

THE ELECTRICAL CONTRACTING FOUNDATION

ORGANIZATIONAL DEVELOPMENT

A Comparison of Operational Costs of Union vs. Non-Union Electrical Contractors

Dr. Praviz (Perry) Daneshgari
Motor Consultants of America, Inc.



ELECTRI 21

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Executive Summary

This study was commissioned to investigate the main differences between unionized electrical contractors (ECs) and open-shop contractors, as well as to identify the main cost drivers and how they differ between the two. Throughout this study, we determine the impact of various cost drivers on union contractors.

Their impacts on cost can be ranked as:

1. Operational model
2. Labor management and cost
3. Labor hiring, training and loyalty
4. Procurement
5. Office support
6. Crew ratio
7. Application of prefabrication
8. Composite crew mix

The research was conclusive about the importance and impacts of these cost drivers. *Contrary to common perception, the main difference between the two styles of operations is not the labor cost, but, rather how the labor is managed.* The cost of labor and its uncertainty is driven primarily by management practices. We believe that these differences have had major impacts on unionized electrical contractors' market share. Market share has been one of the main measurements for businesses since the early twentieth century. Share of the market by itself, however, does not justify any concern or lack of it for the

health and wealth of an industry or organization. Profitability, productivity and market share need to be evaluated simultaneously in order to gauge the success of any operation or organization.

Current measurements of the market share of the signatory contractors, and therefore of the IBEW, show a 30-year decline. (NECA maintains its market share data on a per-person basis. IBEW market share is calculated by dividing the number of IBEW electricians by the total number of electricians.) According to NECA's measurement, the market share has dropped from 48 percent in 1982 to 31 percent in 2000 (15). The market share drop and reduced profitability, as well as market expansion of open-shop electrical contractors, have troubled unionized industry leaders.

This study determined that the convoluted expectations and regulations of the labor union add cost to the stakeholders without providing any added value to them. On the other hand, open-shop contractors enjoy a higher level of freedom that results in lower cost.

The conclusion of our research is both provocative and essential for the future growth of union electrical contractors. To secure your business' future by expanding your productivity, profitability and, therefore, your market share, please read on.





Introduction

Unionized electrical contractors are under constant and fierce market pressure from their nonunion competitors. The current situation is similar to that of the United Auto Workers (UAW), about which this author has considerable experience. The decision in the early 1970s of the Users Round Table (today's equivalent of the Construction Users Round Table) to reduce its involvement with the union contractors started and aggravated the situation. Although unionized ECs believe that cost of labor is the main reason for increased nonunion market share, other management related factors differentiate the two groups. Some of those factors include operational model, labor management and cost, labor hiring, training and loyalty, pro-

curement, office support, crew ratio, application of prefabrication, and composite crew mix. These factors, which directly impact profitability, are not well understood.

Figure 1 depicts a few interesting and alarming statistics with regard to market share and the unionized workforce (15).

Many differences exist between the operational costs of union and nonunion electrical contractors. While the higher union labor rate and fringe benefits do impact each project's cost, our research has identified that other cost drivers, such as labor management, have as high or higher impacts on the bottom line of contractors — and therefore on the signatory contractor's market share. To better understand this, we compared impacts of labor cost, as well as other factors that could contribute to union versus nonunion price differences. Our research concentrated on the following components as cost drivers:

- Operational model
- Labor management and cost
- Composite crew mix
- Crew ratios
- Labor hiring, training and loyalty
- Application of prefabrication
- Procurement
- Office support

Figure 1: Lessons from History

Bureau of Labor Statistics:

- Employment in the construction industry:
 - 1.2 million in 1939
 - 6.8 million in 2001*(only 18% of this population is organized)*
- Total hours worked by nation's electricians:
 - 600 million in 1982
 - 1.35 billion in 2000
- Market share of union workers (IBEW):
 - 48% in 1982
 - 31% in 2000





Goals and Objectives

The purpose of this project was to identify and investigate factors impacting profitability and cost on both union and nonunion ECs.

- The investigation of these cost drivers concentrated on discovering the following factors:
- The main contributing components of cost for union and nonunion electrical contractors.
- The influence of these components on overall cost and profitability.
- The verification of the impact of the components on overall cost.
- The effect on union ECs' competitive advantage when there is a reduction of cost on any of the components.





Data and Information Gathering

We took the following steps in conducting this study:

Twenty-five relevant companies were interviewed for this research—union and nonunion electrical contractors, electrical material manufacturers and electrical material distributors.

A literature survey of the electrical contracting industry was conducted. It gave us insight into common customer expectations of both union and nonunion ECs, as well as insight into the industry perceptions of both union and open-shop labor.

Data was gathered, including a survey of unionized electrical contractors. This survey enabled us to verify our interview findings among a wider sample of electrical contractors.





Industry Interviews

To understand the EC industry's perceptions and realities, we interviewed industry and company leaders, as well as a few IBEW leaders, union and open-shop electrical contractors. We also included a few electrical distributors and manufacturers in our interviews. The interviews were conducted to clarify underlying assumptions and perceptions in the industry from the contractor's point of view. The data gathered from these interviews helped us to develop the survey questions. In addition to the interviews, we introduced some input from companies that we had the good fortune to either work with or study during previous research. This, in combination with the literature survey, enabled us to draw conclusions and correlations among seven factors that distinguish union and nonunion organizations.

To get an accurate slice of the entire EC industry, we took into consideration the sales volume, geographic location and markets of each interviewed company. The annual sales of interviewed companies ranged from a few million dollars to one billion dollars, and the locations and territories of those companies spanned the United States.

In each interview, we spent approximately two hours with the company's decision makers and managers in a relaxed setting.

Confidentiality was promised to the interviewed companies. All of the companies had been prepared with project objectives and an interview agenda specific to their industry. (See Appendix A for a copy of the interview agenda and of the companies interviewed by the research team.)

In addition to conducting the interviews, we were invited to facilitate a meeting of the National Labor Management Cooperation Committee (NLMCC) in August of 2003 in Knoxville, Tennessee. The purpose of the meeting was to identify the common issues facing the labor and management. The NLMCC consists of executives from both the National Electrical Contractors Association (NECA) and the International Brotherhood of Electrical Workers (IBEW). **Table 1** shows the executives and industry leaders who attended. At the meeting, the author introduced the preliminary research results and asked the labor and management leadership for their input and course corrections for the remainder of the work. (See Section 5.10 for their input.) As a result, members of the meeting organized three national collaborative teams between NECA and the IBEW to investigate various options for improving their collective market share.

Table 1: Executives and Industry Leaders in Attendance

John M. Grau	Chief Executive Officer	NECA
Edwin D. Hill	International President	IBEW
Ben Cook	President	NECA
Jeremiah J. O'Connor	International Secretary	IBEW
Mark Ayers	Director, IBEW Construction and Maintenance Department	IBEW
Frank J. Carroll	Vice-President, Second District	IBEW
Pat Curley	Vice-President, Sixth District	IBEW
Robert F. Daoust	Vice-President, District 9	NECA
William C. Eads	Vice-President, Eleventh District	IBEW
Robert Egizii	Vice-President, District-at-Large	NECA
Rex A. Ferry	Vice-President, District 2	NECA
David F. Firestone	Vice-President, District 7	NECA
Johnathan B. Gardner	Vice-President, Seventh District	IBEW
R. Drew Gibson	Executive Director, Midwestern Region	NECA
Geary M. Higgins	Vice-President, Labor Relations	NECA
Melvin W. Horton	Vice-President, Fifth District	IBEW
E. Milner Irvin	Vice-President, District 3	NECA
Robert Klein	Vice-President, Tenth District	IBEW
William Kuhr	Executive Director, Western Region	NECA
James E. Mackey	Vice-President, District 6	NECA
Edward T. McPhee, Jr.	Vice-President, District 1	NECA
Michael S. Mowrey	Vice-President, Ninth District	IBEW
Larry F. Neidig	Senior Executive, Assistant to the International President	IBEW
Richard A. Parenti	Executive Director, Eastern Region	NECA
A.J. Pearson	Executive Director	NJATC
David Roberts	Executive Director, Southern Region	NECA
Gervase R. Rose	Vice-President, District 4	NECA
Donald C. Sigel	Vice-President, Third District	IBEW
J. Michael Thompson	Secretary-Treasurer	NECA
Jon F. Walters	Vice-President, Eighth District	IBEW

Interview Results

The interviews identified the EC industry's predominant perceptions in:

- Operational model.
- Labor management and cost.
- Composite crew mix.
- Crew ratios.
- Labor hiring, training and loyalty.
- Application of prefabrication.
- Procurement.
- Office support.

It is necessary to mention here that the majority (82 percent, according to NECA) of all the union contractors is smaller than ten million dollars in annual sales. As in any nationwide study, some generalizations had to be made. These conclusions, however, may not apply to all of the companies all of the time, especially to larger companies whose management has taken more active roles in their labor management. Additionally, due to the nature of

the union agreements, which are regionalized, some of the conclusions may not apply across the country.

Therefore, when we mention a union or open shop’s specific behavior or operation, we mean that it applies to the majority of the interviewed companies. Our statements should not be taken as absolute generalizations.

This section is reporting only what the interviewed companies have told us. Section 8.0 contains our analysis of these interviews and survey results.

Operational Models

The most important difference between union and open-shop ECs is in their operational models. Open-shop managers look at their operations as a business, while a majority of the union contractors view themselves as an extension of their field operations. *In other words, union contractors look at themselves as electrical shops doing business versus businesses providing electrical services.*

This basic difference in operational philosophy dictates their organizational behavior. Open-shop operators consider themselves as the managers and owners of the means of production, while most union contractors believe that it is the labor that controls the means of production. Open-shop managers believe that they are responsible for the productivity and, therefore, the profitability of the jobs. Union contractors believe the quality of the labor determines their productivity and profitability.

Union contractors believe that it is the labor in the field that makes them money. Open-shop contractors know that the money is made in the field by effectively managed labor. Union contractors believe the labor is the high-

est risk and uncertainty of the job, while open-shop managers consider the *management* of the labor to be the highest risk. In other words, it is not the labor that is uncertain—it is how the labor is managed.

Labor Management and Cost

A common perception throughout the electrical contracting industry is that the difference in labor rates, fringe benefits and lack of freedom to vary crew ratios causes higher labor cost for union contractors. This perception is true. Our survey showed that union contractors’ price for labor is, on the average, 10.9 percent higher than their open-shop competitors. A less top-heavy crew ratio, utilizing a higher number of apprentices, also allows open-shop ECs to lower their job cost.

Even though these factors impact the sales price, we found that there are other factors that affect the operational cost of union electrical contractors.

According to NECA’s 2002 annual financial performance report, labor cost makes up 41.6 percent of the project’s total cost for union contractors (1). (See **Table 2.**) Our previous

Table 2: Total Project Cost for Union Contractors

Material Cost	29.59%
Direct Labor Wages	28.34%
Labor Adder	13.26%
Total Direct Cost	79.50%
Gross Income	20.50%
Total Overhead Expenses	16.80%
Net Profit Before Tax	3.08%

research (10) has shown, and this research has validated, that the operational model and labor management have the largest impact on labor cost. According to the survey conducted by this researcher, from the electricians' perspective, 60 percent of jobsite performance issues stem from insufficient explanations by management and from supervision's expectations (10).

Composite Crew Mix

Composite crew mix is closely tied to the crew ratio; however, the contractors have the choice of mixing different crews. For example, how many foremen, journeymen and apprentices are mixed within the crew ratio limits is the choice of each contractor. Union contractors can lower their labor cost by changing the composite crew mix after the initial estimate. They can also alter this mix during the project. The issue that surfaced during the interviews is that open-shop contractors have greater flexibility in setting and managing their composite crew mix and ratio. This is often the case.

Crew Ratios

The concept of nonregulated crew ratio was also an important topic in the interviews. The industry perception is that open-shop contractors can use a less top-heavy crew ratio, employing a higher percentage of apprentices and helpers, thereby lowering their project cost. By contrast, union ECs' crew ratios are regulated by local NECA/IBEW labor management agreements. This perception of nonunion ECs running less top-heavy crews was validated in the interviews. However, because of the differences in their philosophies of operation, union contractors will have a more difficult time managing a flexible crew ratio since they expect the

labor to run the jobs. The union electricians are trained primarily in the technical aspect of their jobs, believing that changing the crew ratio will have a negative impact on their productivity. There are some exceptions to this. The crew ratio for open-shop contractors in a few areas of the country, mainly in the Northeast, is controlled either by city or state regulations. Often these regulations mandate crew ratios comparable to those of local NECA/IBEW labor agreements.

Labor Hiring, Training and Loyalty

Training differences between union and nonunion ECs surfaced in nearly all interviews. The viewpoint of the EC industry is that union electricians have better technical training than do their open-shop counterparts. This perception is well founded. The training within the National Joint Apprenticeship and Training Committee (NJATC) is thorough and well respected throughout the industry.

The locations of training differ between union and nonunion ECs. Our survey data showed that the majority of the union contractors rely on NJATC for the bulk of their training. Union contractors fund an annual training budget of over \$100 million, which is spent by the NJATC to train electricians (3). Union electricians undergo rigorous technical training for the first several years of their careers.

Like union ECs, open-shop ECs often rely on external associations, such as the Independent Electrical Contractors (IEC) or their vendors, for their training. The difference is that most interviewed open-shop ECs offer internal training as well. In some cases, the entirety of their training is within the company.

Most union contractors we interviewed are satisfied with the basic training their apprentices receive to become journeymen, and they rarely use available advanced training offered by NJATC. Open-shop contractors, on the other hand, offer incentives, and most require minimum annual training from their technicians. These requirements are not just in technical training. They require safety, financial, productivity, company values and managerial training as well.

The study data show that only 25 percent of all the nation's union electricians are considered to be core electricians for union contractors. This, compared to the fact that all the electricians working for open-shop contractors work for the companies, creates a disadvantage for union contractors. Open-shop contractors, however, show a higher rate of turnover that has a comparable impact on their operations. The disparity points to major differences in loyalty between the two operational models. Additionally, keeping the same crew together is much easier for open-shop contractors. Union contractors have to rely on individual productivity and performance, whereas open-shop contractors can rely on team productivity and performance. This gives open-shop contractors a greater advantage in the reduction of their labor productivity variation.

Application of Prefabrication

The flexibility-of-crew ratio for prefabrication is believed to give a cost advantage to open-shop operators. The variable crew ratio of open-shop contractors allows for cheaper manufacture of prefabricated material. Union contractors have to comply with the local NECA/IBEW labor agreements that set the crew ratio at the prefab shop equal to the crew ratio in the

field. Open-shop contractors' crew ratios are unregulated, unless their prefab operations fall within one of the cities or states that has universal regulations.

Procurement

Our interviews revealed no significant differences in procurement processes between union and open-shop contractors. The same advantages of horizontal integration vs. vertical integration were observed in both types of electrical contracting models. Sporadic partnership with distributors was observed in both union and open-shop operations. These observations led us to believe that both union and open-shop contractors can benefit from a better procurement model.

Office Support

Support staff in an open-shop EC is considered to be an integral part of the entire company's operations. Among union contractors, support staff is typically considered a necessary evil. Due to the productivity differences between the two types of operations, union contractors keep their support staff at a minimum, believing that they are a non-value added expense. During our review of the financial data of the companies interviewed, we found that in order to improve net profits by 30-50 percent, a typical union contractor has to lower the company's overhead cost by 25-30 percent. Instead, contractors could achieve comparable results by reducing the cost of goods sold (through better labor management productivity) by a mere 1 percent.

The function of the support staff also varies between union and open-shop contractors. For example, union contractors in high population density areas of the country, who are forced to



operate in multiple jurisdictions, must allocate a large amount of their office labor’s time to tracking IBEW forms. (See **Figure 2.**) Naturally, open-shop contractors do not carry this cost.

National Labor Management Cooperation Committee (NLMCC)

Open-shop contractors are gaining market share in the newly emerging, highly technical electrical contracting markets as well, while union ECs tend to maintain their

market share in mature electrical contracting markets. During the NLMCC meeting in Knoxville, Tennessee, the NECA and IBEW executives estimated the market share of unionized contractors in various markets. (See **Table 3.**) According to their estimates, union ECs focus more on industrial, utility, line and government/ institutional work. Open-shop ECs often focus on commercial, VDV and service markets. The opinions of the NLMCC were echoed throughout the interviews.

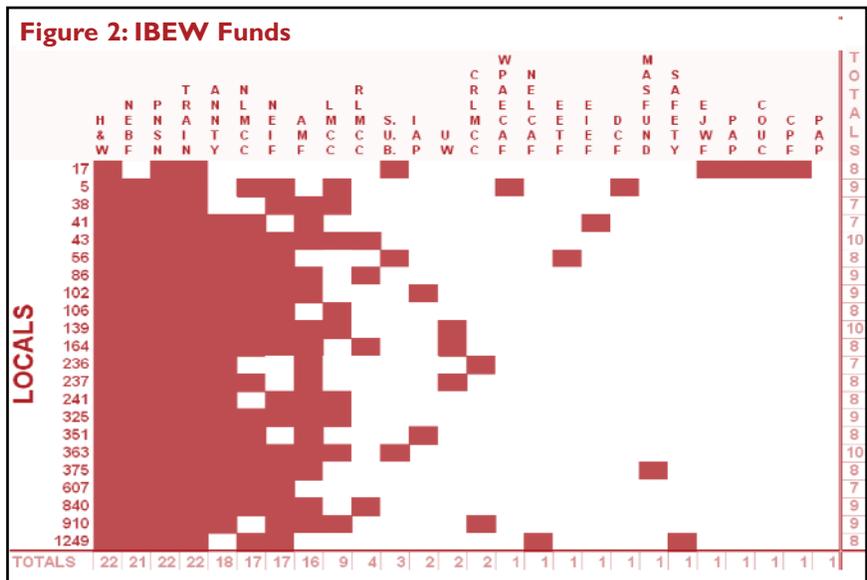


Table 3: Estimated Unionized Market Share

Residential	6%
Industrial	58%
Commercial	25%
VDV	10%
Highway	34%
Line	48%
Service	18%
Government/Institutional	52%

Literature Survey

The literature survey found that ECs share many of the industry perceptions. And research into mature electrical contracting markets and union market share confirmed these perceptions.

Union contractors historically have controlled electrical work in industrial, utility, line and government/institutional industries. With the exception of government/institutional work, many of these markets have declined.

Power Generation Impact

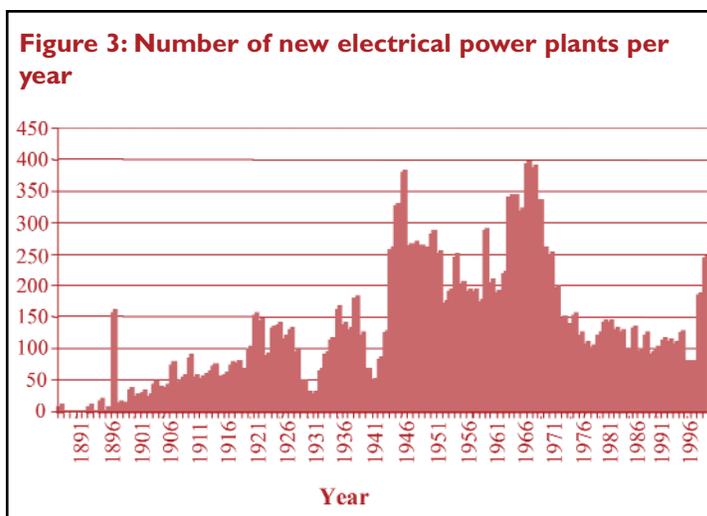
During the 1990s, power plant construction, a market NECA/IBEW historically controlled, reached its lowest level since the 1940s (4). In addition, the investment in transmission lines has been steadily dropping since tracking began in 1975 (5). Manufacturing's percentage of the Gross Domestic Product (GDP) has been declining for the past 20 years (6).

The changes and shifts in markets dominated by either union or open-shop contractors have had a major impact on expansion or retraction of the total market share. Using market share estimates as an indicator, open-shop contractors tend to focus on commercial work while also working extensively in the VDV and service

industries. In fact, one of the reasons that open-shop contractors have gained market share is that the markets they specialize in have increased over the past 30 years. This stands in stark contrast to the markets in which the IBEW has had dominance. These more traditional markets have decreased.

An example is in the power plant industry where construction has declined steadily from 1970 to 1998, as displayed in **Figure 3**. One reason for the decline is nuclear power, which has transformed the power generation industry. With nuclear power, fewer plants can supply a much larger capacity, as illustrated in **Figure 4**.

By 1990, nuclear power was deemed too risky. Only two nuclear power plants were



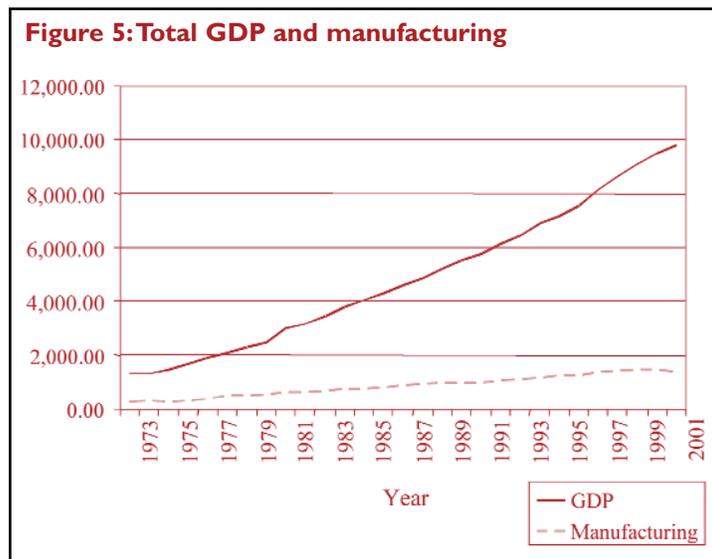
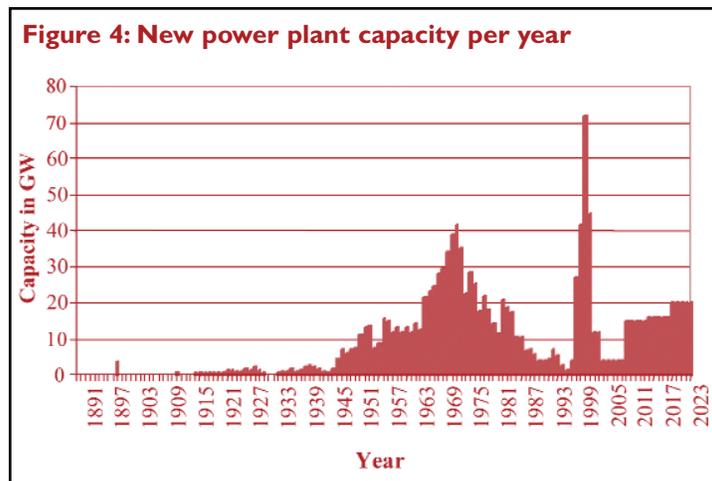
completed after 1990. This contrasts with the 106 nuclear power plants that were built in the 25 years prior to 1990. Even during the economic boom of the 1990s, power plant building was at its lowest level since World War II.

However, the gradual deregulation of the power generation industry during the late 1990s and early 2000s, coupled with the blackouts in California and the Northeast, has reversed the trend and created record levels of power plant building. Most of these power plants were built as simple and/or double cycle units that did not generate as much work as the pervious power

plant builds did. From 2000 through 2002, more power plants were built than in any other three-year stretch in history. However, power plant building is expected to taper off by 2005 (7).

Manufacturing Impact

Another stronghold of union contractors has been manufacturing. Manufacturing output for the United States has increased 180 percent over the past 50 years, as seen in **Figure 5**. The increase has averaged 2 percent per year (6). Its percentage of Gross Domestic Product has, however, declined. Non-manufacturing output of the United States has increased 420 percent since 1950 (8). The industry's slow growth directly affects union contractors' market share because of their dominance in this market.



Transmission Line Impact

The trend has been nearly the same for transmission line work, with the difference being that line work is expected to increase significantly in the near future. This increase will be fueled by transmission problems that are a result of years of inattention to rising utility needs. Electrical engineers have been forecasting transmission problems in the United States for several years due to decreased spending and expansion of the population. Deregulation of the energy systems of the United States has also contributed to the problem. The nationwide transmission lines are part of a largely unregulated public network. Spending to maintain these lines has dropped significantly over the last 25

Figure 6: Spending on transmission lines 1975-2000

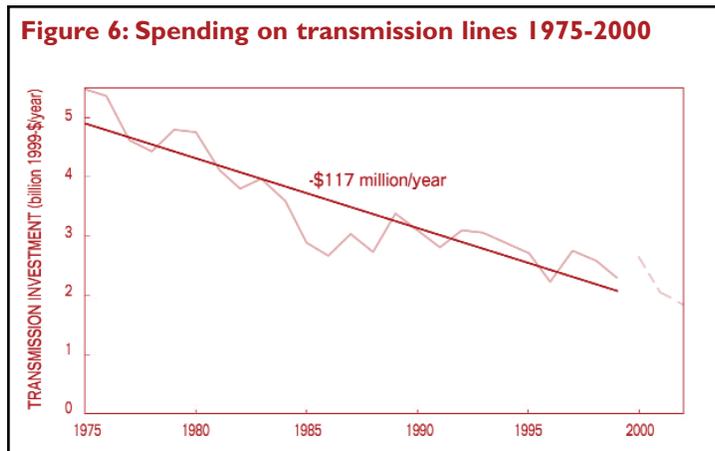
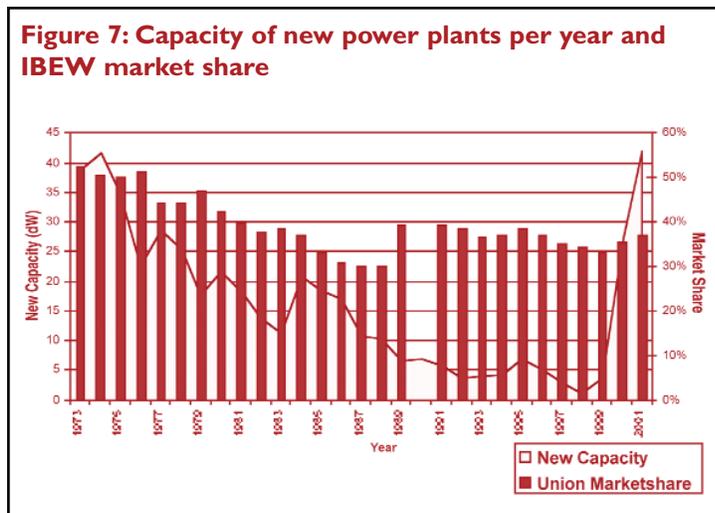


Figure 7: Capacity of new power plants per year and IBEW market share



years, as seen in **Figure 6**. In fact, spending on transmission lines has dropped an average of \$117 million per year since 1975. Spending on transmission lines today is less than half of the spending in 1975. Experts are concerned because the demand for electricity continues to increase (5). Transmission problems in California, as well as the summer 2003 blackout in New York, Cleveland, Ottawa and Detroit, have revealed the transmission line demand problem facing the country. Because of this, line work is expected to increase significantly in the near future.

Market Share

The drop in the union market share has, in some cases, mirrored the drop in its stronghold markets. The IBEW has lost an average of 1.1 percent of market share per year since 1973 (9). This decline reflects the drop in manufacturing’s percent of the GDP, the reduction in power plant building and the decline in spending on transmission lines. (See **Figure 7**.)

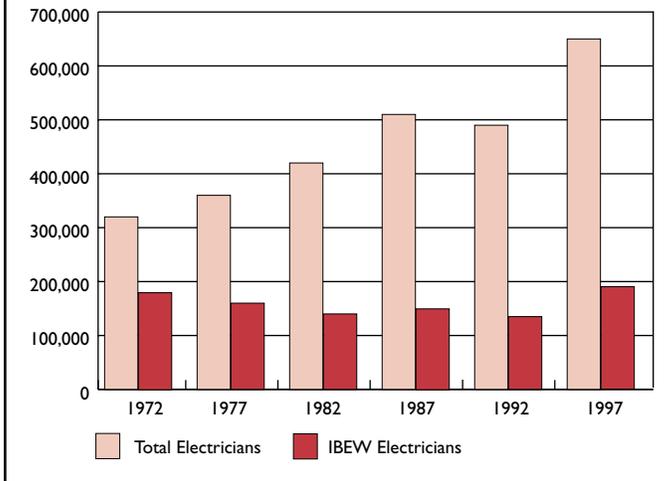
NECA maintains its market share data on a per-person basis. The market share is equal to the number of IBEW electricians, divided by the total number of electricians. Market share information in this format reveals demographic and employment trends in the population. The IBEW and NECA can use economic market share data to develop a market penetration strategy. Economic market share is defined as the total dollars spent on electrical construction work, instead of the number of people working on it.

For example, service work is thought to be very profitable. Service work also utilizes more resources (trucks, vans, equipment) per labor than construction work does. Electricians who work in the service field may comprise only 5 percent of the total electricians, but they may generate 10 percent of the industry’s profits. Clearly, looking at market share data on a per-person basis will impede union contractors from gaining a greater understanding of the most profitable (and least profitable) EC markets.

The profitable markets in which union contractors have had a historical dominance, such



Figure 8: Number of total electricians in the United States and number of IBEW electricians



as line work, power generation, manufacturing and industrial, are continuing to erode, while some of these markets, such as line and power generation, may have an opportunity to rebound. On the other hand, the opposite is true for the nonunion contractors' typical markets. The markets in which they specialize—commercial, VDV and service—have all increased in size over the past 30 years. The shift in markets and the reduced cost of production of open-shop contractors have helped them increase their market share. The number of IBEW electricians has remained relatively constant, while the total number of electricians has steadily increased. (See Figure 8.)

Union Contractor Survey

The third part of our process was the conduction of a survey. The survey of union contractors was intended to verify our interview findings across a wider cross section of contractors. We distributed the survey via E-mail to 600 union contractors and received 40 useful surveys in return. (See Appendix B for the survey questions and a list of those who participated in the survey.)

The first survey section addressed demographic information about union contractors. The average respondent's company was 39.5 years old. The youngest company was 4 years old, while the oldest was 98. The median company had one location and 81 employees.

Ninety-two percent of respondents were with an independently owned contractor. The largest market for the responding contractors was commercial, as shown in **Figure 9**. This response, however, does not mean that union contractors have the largest market share in the commercial market. It simply could mean that the available dollars in the industrial market are fewer than those in the commercial market. Therefore, union contractors see most of their sales coming from commercial work. Industrial ranked as the second largest market for the respondents.

Figure 10 shows the employee breakdown.

Figure 9: NECA contract markets

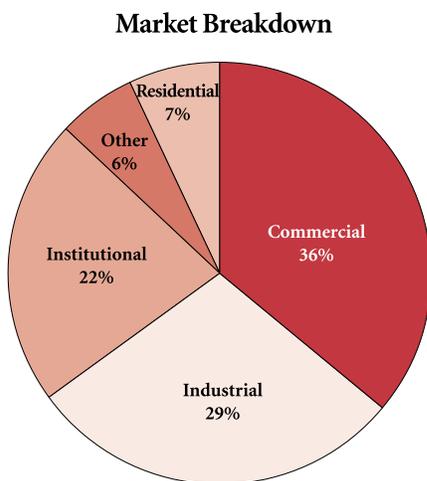


Figure 10: Non-bargaining employees as a percentage of total employees

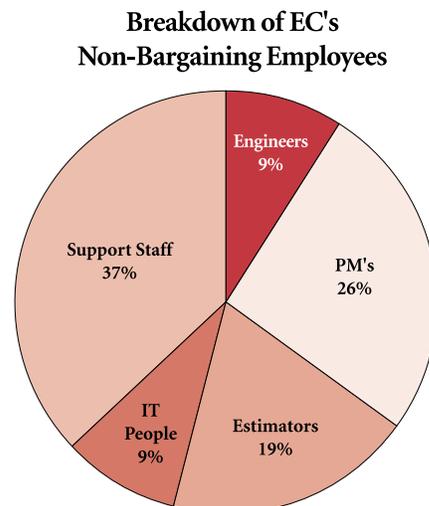


Figure 11: NECA contractor PM origins

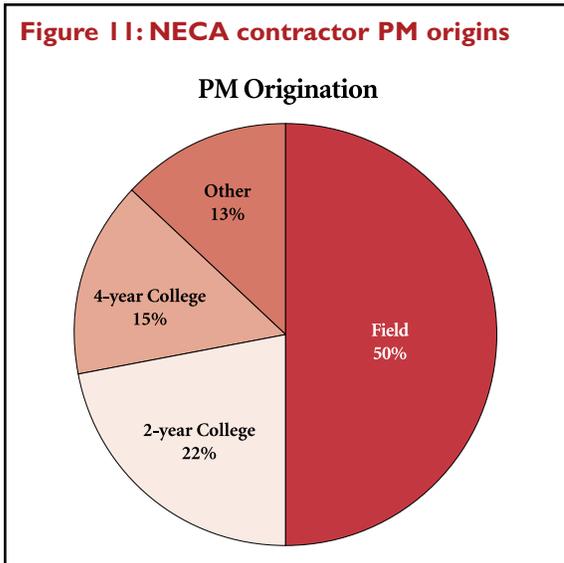


Figure 11 indicates that 50 percent of the project managers come from the field. This confirmed data we gained from industry interviews.

A small percentage of the interviewed ECs had all of their project managers originating in the field.

The survey showed that the average electrician's tenure with one union EC is 7.3 years, while 25.1 percent of electricians stay with the same contractor for more than 15 years.

According to the respondents, their average loaded labor cost is \$50.05. This labor cost is \$10.09 higher than the open shops' loaded labor cost. When bidding against open-shop ECs for projects, union contractors' bids average 10.9 percent higher than their open-shop counterparts.

The next section of the survey dealt with the internal operations of union ECs. Fifty-four percent of surveyed contractors provided manuals for their project managers, while only 29.7 percent had manuals for their electricians. Forty-three and two-tenths percent of the responding companies indicated that they have manuals for estimators and foremen.

As part of our survey of internal operations, we asked several questions about what kinds of meetings were conducted. If meetings were conducted, the survey asked which positions were represented at those meeting.

The meetings that we investigated were:

- Project kickoff.
- Project handoff from estimation to management.

Figure 12
Project Progress Meeting Conducted?

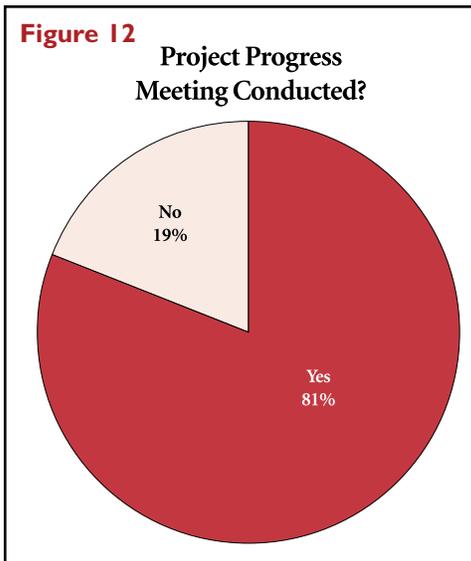
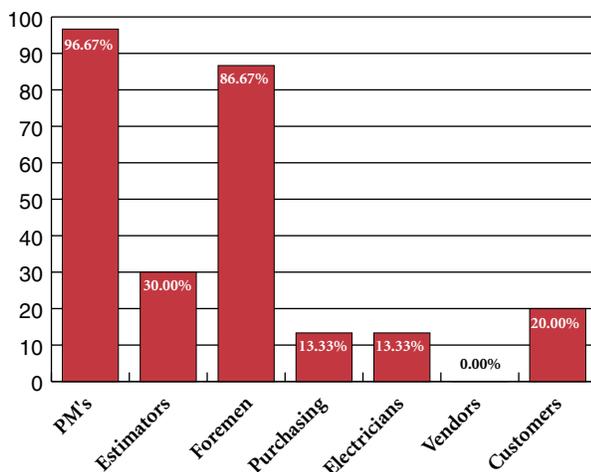


Figure 13

% of Companies with Representatives Attending Progress Meeting by Position (% of those conducting meeting)



- Project progress.
- Project closeout.
- Project postmortem.

Figures 12-15 show the types of meetings conducted by the contractors and the functions of those participating in them.

The survey also queried ECs about productivity. Survey respondents indicated that they tracked productivity by following labor hours and total project costs. Over 70 percent of responding contractors track productivity of their field workers. The majority (77 percent) responded that tracking occurs weekly.

The survey asked three questions about prefabricated material within the internal operations section:

- Do you use prefabricated material?
- Where is the prefabricated material built?
- Do you experience resistance to prefabricated material?

Sixty-two percent of surveyed contractors indicated that they use prefab. Of the majority of those who use prefab, 82.6 percent build their prefabricated material in the shop

(off the job site). Only 21.7 percent of contractors build prefab in the field.

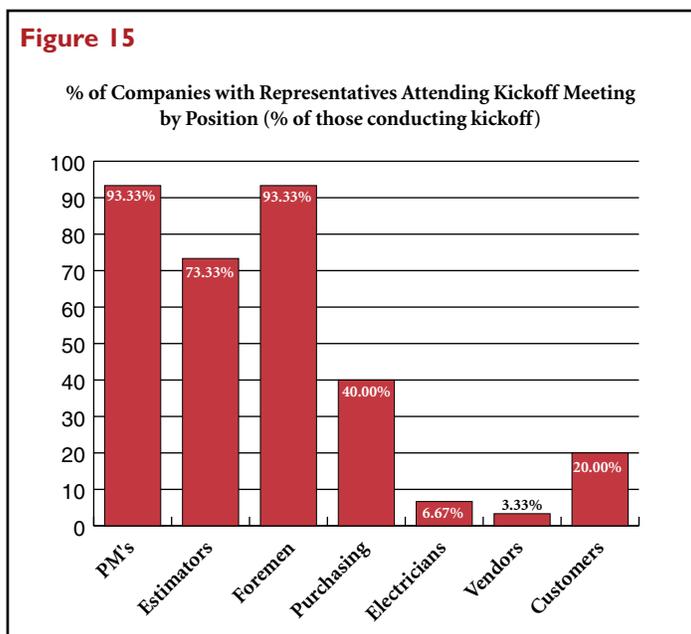
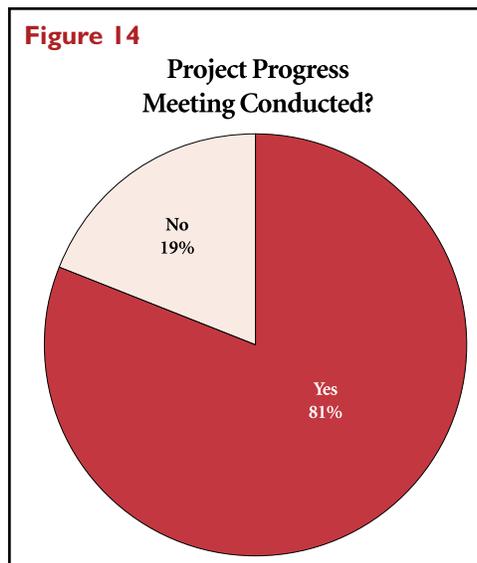
Only one-fourth of the surveyed contractors experiences resistance to off-the-job-site prefab.

The next section of the survey addressed training. The first question asked was “Where do the tradesmen receive training?” All of the respondents answered that their electricians were trained at the union hall or by an association such as NECA. Additionally, we asked questions concerning the types of training for positions such as project managers, estimators, foremen, electricians and office staff. The types of training are:

- Managerial.
- People skills.
- Technical.
- No training.
- Other/miscellaneous training.

The results are shown in Figures 16-19.

“Safety” was the only response within the “other training” category.



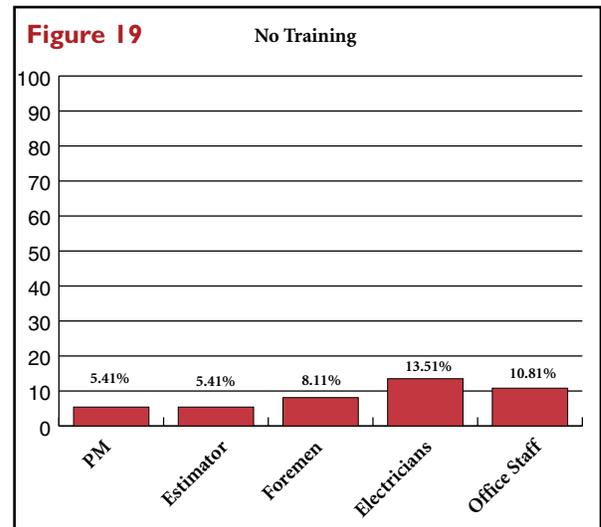
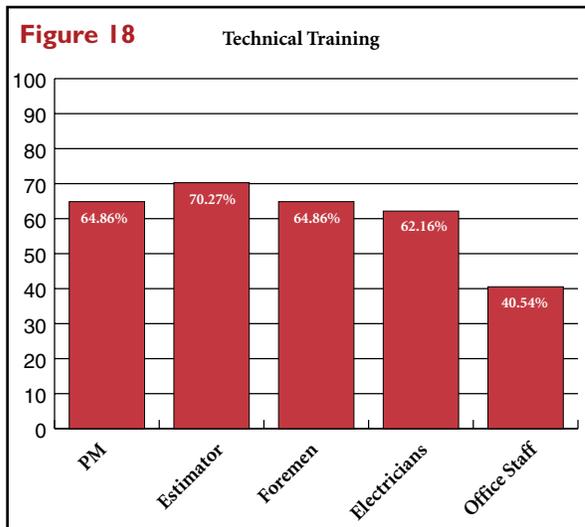
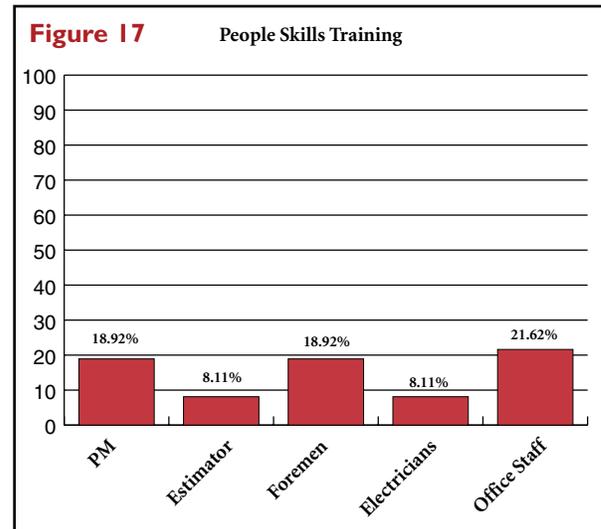
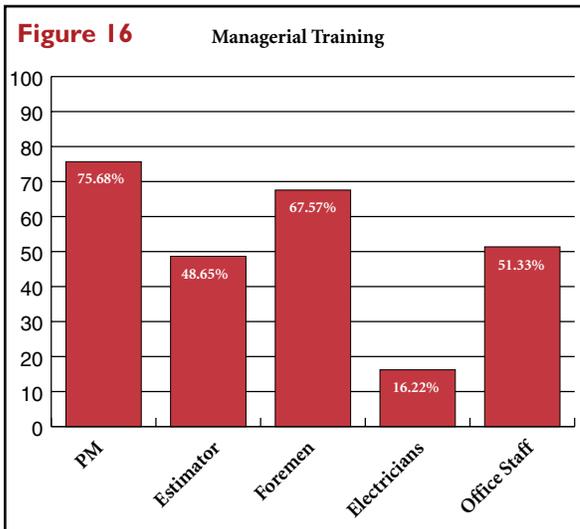
Then our survey examined the factors that have the largest impact on profitability. We offered to the respondents the ten factors listed, along with three “other _____” generic factors. Respondents were asked to rank the thirteen factors, one through thirteen, according to their impact on a project’s profitability. The results are shown in **Figure 20**.

The “other” category had responses such as:

- Skill of electricians.
- Not listening to directions.
- Schedule compression.

- Security issues.
- Project accessibility.
- Engineering.
- Architecture.
- Schedule.
- Job progress.
- Individual productivity.

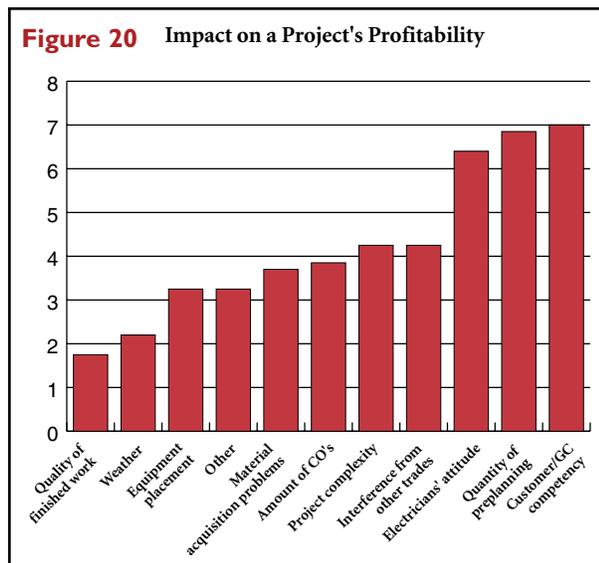
The final questions yielded the most diverse responses. The questions were “Where do you see the electrical contracting industry going in the future?” and “Where do you see your company going in the future?” No specific conclu-



sions could be drawn from the answers.

Some of the answers given to these two questions were:

- ECs will become more specialized.
- More design-build.
- More service work.
- Increased competition will weed out the less competitive companies.
- Not enough skilled people.
- Greater technical complexity of projects.
- Doing more business with end-user.
- More owner and GC direct purchasing.
- Industry will shrink.





Analysis

The goal of this research project was to investigate the differences in operational costs between union and nonunion electrical contractors.

Bid prices reflect the disparity in operational costs. Survey results revealed that the average bid price of union contractors was 10.9 percent above the bid price of nonunion contractors.

The industry perceives that the typically higher labor cost of union electricians, as well as the freedom that nonunion contractors have to use an unregulated number of lower priced apprentices and helpers, explains the 10.9 percent difference in bid price. We found that to be true, and the differences in labor cost and crew ratio do contribute to a portion of the 10.9 percent bid price difference. On the other hand, the differences in labor management, operational model and training show a greater impact on the contractors' cost drivers.

Operational Models

Our research found several operational models existing in both union and nonunion electrical contractors. The predominant operational models for all electrical contractors are:

1. Traditional (technically oriented).
2. Transitional (in transition from traditional to professional).

3. Professional (business oriented) (10).

The majority of both union and nonunion electrical contractors began as traditional, technically oriented companies. *The traditional company was based initially on the technical knowledge of its founder or leader.* Corporate memory typically resided with this one person who was able to complete each job within the company if the need arose.

Eventually, the transitional electrical contractor arose out of the traditional model. Increasingly, the company leader could not be everywhere at once and could not serve as a singular point for all company knowledge. ECs outlined and specified their business processes and procedures so that others could complete their jobs adequately. *These transitional contractors can be defined as companies that have recognized the necessity or benefits of the professional operational model but have not made the entire transition.*

*On the other hand, the professional operational model, depicted in **Figure 21**, employs standardized project management and system design characteristics (11).* Contractors employing a professional operational model often rely on:

- Strategic planning and marketing plans.
- Field feedback.



- Seamless material handling and tracking.
- Increased estimation accuracy.
- Project management.
- Business financial visibility.

Both union and nonunion electrical contractors fall within one of these three operational models. According to survey and interview data, union contractors typically begin to break out of the traditional operational model when they achieve around \$10 – \$15 million in revenue, depending upon their location and demography. To achieve growth at this level, contractors begin the transformation to a more professional operational model. At this point, the owners or company leaders cannot control all issues because their companies have become too large. By contrast, the transformation within open-shop contractors from traditional to transitional, and eventually to professional, occurs at an earlier stage.. Open-shop contractors begin to treat their companies as professional businesses earlier in their growth cycles — usually by the time they reach \$2 million in revenue.

The professional operational model incorporates a standardized process of project management. Union ECs have to deal with a higher variation in their labor force. Every time an EC hires a new IBEW electrician, there is a learning curve. A lack of standardized practices of project management throughout the electrical contracting industry causes the rotating electricians to relearn project management styles and systems with each contractor. Open-shop electricians have a lower rate of rotation among different electrical contractors; therefore, they do not have to undergo a comparable relearning process.

Another focus of our research was in project preplanning, project management and value engineering. Value engineering and preplanning are part of the corporate culture of contractors who use the professional operational model (10).

Most of the nonunion contractors tend to involve several departments in their project planning and value engineering. Often, project managers, foremen and electricians all have input into estimation. These same companies may also involve the field, project managers and office staff in perpetual value engineering. By including more departments in more processes, the contractors reemphasize the structured communication flow, as well as the wide communication bandwidth that is a tenet of the professional operational model. This model is based upon the constraint of information and workflow principle, in which increasing the bandwidth of information flow will lead to increased workflow, as seen in Figure 22 (11).

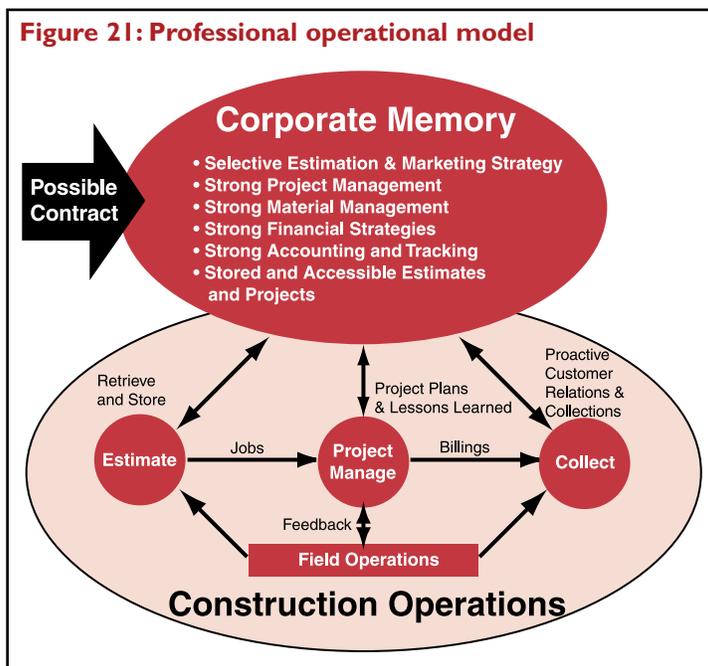
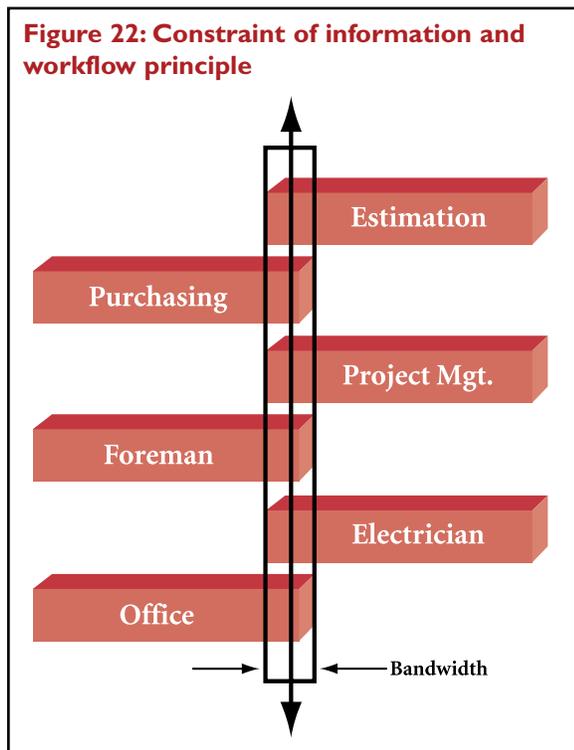


Figure 22: Constraint of information and workflow principle



Labor Management and Cost

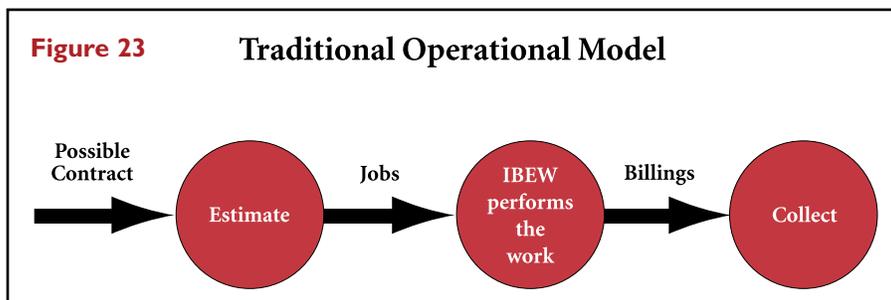
As previously stated, the difference in labor cost between union and open-shop contractors is seen as a main driver of cost difference between the two. According to our survey, the average loaded labor cost for union contractors is \$50.05. The same contractors estimate that the difference in loaded labor cost between union and open-shop ECs is, on the average, \$10.09. This translates into a 20.2 percent difference in labor cost. Since labor currently makes up 41.6 percent of the union contractors' total costs (1), a 20 percent difference in labor cost should increase the union contractors' total project cost by 8.3 percent, a significant amount to over-

come for any contractor. So the difference in labor cost for union and nonunion electricians *does* affect the project cost. At most, however, this cost is an 8.3 percent increase of project cost for union contractors.

Throughout the electrical contracting industry, there is a perception that union electricians receive stronger, more standardized training than do nonunion electricians. This reputation can actually work against union contractors. Union electricians are often expected to improve productivity on their own, based on their reputation of being well trained, capable and knowledgeable. On the other hand, open-shop ECs emphasize more communication among electricians, foremen, superintendents and project managers. This communication flow allows ideas for productivity improvements to be spread among all of the electricians to management.

The training that IBEW electricians receive through the well respected National Joint Apprenticeship and Training Committee (NJATC) program has created a mindset that leads contractors to operate within the traditional operational model. In this model, different departments have the “throw-over-the-wall” mentality, as seen in **Figure 23**. After the project is estimated, it is “thrown over the wall” to the labor (10). Once the project is completed, it is once again “thrown over the wall” to the accounting department for collection.

Figure 23 Traditional Operational Model



Union contractors can easily fall into the traditional operational model by letting their field handle a large percentage of the planning. For example, in one case, a large union contractor examined all of the projects that lost money over a one-year timeframe. This contractor determined that on nearly all of the losing projects, there were problems with branch wiring. The same contractor found that the planning for branch wiring had been left to apprentices in the field who handled this task because it was seen as one of the more mundane elements of the project.

According to survey results, project closeout meetings do not include field representation among 32 percent of union contractors, as seen in **Figures 24 and 25**. The majority of the contractors who have no field representation at these meetings has already completed the work prior to the meeting. Nonunion contractors also can make the mistake of operating with the traditional operational model, but it is not so common. The uncertainty of an electrician's background and training leads these project managers (PMs) to develop extensive plans for all aspects of the project.

In contrast to union ECs, the majority of open-shop contractors we interviewed reported that they held project postmortem meetings. These meetings included representatives from all of the departments that were involved with the job. The increased communication resulting from the meetings allowed each department to learn from other departments' successes and failures. On the next project, these contractors will be able to capitalize on their successes while they prevent recurring mistakes.

The differences in training and working relationship translate into different responsibilities within each organization. Electricians are responsible for the technical work in both the union and nonunion electrical contractors. Preplanning is done almost exclusively by PMs in union ECs, and this preplanning is done prior to job kickoff. Because electricians usually have not been hired yet by union ECs during the preplanning stage, they are not included in preplanning.

Eighty-four percent of union contractors have job kickoff meetings. But within this 84 percent, only 7 percent of the meetings include electricians. Within nonunion ECs, the PMs

Figure 24

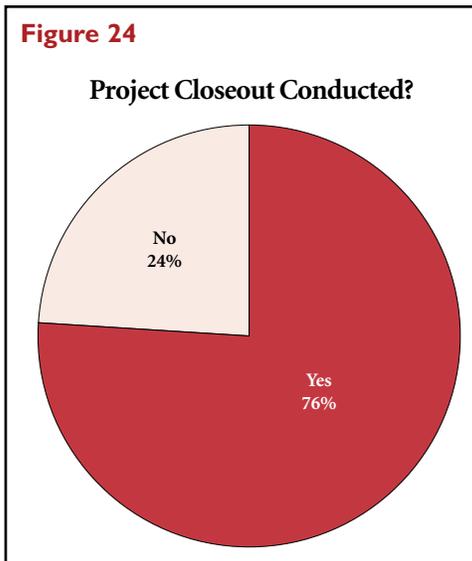
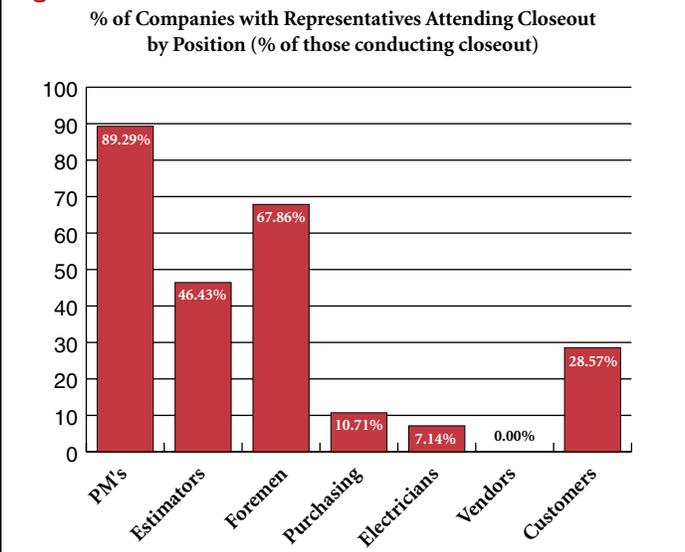


Figure 25



still do the majority of the preplanning, while the electricians provide their input. The field labor in union contractors primarily handles on-the-job planning and change orders. On the other hand, both the field and the management within nonunion contractors handle these same functions. And project closeout within open-shop ECs is handled by nearly all parties involved in the project. The survey results show that fewer parties are consistently involved in union project closeout. Union contractors' PMs tend to involve only employees in a management role – namely foremen and project managers.

Composite Crew Mix

This study did not find a significant impact caused by composite crew mix as a driver of cost difference between the two operations. The individual contractor mainly controls the advantage of composite crew mix variation and its usage. Lack of inclusion of helpers in the composite crew mix, however, creates a disadvantage for the union contractors

Crew Ratios

As mentioned previously, the open-shop contractor's ability to have more flexible crew ratios lowers his cost of operation. In some areas, particularly in the Northeast, states regulate the crew ratio. Numerous cities throughout the country now have instated similar regulations. In these areas, the government regulates both open-shop and union EC crew ratios. For example, New Hampshire sets a stringent requirement of one apprentice to one journeyman for the first five apprentices and one apprentice to three journeymen for the rest of the jobsite (12). Rhode Island sets a one-to-one

ratio for journeymen and apprentices (13). An open-shop EC who works within these locales must comply with ratios that are similar to those of his union counterparts.

It is worth noting that, because of the differences in operations management between the two contracting models, higher or more flexible crew ratios for the union contractor could cause additional problems. This is because the field labor is the primary planner and decision maker more frequently than it is with an open-shop operation.

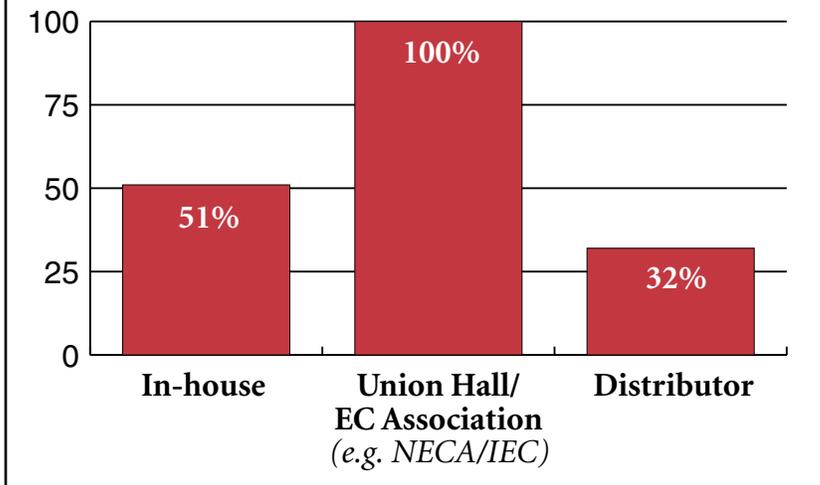
Labor Hiring, Training and Loyalty

The differences in training between union and open-shop ECs have been an advantage to open-shop ECs, helping them to increase market share in newly emerging, highly technical markets. The internal company training of open-shop ECs allows them to train their electricians and staff on anything that may benefit their companies. This agility and flexibility with regard to internal training allow ECs to quickly provide training classes for teaching new technology or adapting to new markets. Because training is ongoing and expected throughout the careers of open-shop electricians, open-shop ECs can adapt quickly to new, high technology and emerging electrical contracting markets.

The internal training of open-shop ECs, compared to the external training of union electricians, is also evident in non-technical curricula. Training at open-shop ECs regularly includes productivity training. The open-shop contractors' knowledge of productivity principles is responsible for the industry's perception that these nonunion electricians are more productive than their union counterparts. In addi-



Figure 26 Training Locations for NECA Contractors



rule. A few union contractors provide extensive managerial and productivity training to their electricians. According to our survey of union contractors, only 51 percent offer any in-house training. Most of the interviewed open-shop ECs offer in-house training, in addition to the use of associations such as the Independent Electrical Contractors (IEC).

The structures of the

IBEW and NECA require that union electricians move from one electrical contractor to another, depending upon the availability of work. Due to potentially regular or frequent moves among contractors, most electricians have a relatively short tenure with any single company (in contrast to their nonunion counterparts). Of course there are noted exceptions to this. Nearly every electrical contractor has a group of core electricians who work consistently for his company. A *core electrician is defined as someone employed by the same electrical contractor for several years without working for any other contractors*. These electricians often have excellent work performance. The contractor is reluctant to return these electricians to the union hall because often they will be working elsewhere when the EC needs their services again. These core electricians are in the minority, however. According to the survey, 25.1 percent of union contractors' electricians have worked for the same contractor for 15 years or more. A calculation based upon NECA/IBEW market share also displays the percentage of IBEW electricians who are core. The core electrician calculation, seen in **Figure 27**, assumes that a

tion, the organization-wide understanding of productivity in open-shop ECs leads to a different mindset than that of union ECs. Open-shop contractors look at system productivity instead of at individual employee productivity. The lack of productivity training for union electricians has led to a misunderstanding of productivity by union electricians. This misunderstanding causes union ECs to see productivity as a measurement of the individual employee rather than of their companies' systems.

During the late 1990s, contractors went out of business at a rate that was 33 percent higher than the national business average (14). Open-shop electricians understood then—and understand now—that it is in the best interest of themselves and their companies to increase productivity during industry declines. These electricians know that if their companies are not competitive and able to win projects, they will be unemployed.

Most union contractors rely upon the NJATC and the IBEW to provide the majority of training for their electricians, as seen in **Figure 26**. There are notable exceptions to this

\$15 million EC, needs to keep about 40 electricians working at all times to remain profitable.

The calculated 28.1 percent of core IBEW electricians contrasts with open-shop electricians who are all employed by the contractor. Unlike typical IBEW electricians, most open-shop electricians work for only one EC. On occasion, however, one open-shop EC will “share” electricians with another open-shop EC.

This concept of core electricians emerged repeatedly in industry interviews. Most interviewed union contractors had a small percentage of electricians who had worked at for their companies for more than 15 years. The rest of the electricians rotate in and out of different union contractors, many with less than one year of tenure.

By contrast, open-shop ECs, who may keep most of their employees for long periods of time, can enjoy the benefits of employee training over the long run. Any contractor’s resources can be put to better use than training employees who will only be with the company for a short period of time. For a four-week technical project, spending even one day training electricians means 1/28th or 3.5 percent of the labor cost has been spent before any work is completed. However, since most open-shop electricians are with the same company, they will be able to use the knowledge gained from their training on future projects.

Application of Prefabrication

The application of prefabricated material is another area of disparity between union and open-shop ECs. Prefab is very common among nonunion electrical contractors. These ECs can utilize prefab without much resistance from field electricians. Instead of laying off workers

Figure 27: Electrician Tenure

- A \$15M EC requires employment of about 40 electricians in order to break even
- There is \$64B worth of electrical work in the US per year
- The IBEW controls about \$23.6B of the total work
- Only 28.1% of union electricians are “core electricians”
- The other 71.3% of union electricians move from EC to EC

during down times, open-shop ECs put their electricians to work building prefabricated material for upcoming jobs.

For union ECs this is not always realistic. Agreements between contractors and the IBEW usually incorporate a section on prefabricated material that specifies that the ratio of journeymen to apprentices must be the same in the prefab shop as it is in the field. According to our survey, union electricians have resisted prefab among 25 percent of union contractors. Union electricians resist prefab because they see it as a way for the EC to transfer labor cost to material cost, thereby reducing labor on the job. This problem, coupled with the fact that most locals have stipulations in their contracts that only union electricians can work in prefab shops, leads to the perception among union ECs that prefabricated material does not have a cost benefit to the union contractor.

Procurement

As mentioned earlier, this study did not reveal any significant differences in the area of pro-



curement processes between the two operational models. The advantages of horizontal integration vs. vertical integration were observed in both types of electrical contracting models. We observed sporadic partnerships with distributors in both union and open-shop operations. These observations lead us to believe that both union and open-shop contractors can benefit from a better procurement model.

Office Support

The structural difference between union and nonunion contractors also negatively impacts the accounting departments of union ECs. Union contractors must pay into a wide variety of funds based on the locals they work for. For instance, the IBEW Funds chart, seen in **Figure 2**, is an example from a single union contractor. This contractor worked for 22 different locals during 2003. This is a cost that open-shop contractors can avoid. Open-shop contractors pay into the same funds and benefits for each of their employees.

Those working on the companies' accounts are viewed differently in union and nonunion ECs as well. Support staff in open shops is considered to be part of the entire companies' operations rather than as a necessary evil, as union contractors typically view it. Due to the productivity differences between the two types of operations, union contractors try to reduce their support staffs, believing that they are non-value added expenses. But reducing support staff may have little positive impact on profits. During our review of financial data, we found that in order to improve the net profits by 30-50 percent, a typical union contractor has to lower its overhead cost by 25-30 percent. Comparable results could be achieved by reduc-

ing the cost of goods sold (through better labor management productivity) by a mere 1 percent.

Conclusion

While it verified some of the myths and perceptions in the industry, this study also was conclusive about the main impact of operation cost differences between union and open-shop operations. We found that management of labor, which leads to reduction of non-value added work, is the main cost driver for the union contractors. It is commonly perceived that the most uncertain part of any job is the labor. Instead, we found that it is not the labor that is uncertain, but it is the management of the labor. Labor is the final indicator of all the processes and procedures used by the management.

Figuratively, labor can be thought of as fuel in a vehicle's tank, and labor usage is the fuel level indicator. Therefore, management is the driver that should maintain efficient operations of the vehicle. Erratic movement of the fuel gauge is not the reason for bad gas mileage. On the other hand, owing to the lack of appropriate management of the labor, union leaders have had to pursue more controlling agreements that have a negative impact on contractors' profitability.

This study illustrates that the market share can only increase if the contractor is profitable. And the contractor can only be profitable through higher productivity. Higher productivity can only be achieved by better management

practices. Better management practices can only be achieved by a collaborative approach between union contractors and the IBEW to increase profitability and productivity.

The impact of the various factors on cost can be ranked with the operational model at the top, as shown below:

1. Operational model
2. Labor management and cost
3. Labor hiring, training and loyalty
4. Procurement
5. Office support
6. Crew ratio
7. Application of prefabrication
8. Composite crew mix





Appendix A

To understand the perceptions and realities of the EC industry, we interviewed industry and company leaders. Interviews were conducted to clarify underlying assumptions and perceptions in the industry from the contractor's point of view.

In each interview, we spent approximately two hours with the company's decision makers and managers in a relaxed setting. Confidentiality was promised to the interviewed companies. The resulting data gathered from these interviews helped to develop the survey questions. The interviews were structured in a way that enabled us to understand the companies' operational philosophies. All the companies had been prepared with the following project objectives and interview agenda prior to the interview.

These questions were used as a guide for our interviews. During the interviews with manufacturers and distributors, we put a different twist on our approach to match their operation needs.

Industry Interview Agenda

1. What are your markets (business units)?
2. Operational model and infrastructure
3. Strategic plans
4. New market penetration plan and goal
5. Where do you see your industry going?
6. Goals and plans for productivity increase
7. Financial strategy to support growth and productivity
8. Cost:
 - How much of your revenues go into labor cost?
 - What is the breakdown of other costs?
9. Training:
 - What sort of training do your people have?
 - Where did they get this training?
 - Do you offer any sort of training?
 - If so, do your employees utilize it?
 - What certifications do your employees have?
10. Control:
 - What authority do individual positions have?
 - Project managers



Electrical workers

Foremen

Superintendents

11. Purchasing strategy:

Do foremen have the authority to purchase directly from the jobsite?

Who has to approve of purchases?

Do you have a centralized purchasing department?

12. Communication:

How do you communicate with the jobsite?

How do you communicate with the electrical workers?

13. Crew ratios:

What are your ratios of electrical workers/foremen/supervisors/administrative staff for your jobs?

Why do you have your ratios set up this way?

14. Operational model:

How are your operation and business units set up?

How do you decide what jobs to bid on?

How standardized is your company?

Has this operational model changed? If so, how?

What do you see your operational model changing to in the future?

15. If you are a unionized EC:

Would you consider hiring merit-based electrical workers?

What are the benefits of being a unionized EC?

What are the drawbacks of being a unionized EC?

16. If you are an open-shop EC:

Would you consider hiring unionized electrical workers?

What are the benefits of being an open-shop EC?

What are the drawbacks of being an open-shop EC?

17. Future:

Where do you see your company in the future?

Where do you see the electrical contracting industry in the future?

Companies Interviewed

The research team used information gathered from interviews with the following companies:

Baker Electric (EC, union, Escondido, CA)
Bruce & Merrilees (EC, union, New Castle, PA)
Cleveland Electric (EC, union, Atlanta, GA)
Cogburn Electric (EC, union, Jacksonville, FL)
Collins Electric (EC, union, Stockton, CA)
Consolidated Electrical Services (EC, open-shop, Boston, MA)
Cutler-Hammer (Manufacturer, Pittsburgh, PA)
Denier Electric (EC, open-shop, Cincinnati/Columbus, OH)
Elk Electric (EC, union, Austin, TX)
Ferguson Electric (EC, union, Buffalo, NY)
GE (Manufacturer, Mebane, NC)
Graybar (Distributor, St. Louis, MO)
Johnson Electric (EC, open-shop, Grandville, MI)
Kyle Electric (EC, union, North Bend, OR)
Mills Electrical (EC, open-shop, Dallas, TX)
Morrow-Meadows Corporation (EC, union, City of Industry, CA)
Newkirk Electric Associates (EC, union, Muskegon, MI)
Ozz Corporation (EC, union, Toronto, Ontario, Canada)
Parsons (EC, union, Minneapolis, MN)
Pieper Electric (EC, union, Milwaukee, WI)
Precision Electric (EC, open-shop, Las Vegas, NV)
Sachs Electric (EC, union, St. Louis, MO)
Square D (Manufacturer, Nashville, TN)
Tore Electric Company (EC, union, Belleville, NJ)
Trom Electric (EC, open-shop, Toronto, Ontario, Canada)
Universal Systems (EC, union, Flint, MI)





Appendix B

Industry Survey

Following the industry interviews, we developed a survey. The survey was intended to verify the interview findings across a wider range of electrical contractors. The survey concentrated on the following points:

- Differences in productivity tracking between open-shop and union ECs.
- Differences in operational model and operational theory between open shop ECs and union ECs.
- Reputations of each group and how these reputations affect the industry.
- Labor management and cost differences between open-shop and union ECs.
- Technical and managerial training differences between the two groups.

The survey was Web-based. A cover letter explained the origins and purpose of the research, as well as the purpose of the survey. Included in this cover letter was a hyperlink to the URL of the survey. The cover letter for the survey was E-mailed to 600 NECA contractors. Thirty-seven contractors completed and returned the survey on the following pages.



Electri'21 Research Survey

Thank you for taking the time to complete this survey for Electri'21

1. Company Information						
1.1	What are your annual sales (Please include all your electrical related sales)?	<input type="checkbox"/> Under \$1M	<input type="checkbox"/> \$1M - \$10M	<input type="checkbox"/> \$11M - \$25M	<input type="checkbox"/> \$25M - \$50M	<input type="checkbox"/> Over \$50M
1.2	How many office locations do you have?	<input type="checkbox"/> 1	<input type="checkbox"/> 2-3	<input type="checkbox"/> 4-8	<input type="checkbox"/> 9+	
1.3	What kind of workers do you contract?	<input type="checkbox"/> Merit Shop		<input type="checkbox"/> Union	<input type="checkbox"/> Both	
1.4	What is the ownership structure? (select all that apply)	<input type="checkbox"/> Independently Owned		<input type="checkbox"/> Publicly Owned	<input type="checkbox"/> Part of a Rollup	<input type="checkbox"/> ESOP
1.5	What is your company's age?	_____				
1.6	What is your loaded labor rate?	_____				
1.7	What are your markets? (% of sales)					
a.	Residential	<input type="checkbox"/> 0-10%	<input type="checkbox"/> 11-20%	<input type="checkbox"/> 21-30%	<input type="checkbox"/> 31-40%	<input type="checkbox"/> 41-50% <input type="checkbox"/> 51%+
b.	Industrial	<input type="checkbox"/> 0-10%	<input type="checkbox"/> 11-20%	<input type="checkbox"/> 21-30%	<input type="checkbox"/> 31-40%	<input type="checkbox"/> 41-50% <input type="checkbox"/> 51%+
c.	Commercial	<input type="checkbox"/> 0-10%	<input type="checkbox"/> 11-20%	<input type="checkbox"/> 21-30%	<input type="checkbox"/> 31-40%	<input type="checkbox"/> 41-50% <input type="checkbox"/> 51%+
d.	Institutional	<input type="checkbox"/> 0-10%	<input type="checkbox"/> 11-20%	<input type="checkbox"/> 21-30%	<input type="checkbox"/> 31-40%	<input type="checkbox"/> 41-50% <input type="checkbox"/> 51%+
e.	Other _____	<input type="checkbox"/> 0-10%	<input type="checkbox"/> 11-20%	<input type="checkbox"/> 21-30%	<input type="checkbox"/> 31-40%	<input type="checkbox"/> 41-50% <input type="checkbox"/> 51%+
f.	Other _____	<input type="checkbox"/> 0-10%	<input type="checkbox"/> 11-20%	<input type="checkbox"/> 21-30%	<input type="checkbox"/> 31-40%	<input type="checkbox"/> 41-50% <input type="checkbox"/> 51%+
1.8	If you are ISO certified, please select your certification.	<input type="checkbox"/> 9000	<input type="checkbox"/> 9001	<input type="checkbox"/> 9002	<input type="checkbox"/> Other	
2. Employee Information						
2.1	How many people do you currently employ (total)?	<input type="checkbox"/> 0-20	<input type="checkbox"/> 21-50	<input type="checkbox"/> 51-200	<input type="checkbox"/> 201-500	<input type="checkbox"/> 501+
a.	How many Engineers?	<input type="checkbox"/> 0-1	<input type="checkbox"/> 2-5	<input type="checkbox"/> 6-15	<input type="checkbox"/> 16-30	<input type="checkbox"/> 31+
b.	How many Project Managers?	<input type="checkbox"/> 0-1	<input type="checkbox"/> 2-5	<input type="checkbox"/> 6-15	<input type="checkbox"/> 16-30	<input type="checkbox"/> 31+
c.	How many Estimators?	<input type="checkbox"/> 0-1	<input type="checkbox"/> 2-5	<input type="checkbox"/> 6-15	<input type="checkbox"/> 16-30	<input type="checkbox"/> 31+
d.	How many IT people?	<input type="checkbox"/> 0-1	<input type="checkbox"/> 2-5	<input type="checkbox"/> 6-15	<input type="checkbox"/> 16-30	<input type="checkbox"/> 31+
e.	How many Support Staff?	<input type="checkbox"/> 0-5	<input type="checkbox"/> 6-10	<input type="checkbox"/> 11-25	<input type="checkbox"/> 26-50	<input type="checkbox"/> 501+
f.	How many Electricians do you average?	<input type="checkbox"/> 0-20	<input type="checkbox"/> 21-50	<input type="checkbox"/> 51-200	<input type="checkbox"/> 201-500	<input type="checkbox"/> 501+
2.2	What Percentage of your project managers originate from the following?					
a.	Field	_____%				
b.	2-year college	_____%				
c.	4-year college	_____%				
d.	Other _____	_____%				
2.3	Are your project managers and estimators separated by their job responsibilities?	<input type="checkbox"/> Yes		<input type="checkbox"/> No		
2.4	What is the average tenure for an electrician?	<input type="checkbox"/> 0-1 yrs	<input type="checkbox"/> 2-4 yrs	<input type="checkbox"/> 5-8 yrs	<input type="checkbox"/> 9-13 yrs	<input type="checkbox"/> 14+ yrs
2.5	What percentage of your electricians have been with your company for over 15 years?					
If you are unionized, please continue with number 3. If you are open shop, please skip to question 4						
3. Unionized EC Questions						
3.1	How is your labor rate compared to the local open shop rate?	<input type="checkbox"/> \$0-\$7 Below	<input type="checkbox"/> \$1-\$7 Above	<input type="checkbox"/> \$15+ Below	<input type="checkbox"/> \$8-\$14 Below	
				<input type="checkbox"/> \$8-\$14 Above	<input type="checkbox"/> \$15+ Above	
3.2	How do your bids typically compare to open shop EC's bids?	<input type="checkbox"/> 0%-7% Below	<input type="checkbox"/> 1%-7% Above	<input type="checkbox"/> 15% Below	<input type="checkbox"/> 8%-14% Below	
				<input type="checkbox"/> 8%-14% Above	<input type="checkbox"/> 15%+ Above	
3.3	What is the ratio of Apprentices to Journeymen to Foremen in your local area?					
	Apprentices _____	Journeymen _____	Foremen _____			
Please skip to question 5						
4. Open Shop EC Questions						
4.1	How is your labor rate compared to the local union labor rate?	<input type="checkbox"/> \$0-\$7 Below	<input type="checkbox"/> \$1-\$7 Above	<input type="checkbox"/> \$15+ Below	<input type="checkbox"/> \$8-\$14 Below	
				<input type="checkbox"/> \$8-\$14 Above	<input type="checkbox"/> \$15+ Above	
4.2	How do your bids typically compare to unionized EC's bids?	<input type="checkbox"/> 0%-7% Below	<input type="checkbox"/> 1%-7% Above	<input type="checkbox"/> 25% Below	<input type="checkbox"/> 8%-14% Below	
				<input type="checkbox"/> 8%-14% Above	<input type="checkbox"/> 15%+ Above	

Please continue on the other side

Electri'21 Research Survey

Thank you for taking the time to complete this survey for Electri'21

5. Internal Operations	
5.1	Please select all for which you have manuals <input type="checkbox"/> Foremen <input type="checkbox"/> Project Manager <input type="checkbox"/> Estimator <input type="checkbox"/> Purchasing <input type="checkbox"/> Electricians
5.2	Do you conduct meetings for any of the following? If so, please select the people who are involved in the meetings.
a.	Project Kickoff? Meeting? <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Vendor <input type="checkbox"/> PM <input type="checkbox"/> Estimator <input type="checkbox"/> Foremen <input type="checkbox"/> Purchasing <input type="checkbox"/> Electricians <input type="checkbox"/> Customer
b.	Project hand-off from estimation to management? Meeting? <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Vendor <input type="checkbox"/> PM <input type="checkbox"/> Estimator <input type="checkbox"/> Foremen <input type="checkbox"/> Purchasing <input type="checkbox"/> Electricians <input type="checkbox"/> Customer
c.	Project Progress Meeting? <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Vendor <input type="checkbox"/> PM <input type="checkbox"/> Estimator <input type="checkbox"/> Foremen <input type="checkbox"/> Purchasing <input type="checkbox"/> Electricians <input type="checkbox"/> Customer
d.	Project Closeout? Meeting? <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Vendor <input type="checkbox"/> PM <input type="checkbox"/> Estimator <input type="checkbox"/> Foremen <input type="checkbox"/> Purchasing <input type="checkbox"/> Electricians <input type="checkbox"/> Customer
e.	Project post-mortem? Meeting? <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Vendor <input type="checkbox"/> PM <input type="checkbox"/> Estimator <input type="checkbox"/> Foremen <input type="checkbox"/> Purchasing <input type="checkbox"/> Electricians <input type="checkbox"/> Customer
5.3	Do you track productivity? (If not, please skip to question 5.5) <input type="checkbox"/> Yes <input type="checkbox"/> No
a.	How often do you track productivity? <input type="checkbox"/> Daily <input type="checkbox"/> Weekly <input type="checkbox"/> Monthly <input type="checkbox"/> Once per project
b.	What is used to measure productivity? <input type="checkbox"/> Labor Hours <input type="checkbox"/> Material <input type="checkbox"/> Total Project Cost <input type="checkbox"/> Other _____
c.	What positions do you track productivity? <input type="checkbox"/> Field Workers <input type="checkbox"/> Total Project Cost <input type="checkbox"/> Shop Workers <input type="checkbox"/> Office Staff <input type="checkbox"/> Other _____
5.4	Do you use prefabricated material? (If not, please skip to question 5.6) <input type="checkbox"/> Yes <input type="checkbox"/> No
a.	Where does the prefab get built? Please select all that apply. <input type="checkbox"/> Shop <input type="checkbox"/> Field <input type="checkbox"/> 3rd Party
b.	Do you experience resistance to prefab? <input type="checkbox"/> Yes <input type="checkbox"/> No
5.5	Gross Margin Percentage <input type="checkbox"/> 0%-8% <input type="checkbox"/> 9%-12% <input type="checkbox"/> 13%-15% <input type="checkbox"/> 16%-18% <input type="checkbox"/> 19%-23% <input type="checkbox"/> 25%+ (This number will be used for statistical analysis purposes only)
5.6	Please rank 1-13 the following factors as to their impact on a project's profitability. (1 for the most impact and 13 for the least impact)
	a. _____ Project complexity level
	b. _____ Quantity of preplanning
	c. _____ Customer/ GC's Competency
	d. _____ Weather
	e. _____ Quality of finished work
	f. _____ Amount of change orders
	g. _____ Material acquisition problems (backorders, etc)
	h. _____ Interference from other trades
	i. _____ Equipment location (material inventory, tool inventory)
	j. _____ Electricians' attitudes
	k. _____ Other _____
	m. _____ Other _____
	l. _____ Other _____
6. Training	
6.1	Where do your tradesmen receive technical training? <input type="checkbox"/> Union Hall <input type="checkbox"/> In-House <input type="checkbox"/> Distributor <input type="checkbox"/> EC Assoc. (e.g. NECA/ IEC)
6.2	Please select all types of training for which each of the following positions receive.
a.	Project Managers <input type="checkbox"/> Managerial <input type="checkbox"/> Emotional <input type="checkbox"/> Technical <input type="checkbox"/> None <input type="checkbox"/> Other _____
b.	Estimators <input type="checkbox"/> Managerial <input type="checkbox"/> Emotional <input type="checkbox"/> Technical <input type="checkbox"/> None <input type="checkbox"/> Other _____
c.	Foremen <input type="checkbox"/> Managerial <input type="checkbox"/> Emotional <input type="checkbox"/> Technical <input type="checkbox"/> None <input type="checkbox"/> Other _____
d.	Electricians <input type="checkbox"/> Managerial <input type="checkbox"/> Emotional <input type="checkbox"/> Technical <input type="checkbox"/> None <input type="checkbox"/> Other _____
e.	Office Staff <input type="checkbox"/> Managerial <input type="checkbox"/> Emotional <input type="checkbox"/> Technical <input type="checkbox"/> None <input type="checkbox"/> Other _____
7. Future	
7.1	Where do you see the electrical contracting industry going in the future? _____ _____ _____
7.2	Where do you see your company going in the future? _____ _____





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