,000 active members and retirees in 1000 local unions. Members work in a wide variety

of fields, including, utilities, construction, telecommunications, broadcasting, manufacturing, railroads and government (IBEW, 2017).

The objectives of IBEW are : to organize all workers in the entire electrical industry in the United State & Canada; to promote reasonable methods of work; to cultivate feelings of friendship among those of the industry; to settle all disputes between employers and employees; to secure employment; to assist each other; to reduce the hour of daily labor; to secure adequate pay for the work; to seek higher standard of living; to seek security for individuals; and by legal and proper means to elevate the moral, intellectual and social conditions of members, their families and dependents, in the interest of a higher citizenship (IBEW, 2017).

The last decade has been one of the most trying periods for the IBEW and the unionized electrical construction industry since the Great Depression. A growing and aggressive nonunion sector has eaten into the IBEW's work, even in regions where IBEW traditionally strong. And the 2008 economic crash sent the unemployment rate to the highest levels in 70 years, threatening to further erode union market share. The study conducted in 2014 shows that 70 percent of electrical construction work in the United States is done by nonunion. Also, the market share, competition and the strength of local unions is widely different, from north to south and from east to west throughout the United State. In the south-east union market share are below average and have not shown significant growth in recent years (IBEW, 2017).

Local Union 613 is one of the hundreds affiliation of the International Brotherhood of Electrical Workers in the south east. It represents over 3500 members in all phases of the electrical industry and have jurisdiction in 59 counties in the state of Georgia to include the Athens, Rome and Columbus areas (IBEW, 2017).

One of the objectives of IBEW is to promote reasonable methods of work (IBEW, 2017). To this effect, different methods of work have been introduced through its history. Prefabrication is one of these methods and previous studies indicate that most electrical construction companies are currently using prefab and adopt it on any project, regardless of the project size. In addition, they use prefab in different electrical activities, but most of time, prefab is used in cutting and spooling wires, bending conduits and creating receptacle assemblies. Also, Electrical contractors usually perform prefab in-house and off-site. This suggests that electrical contractors have their own prefab shops where they perform prefab and then they send the prefabricated items to construction site ready to be installed. However, they still spend a limited amount of their labor hours on prefab. (Bogus, S., Jones, C. and Rounds, J., 2009) (Hanna A., Michail G. and Iskandar K., 2017) (Khaleghian, H., Shan, Y. and Lewis, P., 2016).

Research Methodology

Data collection

Survey questions is formed to collect the necessary data from union electrical workers who are working under local union 613. Initially, a pilot survey is conducted to review the questionnaire relevance by interviewing one project manager & two foremen. Following the review step, the survey was distributed to union electrical workers in hard & soft copies. A total of 14 respondents have given response to the questionnaire who are working in seven different companies. The respondents are five Atlanta Electric Training Center instructors, three project managers, one estimator, two foremen and three apprentices. Eight of the respondents have more than 15 years' experience working for electrical unions. More representative samples are taken for instructors, since they have accumulated vast experience in the field before they joined the training center. And, additional respondents are taken to obtain representative samples from each major union members classification. These respondents are working in six different union electrical contracting companies.

The questionnaire has three sections. The first section gives general information to the respondents about the research. The second section comprises questions about the general profile of the respondents. In the last section, the questions are designed to evaluate union workers attitude towards prefabrication & mainly focus on listing & comparing most useful prefabrication practices.

Data analysis

Most of the best practices are collected from previous studies and weighted based on the collected data. For each activity, respondent rated the usefulness of the practice based on a five-level rating scale. The minimum rating is “1” and the maximum rating is “5”. To calculate the weighted average, first, each rating is multiplied by the number of respondents. Next, all multiplied ratings are added together and then, divided by the number of respondents. The weighted average is the final rating for each listed description.

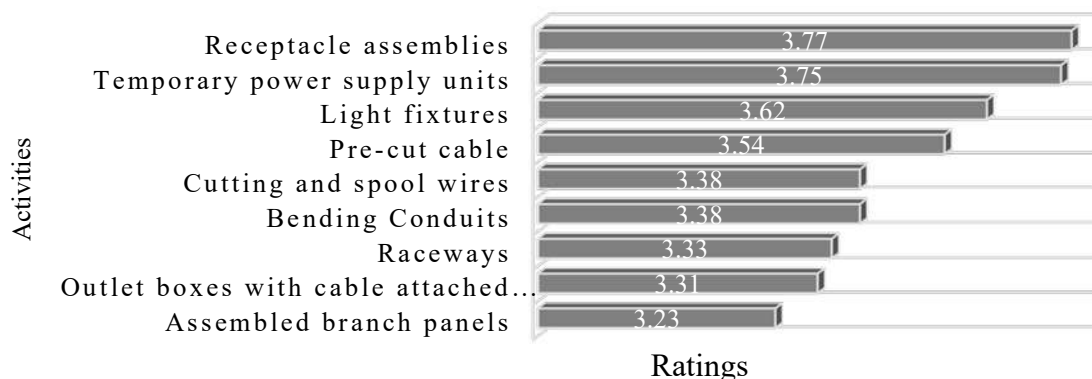
Results & Inferences

Respondents were asked a question about their attitude toward prefabrication. The purpose of this question was to study the correlation between being a union electrical worker and adopting prefab. Of the total respondents, thirteen of them have been involved in prefabrication work throughout their experience & twelve of them support prefabrication in electrical work activities. The other question asked about whether the increased use of prefab offers the potential to gain competitive advantage or not. Except one respondent, all agree on competitive advantage of prefabrication. These show that there is wide acceptance of prefabrication among union electrical workers. The difference is on understanding and implementation of best practices of prefabrication. Hence, the survey includes respondents rating on the prevailing best practices of prefabrication feasible to union electrical workers, which are identified and categorized in to four sections.

Frequency of prefabrication usage on different assemblies

The respondents rated the frequency of prefabrication usage for some of the common prefabrication assemblies on a scale from “never” to “all of the time” & is shown in figure 1 below. Each rating factor is assigned a number: one to five. The mean scale denotes the average of all the responses for each activity. The closer this number is to five, the more significance is given to this point. With a mean scale of 3.77, receptacle assemblies are the most often used. Temporary power supply units come second with a mean scale of 3.75 and light fixtures come third with a mean scale of 3.62. The difference between each category is minor, which shows that, prefabrication is adapted in major categories of electrical assemblies.

Fig. 1: Rating of Usage Frequency of Prefabrication Assemblies



Important requirements for good prefabrication

The respondents rated the requirements of good prefabrication based on seven listed practices from previous studies, as shown in Table 1 below. According to the rating, Proper design in terms of repetitiveness is the most important requirement for effective prefabrication. Also, union electrical contractors believe that early decision making is a substantial requirement. Though, using BIM (building information modeling) is the least important requirements. Hence, it is important to familiarize union electrical workers to BIM to maximize its usage among union electrical workers.

Table 1 *Rating of important requirements*

Requirements for good prefabrication	Not at all	little	Some what	very	Extremely	Weighted average
Proper design in terms of repetitiveness/modular				3	10	4.77
Early decision making			1	2	10	4.69
Thorough shop testing & verification			2	3	7	4.42
Careful supply chain management			2	6	5	4.23
Detail transportation planning & expediting			2	6	5	4.23
BMI (building information modeling) usage			3	5	4	4.08
Underground assemblies		1	3	5	3	3.83

Benefits of prefabrication

After confirming union electrical workers support for prefabrication, it is important to study benefits of prefabrication as compared to traditional method. According to the rating as shown table 2 below, prefabrication has great potential for improving craft productivity by centralizing use of tools and equipment. Also, it reduces construction waste as compared to traditional work method. This can help union electrical workers for optimizing the benefits by making further improvements in using prefabrication in their future projects.

Table 2 *Rating of benefits of prefabrication*

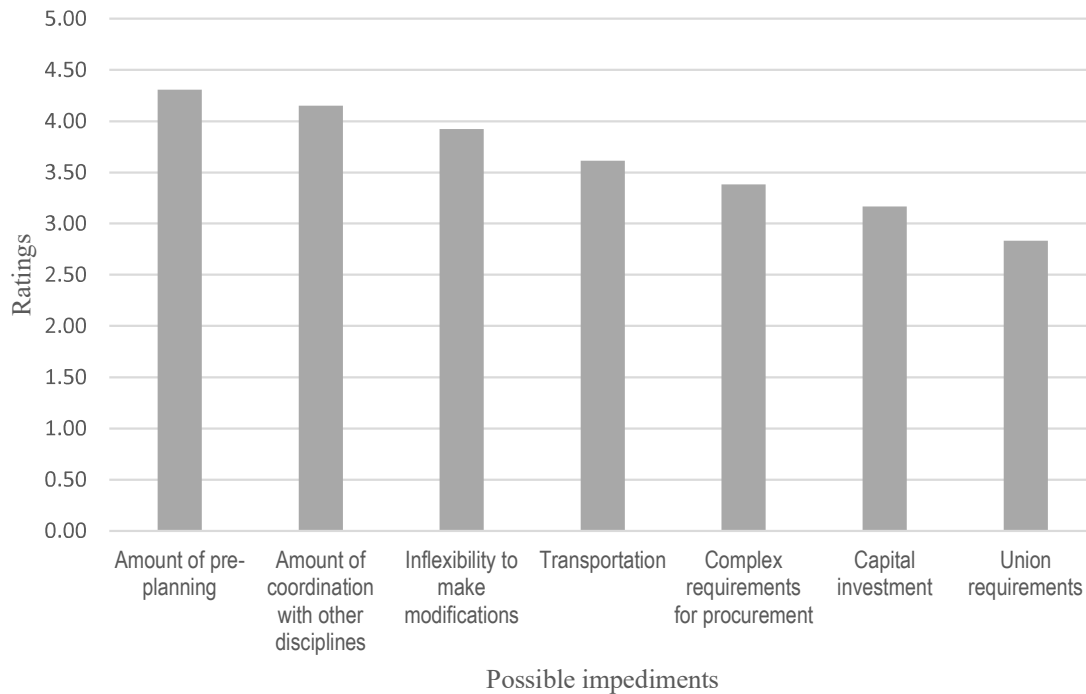
Benefits of prefabrication	Much worse	Worse	The same	Better	Much better	Weighted average
Centralized use of tools & equipment			1	6	5	4.33
Reduce construction waste			3	4	6	4.23
Increase productivity			3	7	3	4.00
Decreasing high elevation & confined space work			3	8	2	3.92
Reduce shutdown time		1	1	5	2	3.89
Reduce project duration		1	1	9	1	3.83
Safety			5	7	1	3.69
Increasing parallel activity			5	6	1	3.67
Quality		3	2	6	1	3.42
Reduces mistakes & rework	2	1	7	2	1	2.92

Impediments to the use of prefabrication

After listing seven possible impediments of adapting prefabrication on any electrical projects from previous studies, significance of each impediment is rated as indicated in figure 2 below. The amount of pre-planning is the most significant one and coordination with other disciplines is the second significant impediment with prefabrication. The third significant impediment is inflexibility to make modification. Union requirements is the

less significant impediment. This agrees with the result shown above that union requirements are not significant factors in determining the use of prefabrication.

Fig. 2 Rating of Possible Impediments to Use Prefabrication



Conclusion

Thirteen of respondents have been involved in prefabrication work throughout their experience & twelve of them support prefabrication in electrical work activities. This indicates there is a wide acceptance of prefabrication among union electrical workers, even though there are few union restrictions. And mainly, the prevailing best practices of prefabrication feasible to union electrical workers are identified, which are summarized in the following four sections.

1. Proper design in terms of repetitiveness, earlier decision-making and thorough shop testing are the most important requirement for effective prefabrication. On the other hand, union electrical workers are not familiar with BIM in prefab use.
2. Prefabrication has great potential for improving craft productivity by centralizing use of tools & equipment & reducing construction waste as compared to traditional work method.
3. Electrical contractors use prefab in different electrical activities, but most of time, prefab is used in creating receptacle assemblies, temporary power supply units & installation of light fixtures.
4. The amount of pre-planning, coordination with other trades and inflexibility to make modifications and are the most significant impediments to using prefab in the electrical construction industry.

This gives a common understanding among union electrical on implementation of prefabrication & it open doors for continual improvement on prevailing best practices. Finally, further research is required to handle the most significant

impediments on usage of prefabrication. Also, it is important to identify union restrictions on prefabrication, which vary depending on local unions jurisdictions.

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