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Essential Estimating Tips

How to ensure your next estimate is as accurate and successful as possible

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EXECUTIVE SUMMARY

DON'T UNDERESTIMATE THE IMPORTANCE OF ESTIMATING

Rising costs and other economic factors have made estimating more important than ever.

By Michael Morris, Editor, *EC&M*

With rising material costs, labor shortages, and increasing inflation, accurate estimating is crucial for any project. By making sure that an estimate is as accurate as possible, contractors can maximize their profits and ensure that a job is completed within budget and in a timely manner. Because of this, estimating has continually been a popular topic for *EC&M* readers. The articles presented in this e-book are filled with tips and tricks on how to estimate as accurately as possible. To kick things off, page 3 begins with "Eight Timeless Estimating Principles" by Subject Matter Expert and *EC&M* Contributor Don Kiper. As Kiper puts it, "The estimating process — like other industry processes — has improved over the years through better communications, computers, and software. But computers and software will not make you an estimator any more than owning a hammer and a saw will make you a carpenter." That's why, despite available technology, it's important to brush up on the "timeless" estimating principles in order to utilize technology effectively when creating an estimate.

The next two articles in this e-book, "Identifying Estimator Errors" on page 6 and "The Danger of Making Assumptions When Estimating" on page 9 cover some common errors to avoid when estimating. Like Kiper says, "The very nature of the estimating process is fertile ground for making mistakes." No estimator is perfect, but limiting those mistakes and ensuring the estimate is as accurate as possible is the key to success. The advice in these articles is crucial to be aware of in order to avoid costly mistakes.

Following those articles, "Understanding Labor Hours and Labor Costs" by Don Kiper on page 12 and "How to Reduce Lost Labor Hours on Electrical Construction Projects" by Tim Kridel on page 16 focus on labor hours and how those costs can impact a project. Ensuring that you have the necessary labor required and that labor hours are not being wasted is essential for a project's profitability.

Finally, to close out this e-book, Don Kiper discusses one of the most important aspects of estimating in "Getting the Bid Out on Time" on page 21. Accuracy is important to estimating, but so is submitting the bid in a timely manner. This compilation of articles is a must-read for any estimator or contractor looking to maximize their next estimate.

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EIGHT TIMELESS ESTIMATING PRINCIPLES

Don't miss these time-proven tips from the pages of yesteryear.

By Don Kiper

The estimating process — like other industry processes — has improved over the years through better communications, computers, and software. But computers and software will not make you an estimator any more than owning a hammer and a saw will make you a carpenter. To be a skilled carpenter, you must understand the principles of house building. To be a skilled estimator, you must have a good understanding of these components: philosophy, methodology, and use of software. Over the years, estimating methodology and the implementation of software have revolutionized the process. While the methodology has changed with software, there are some estimating principles that remain timeless.

In the 1960s, *EC&M* published a book titled "How to Estimate Electrical Work." This 98-page booklet contained 56 practical articles on electrical estimating methods. Some may find this book outdated and would never consider reading it. However, it contains many time-tested and proven estimating principles that are still true and should be considered in the estimating process.

In this article, we will look at some of these timeless principles I have extracted from random articles in that book.

PROVIDE A DETAILED SCOPE OF WORK

When there are no plans and specifications, the estimator should provide sketches or plans of the work to be installed. This scope of work letter or bid proposal should include details of quantities, wiring methods, and materials used in the estimate. The scope of work

cannot be vague. When the scope of work is not well defined, scope seep is inevitable.

TRACKING YOUR OWN LABOR DATA IS BEST

The "Manual of Labor Units" published by NECA is data collected by the organization to provide contractors with an "approximate value" for labor units. However, the best contractors track labor installations on their projects to provide the best historical data for their company and market. When a project has labor overruns, a project's historical labor data will provide valuable information for future estimates.

THE BEST CONTRACTORS TRACK LABOR INSTALLATIONS ON THEIR PROJECTS TO PROVIDE THE BEST HISTORICAL DATA FOR THEIR COMPANY AND MARKET.

EQUIPMENT WEIGHT AFFECTS LABOR UNITS

The weight of material and equipment is important when determining labor for installation. For example, an industrial 2-lamp LED luminaire weighs approximately 5 lb, while a 2-lamp LED luminaire for a Class I, Division 1 location weighs approximately 32 lb. Another example would be a 100A NEMA 1 disconnect switch, which weighs approximately 15 lb. The same size switch in a NEMA 7 explosion-proof enclosure weighs approximately 50 lb. The estimator must always consider equipment weights when assigning labor units to an item. The types and sizes of hangers are also impacted by equipment weight.

LABOR ADJUSTMENTS DUE TO JOB FACTORS SHOULD BE CALCULATED

Job factors or project labor factors are project conditions that have a negative impact on labor productivity. There are as many as 40 project labor factors used today. This booklet lists six. They are standby, weather, size, coordination, complexity, and efficiency. The job factors are labor hours added to the direct labor hour total. These factors are cumulative. For example, if 20% of the work will be performed outside in inclement weather, only these labor hours are adjusted accordingly. A weather adjustment would vary based on geographic location.

PROJECT LABOR FACTORS APPLIED IN OCCUPIED FACILITIES

Determining labor for a new building compared to an occupied facility must be considered. When work is installed in an area occupied with desks and filing cabinets, it will require dust control, protection of the area, and white-glove inspection cleaning once the work is installed. Another example would be a warehouse filled with products that may have to be moved with forklifts to provide access to the work area.

INSTALLATION LABOR FACTORS APPLIED BASED ON MOUNTING HEIGHT

When luminaires or conduits are installed above a normal working height, adjustments must be made to the labor units. Different heights will require different adjustments. A luminaire mounted at 20 ft will require more labor than installed at 8 ft. Installation labor factors are adjustments made to labor units based on the ease or difficulty of the installation. These factors may increase or decrease the labor unit of the item being installed. One example of decreasing the labor units would be parallel run feeders either overhead or installed in a trench.

NON-PRODUCTIVE LABOR IS A MISNOMER

The term "non-productive labor" has been used very carelessly. Every contractor should want the "non-productive labor" to be nil or zero. Direct labor is the amount of time or labor hours that is required to install the material as per the plans and

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specifications. In addition to the direct labor hours, a project will have other labor items that should be considered, indirect labor and incidental labor, but never should it be referred to as "non-productive labor." Proper categorization of labor will provide the contractor with the best data to track the project's progress. Also, referring to labor as "non-productive," it makes it difficult to sell to owners and architects on change orders. Please abandon this misnomer immediately.

HAVE A POST-PROJECT MEETING

This meeting has been sometimes referred to as a "postmortem analysis." The contractor will gather valuable information by comparing the actual labor hours required to install a project to the estimated labor hours. One important item is the average crew size for the duration of the project. Having fewer workers is more productive than having too many. During this meeting, the project manager should provide data to the estimating department for future bidding. This data should include the following: journeyman to apprentice ratio, total labor hours, average hourly labor costs, and project labor conditions that had an impact on productivity. This information will increase bidding accuracy on future projects.

Every contractor should always be seeking to improve estimating efficiency. Using the best technology of our day is paramount, but let's not forget the timeless principles of our industry that are unchanged. Our current generation of estimators is indebted to the estimators of yesteryear for their labor and expertise in providing us with sound principles to do our job.

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IDENTIFYING ESTIMATOR ERRORS

An inside look at the most common mistakes estimators make and how to prevent them

By Don Kiper

One of the main goals in estimating is accuracy. Therefore, mistakes must be minimized. A major mistake could be fatal to a project's profitability. When dealing with mistakes in the estimating process, the estimator must work at minimizing them and developing a good process to identify and correct them.

The very nature of the estimating process is fertile ground for making mistakes. With so many factors that can affect the accuracy and quality of the estimate, the estimator must be vigilant.

Estimating requires the ability to quantify a project's materials, labor risks, and all project costs in a very short time. There can be added stress when an employee is managing and estimating multiple projects.

We all make mistakes because we are human. Here are five common mistakes estimators tend to make:

1. Poor interpretation. The contract documents provide the estimator with the ability to properly estimate a project. From

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the drawings, the estimator can accurately "quantify" a project. In today's world of engineering, not all drawings are 100% complete for construction. Architects and engineers issue drawings that are sometimes only 50% complete. This can be challenging for the contractor. The specifications provide product details and how to install the materials. The estimator must properly understand area classifications as well as Code requirements of the Authority Having Jurisdiction and the National Electrical Code. The contractor's work will be judged by the contract documents. Care must be taken in making assumptions of the engineer's intent. Interpreting intent can be costly. When the risks are too great, clarification must be sought from the architect and/or the engineer.

2.Bad judgment. When we make a judgment, it is typically based on careful thought. Our thoughts are influenced by our experience in the trade. Therefore, our judgment improves with historical data. The best judgments are made on facts, not gut feeling, which has little place in the world of quality estimating. Analyzing previous projects and several types of installations will provide the estimator with the ability to make the best judgments. Labor reporting from the field will provide accurate historical data for making judgments related to the current project.

3. Manual calculations. Estimating software, spreadsheets, and calculators are tools that perform calculations. Performing calculations "in your head" is a sure way to make a mistake. Manual calculations must be avoided. Most estimating software programs provide features for determining the bid price within the software. The contractor should be careful using estimating software in conjunction with an Excel spreadsheet. This creates an environment for human mistakes. Estimators should use the best features of software to minimize mistakes. Quality software provides the ability to complete an estimate from beginning to end.

4. Not using software as designed. Computers allow an individual to work efficiently. I began estimating manually with pencil and paper in the mid-1980s. In those days, we used the "NECA Labor Manual" for labor units and a National Pricing Service book for material prices. Today, this has been simplified with estimating software. When I transitioned to computerized estimating, I wanted the estimating software to "think like a manual estimator." This is unwise. The estimator MUST allow the best features of estimating software to change his or her methodology in the estimating process. Using software as designed, you will increase your efficiency and minimize mistakes. Transposing labor and material totals from estimating software to an Excel spreadsheet to summarize an estimate is

THE ESTIMATOR MUST ALLOW THE BEST FEATURES OF ESTIMATING SOFTWARE TO CHANGE HIS OR HER METHODOLOGY IN THE ESTIMATING PROCESS. USING SOFTWARE AS DESIGNED, YOU WILL INCREASE YOUR EFFICIENCY AND MINIMIZE MISTAKES.

counterproductive and risky. Mastering the functions of estimating software will provide the best outcomes. Every software feature has an intended purpose and should be used accordingly.

5. Omissions. An omission is something neglected or left undone. This could be a missing quotation, a general or specific drawing note not addressed, or a missed drawing not quantified. Every estimator should have an estimating sequence that is followed to ensure that the estimate is complete. Constant procedures will produce constant results. The unchecked estimate will prove detrimental to the quality of the estimate.

So your goal should be to avoid these mistakes as much as possible. But how do you go about doing so? Here are six tips to help you avoid making those mistakes.

1. Use a "request for information" for clarity. Contractors are installers, not engineers. Therefore, ask the architect or

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electrical engineer for clarification when in doubt of the project document's intent. So, when you are unsure, ask a question.

2. Master your estimating software. Learn every feature that your estimating software provides. Seek training, and find an online lesson to help.

3. Avoid distractions. Minimizing distractions is essential. A closed office door is better than an open one. Background music may be relaxing, but talk radio and constant news stories can occupy one's mind. On bid day, put a "Do Not Disturb" sign on your office door.

4. Focus on the task at hand. Multitasking is somewhat of a misnomer. You can only give your full concentration to one task at a time. Trying to do two things at the same time is not the best practice. Confucius said, "The man who chases two rabbits catches neither." This is good advice.

5. Take a break. Taking a break allows your mind to relax and refresh. Keeping your nose to the proverbial grindstone can be counterproductive to your efficiency. Working long periods without taking a break can create brain fog.

6. Have an estimating sequence. An estimator should have a systematic sequence for preparing estimates. The use of standardized estimating procedures is essential for speed, accuracy, and consistency. Consistent procedures will produce consistent results. Here are some benefits estimators can expect from using an estimating sequence:

- Increased confidence in their work
- Increased speed and greater estimating departmental production
- Increased organization
- Increased estimating accuracy
- Reduced estimating omissions
- Confidence during the bid summarization

This sequence checklist will greatly minimize mistakes.

Owning mistakes is necessary for learning to identify and correct them. Mistakes must be corrected sooner rather than later. Major mistakes as well as minor mistakes have a culminating effect on the estimate. Identify the mistake, minimize the impact, and improve your processes/practices for prevention in future estimates.

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THE DANGER OF MAKING ASSUMPTIONS WHEN ESTIMATING

Understand these 10 elements of estimating.

By Don Kiper

The word "assume" means "to take for granted; suppose." Most estimating departments are fast-paced environments, which requires the estimator to read many specifications in a short period of time. You may be tempted to review the project documents too casually, causing you to take some things for granted or make assumptions. However, you can minimize or eliminate assumptions if you have a good understanding of the following 10 items:

1. Scope of work — When bidding on a plan and spec project, typically the scope of work is provided in the specification. This specification section will provide the estimator with work to be performed by the contractor. Sometimes, a scope of work will be provided in Division 26 of the specification. This summary of the work can (and may) list work items that the contractor is responsible for. If there is no scope of work listed in the bidding documents, the wise contractor will write one that details the components included in his or her bid price.

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2. Division 1 of the specifications — Some refer to this section as the "front end" of the specification. The bidding documents are found in this section and typically include the following: advertisement for bids, instructions to bidders, bid forms, and the agreement form or contract. Also in this section are the general conditions and supplemental conditions of the project. The general conditions set forth the rules by which the project is constructed and administrated. The supplemental

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conditions deal with the project's specific matters related to the contract. Supplemental conditions may also modify items in the general conditions section.

3. Schedule — The project schedule may be indicated by one of two means. It may give the contractor a number of calendar days, such as 150 days or a fixed calendar date. Regardless of the means, the estimator must understand the schedule. This is vital in determining supervision, equipment rental costs, labor rates, and, most importantly, crew size.

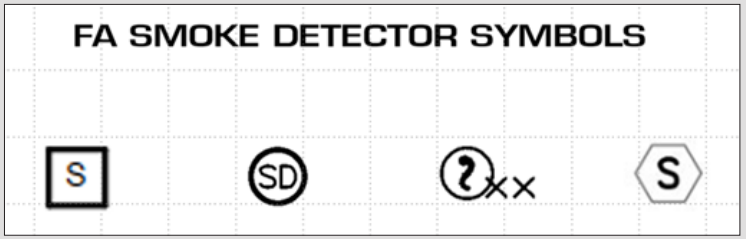
4. Phasing — Some projects require portions to be completed in succession. The phasing drawings will usually indicate specific areas and the completion dates these areas must be completed. Depending on the phasing requirements, the contractor may have to mobilize and demobilize several times over the course of the project.

5. Shutdowns — Renovation projects are known for having shutdowns. When the project requires an upgrade to the electrical service, this is typically done on the weekend and will require overtime. In an occupied facility, the circuitry may need to be fed from a new panel — this work typically will need to be done on off-hours to avoid interruptions to the owner.

6. Building construction — Not all buildings use the same wiring methods. For example, a high-rise condo structure with poured concrete walls is not estimated the same as a multi-residential housing project. In an industrial environment, areas with corrosive materials are estimated differently than areas that require explosion-proof equipment. Both material and labor costs are affected in these different areas. Understanding the building's construction is vital.

WHEN THE PROJECT REQUIRES AN UPGRADE TO THE ELECTRICAL SERVICE, THIS IS TYPICALLY DONE ON THE WEEKEND AND WILL REQUIRE OVERTIME.

Check Your Symbols!



Here is one example of how not every engineer uses the same symbols for devices on the drawings. Here are four different symbols for a fire alarm smoke detector used by various engineers.

Review the symbol legend carefully for each project you estimate. Having to recount devices for various systems because "assumptions" were made will waste valuable estimating time. You can make another dollar, but you can never make another minute. So place a high value on your time!

7. Technical specifications: Divisions 26, 27, and 28 — Technical spec sections have three headings: 1) General; 2) Products; and 3) Execution. The product heading will typically list each product specified with acceptable manufacturers and catalog numbers. The execution heading will detail how the material is to be installed. One example would be conduit installation. For example, PVC conduit may not be permitted to be installed in the slab or underground, where on a previous project this means of installation was permissible. The estimator must completely understand these sections of the specification, paying careful attention to the execution heading.

8. Check scales on all drawings — It is not uncommon for drawings to have different scales. In rare cases, a drawing may have two areas shown — each with a different scale. Quantifying

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materials on the wrong scale can be detrimental to the estimate's accuracy.

9. Check match lines for overlapping items — Some projects require more than one drawing per floor. When this happens, the architect provides match lines. Sometimes, items are duplicated on two drawings.

10. Check column lines — This is very important in multi-level buildings. For example, the main electrical room may be in the basement, and a new panel is being installed on the 4th floor. The vertical length is typically easy to determine. But the horizontal length can be a challenge. This is easily accomplished by identifying column lines of the project. Assuming that the electrical room is directly below is risky, especially when estimating a large feeder.

Making too many assumptions is unwise. The fewer you make, the better. Just remember that estimating is more of a science and less of an art — so treat it as such.

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UNDERSTANDING LABOR HOURS AND LABOR COSTS

Take a look at the labor components that will contribute to an accurate estimate.

By Don Kiper

With labor being the greatest risk in construction, a full understanding of labor components will provide the estimator with the ability to determine a project's labor costs as accurately as possible.

The main components of an estimate are labor costs, material costs, general expenses, equipment, overhead and profit. The labor cost on some projects can be as much as 50% or more of the total bid price, so understanding the process of calculating the labor costs is vital.

1 – LABOR HOURS

The total number of labor hours is determined by the following four components:

1. Direct labor hours — These labor hours are calculated by the number of materials multiplied by the appropriate labor units of each material item. These direct labor hours are derived from the material extension and are extended to the direct labor calculation (**Table 1** on page 13).

2. Indirect labor hours — These labor hours are added for additional manpower such as a project manager, non-working foreman, material expeditor, equipment operator, truck

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Description	Quantity	Labor	Unit	Total Hrs
¾ in. conduit — EMT	100	3.52	C	3.52
1 in. conduit — EMT	100	4.48	C	4.48
1½ in. conduit — EMT	100	6.40	C	6.40
2 in. conduit — EMT	100	7.60	C	7.60
4 in. × 1½ in. square box ½ in. KO	25	23.00	C	5.75
10 in. × 10 in. × 4 in. box screw cover — NEMA 1	1	0.70	E	0.70

Table 1. Direct labor hours are calculated by the number of materials multiplied by the appropriate labor units of each material item.

Labor Type	Hours	Rate	Subtotal	Burden	Fringes	Full Rate	Total
Foreman	8	$50.00	$400.00	26%	$28.00	$91.00	$728.00
Journeyman	16	$45.00	$720.00	27%	$28.00	$85.15	$1,362.40
Apprentice	8	$30.00	$240.00	30%	$28.00	$67.00	$536.00
Totals	**32**	**$41.67**	**1,360.00**	**27.67%**	**$28.00**	**$81.05**	**$2,626.40**
***Note**: Any non-working foreman time should be added under the indirect labor hours total.*							

Table 2. Allocate direct labor costs with the appropriate labor rates for each class.

driver, etc. Think of indirect labor hours as additional workers. The estimator must determine the number of hours that will be required for each worker under the indirect labor category.

3. Incidental labor hours — These labor hours are added for tasks such as travel time, site meetings, commissioning, job setup, etc. Think of incidental labor hours as times for tasks to be completed rather than people.

4. Project factor labor hours — A project labor factor is a condition that affects labor productivity negatively. A percent of lost productivity is applied to a percentage of the direct labor hours. For example, a secured facility, such as a federal building, may require daily security checks for workers before entering the facility. If the security check required one hour daily, then lost productivity of 12.50% would be applied to 100% of the direct labor hours. Another example might be inclement weather. In this case, the lost productivity is only applied to the number of hours required to complete the work during the inclement period, not the entire project. A project labor factor might include, but is not limited to, the following: inclement weather, a high-rise building, overtime, occupied facility, secured facility, project location, and crew size. These factors vary from one geographic location to another. These adjustments are cumulative.

In summary, the total labor hours are the sum of the following:

- Direct labor — Derived from the extension totals of the material listing.
- Indirect labor — Additional employee laborers not installing materials.

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Indirect Labor	Hours	Rate	Subtotal	Burden	Fringes	Total	Full Rate
Project Manager	80	$50	$4,000.00	27%	$28.00	$7,320.00	$91.50
General Foreman	1,020	$60	$61,200.00	27%	$28.00	$106,284.00	$104.20
Equipment Operator	40	$40	$1,600.00	27%	$28.00	$3,152.00	$78.80

Table 3. Indirect labor rates include the base rate, burden, and benefit costs for each individual.

Incidental Labor	Hours	Rate	Subtotal	Burden	Fringes	Total	Full Rate
Job Setup	32	$42.50	$1,360	27%	$28.00	$2,623.20	$81.98
Site Meetings	16	$42.50	$680	27%	$28.00	$1,311.60	$81.98
Commissioning	8	$42.50	$340	27%	$28.00	$655.80	$81.98
Deficiencies	16	$42.50	$680	27%	$28.00	$1,311.60	$81.98

Table 4. Incidental labor rates include tasks that field workers will complete throughout the course of the project.

- Incidental labor — Additional tasks to be performed in support of the project's construction.
- Project factor labor hours — Project conditions that negatively impact labor.

2 – LABOR RATES

Labor rates will vary between prevailing rate and non-prevailing projects as well as geographic location. Labor classes will also have a varying range of hourly rates.

1. Direct labor rates — Once the direct labor hours are allocated to each labor class with appropriate labor rates for each, you will know the blended or average labor rate for your project. Labor classes include, but are not limited to, journeyman, apprentice, foreman, and general foreman. Remember, assigning direct labor hours to a foreman's rate indicates that you are expecting the foreman to work with the tools 100% of the time (**Table 2** on page 13).

Note: Any non-working foreman time should be added under the indirect labor hours total.

2. Indirect labor rates — This labor rate should include the base rate, burden, and benefits costs for each individual. Indirect labor rates will vary from one individual to another. A project manager would typically have a higher rate than a truck driver (**Table 3**).

3. Incidental labor rates — This labor rate typically would be very close to the average labor rate from the direct labor hours allocation. As this work will be done by the workers on the project. These are tasks the field workers will complete throughout the course of the project (**Table 4**).

4. Project labor factor rates — This labor rate typically would be very close to the average labor rate from the direct labor hours allocation. These are labor cost losses due to the project's labor negatively impacted by the conditions. There are many factors that can impact labor negatively (**Table 5** on page 15).

3 – TOTAL LABOR COSTS

The total labor costs are obtained by adding the direct, indirect, incidental, and project factors labor costs together. During the

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Project Labor Factors	Factor	Percent of Direct Hours	Hours	Rate	Subtotal	Burden	Fringes	Total	Full Rate
Lost Time	7%	100	2.24	$42.50	$95.20	27%	$28.00	$183.62	$81.97
Occupied Premises	5%	100	1.60	$42.50	$68.00	27%	$28.00	$131.16	$81.97
Cold Weather	15%	30	1.44	$42.50	$61.20	27%	$28.00	$118.04	$81.97

Table 5. Project labor factor rates include factors that negatively impact labor.

bidding process, the estimator will do his or her best to assign hours and allocated labor classes. This is done based on company experience and the availability of workers. Company historical labor data is a powerful tool when estimating labor costs.

When a project is bid utilizing apprentices and the direct labor crew allocation is not available when the project commences, this will have a negative impact on the overall labor costs.

Getting the labor hours and labor rates properly set up at the front end of the project is very important.

Let's look at some key takeaways:

- Have a complete accurate takeoff of the appropriate materials required by the contract documents. With appropriate labor units applied to each material item, this will provide the total direct labor hours.
- Know the productivity of field labor so the direct labor hours can be accurately estimated.
- Apply a realistic crew allocation of journeymen and apprentices.
- Determine as much as possible, the required number of hours to be included for indirect labor and incidental labor
- Consider any applicable project labor factor and calculate the lost productivity percentage of the direct labor hours.

Above all, the ultimate objective is to make proper allowances for labor risks that are related to the project type, schedule, location, and market conditions.

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HOW TO REDUCE LOST LABOR HOURS ON ELECTRICAL CONSTRUCTION PROJECTS

Supply chain shortages, project creep, inadequate planning, and finger pointing are among the reasons why a full-time employee often has the productivity of a part-timer. Here's how electrical contractors are tackling the problem of lost labor hours.

By Tim Kridel

More than 711,000 people currently work in the electrical industry, according to the U.S. Department of Labor — or they should be working. Instead, they often spend a lot of time standing around waiting for materials, equipment, colleagues, and even customers to show up so they can do their jobs. Exactly how much time? Sometimes more than half of an electrician's workday is unproductive, according to contractors and consultants who have analyzed the problem of lost labor hours.

"They probably only spend 40% to 45% of their time installing, so there's 60% to 55% waste," says Jamie Sullivan, president of Milwaukee-based Staff Electric.

The reasons vary widely — from long-standing problems like project creep to post-pandemic productivity busters including supply chain shortages.

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According to industry experts, sometimes more than half of an electrician's day can be chalked up to lost labor hours.

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Some industry veterans estimate that electrical contractors/electricians spend about 40% of their day doing installation work, which leaves the other 60% as wasted time.

"We used to get 95% of our material from one supply house," says Rich Shumway, field supervisor at Hyattsville, Md.-based Wilcox Electric. "Now we probably get 75% from that supply house and the other 25% comes from three other supply houses, Amazon, Lowe's, Home Depot, or websites. When our supply houses don't have material we need, we often find the material in stock at home improvement stores. We have to take more time now to search for material or alternative solutions for material that was readily available before the pandemic."

Some electrical contractors are mitigating that problem by using prefab, which does more than just ensure that the right materials are in the right place at the right time.

"It also requires pre-planning," says Neil Davidson, executive vice president at Lincoln, Neb.-based Commonwealth Electric Company of the Midwest. "So, it forces us to plan ahead and look at things instead of being reactive on the job site. We're looking way ahead ordering material, putting the parts and pieces together, and getting them out there at the right time. It does a lot of things to increase production on a job site."

FAIL TO PLAN? PLAN TO FAIL

A detailed, organized estimate can go a long way toward minimizing lost labor hours.

"One purpose of an estimate is to provide a detailed, organized plan to execute the project profitably," says Don Kiper, an independent electrical estimating trainer and consultant based in Niagara Falls, N.Y. "Most contractors fail right there."

The more thorough the plan, the more likely electricians are to have everything they need — not only materials, but also tools, forklifts, dumpsters, and even a crew to stage materials and collect trash.

"I feel that the biggest factor is not having a plan and working to that plan," Sullivan says. "In a truly utopian world, if an electrician is working on the 18th floor and gets here at 7 a.m., he would have his drawings in front of him. He would have all his material. All he would have to do is install it."

To get as close to that utopia as possible, Staff scrutinizes each project using processes designed to ferret out waste and inefficiency.

"As an example, we've been doing JPAC™ (job productivity assurance and control), SIS™ (short-interval scheduling), and WBS™ (work breakdown structure) for

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six years," Sullivan says."You can actually see how our productivity has increased per electrician. If the average is $270,000 or $250,000 per electrician, our average is now $350,000 to $370,000. I believe they're not working harder; they're just working smarter.

FINGER POINTING CAN LEAD TO EVEN BIGGER PROBLEMS DOWN THE ROAD IF IT CREATES A CULTURE WHERE PROJECT MANAGERS, ESTIMATORS, AND OTHERS INSTINCTIVELY LIMIT THEIR FEEDBACK SIMPLY TO AVOID CONFLICT.

"An electrician wants to build. How do we get the material to his point of install? How do we get it so that he doesn't have to worry about the garbage or unboxing light fixtures?"

Some productivity busters are due to traditional ways of assessing progress.

"The risk is passed on to the field versus managed by the company," says Dr. Perry Daneshgari, president and CEO of MCA, Inc., a Grand Blanc, Mich.-based consultancy whose clients include Staff Electric. "Companies measure the progress of the jobs financially only, not by the way the job is being done. So the work and labor are not being managed, and that ends up in labor overrun."

Daneshgari maintains labor overrun has historically been a disease in the construction industry. "Since it's not measured, it's not managed," he says.

Another factor that can squelch productivity is busy work that doesn't move the progress needle much. The reason is ironic, considering the electrical industry has a chronic shortage of people.

"The priority of the people in the job site is to make sure people are busy — in other words, so they don't get laid off," Daneshgari says. "The labor get paid as long as they show up, but the company doesn't get paid as long as they show up. The company gets paid when they perform."

Daneshgari likens this to project managers horse trading. "They take the money that they may have in their slush funds or unused money in their fixtures-and-gear budget and let the labor use it."

FIXING THE PROBLEM WITHOUT FIXING THE BLAME

Finger pointing between project managers and estimators is common when a project winds up taking longer than it was supposed to.

"There's a famine in the land for quality skilled estimators because the company culture at most places is that as soon as the job starts going south and losing money, everybody immediately wants to pounce on the estimator," says Kiper, who explored this problem in an October 2019 *EC&M* column, "The Estimator vs. the Project Manager."

Finger pointing can lead to even bigger problems down the road if it creates a culture where project managers, estimators, and others instinctively limit their feedback simply to avoid conflict. The result is fewer opportunities to learn from mistakes — theirs and their colleagues'.

"We're trying to drive a different culture," says Nicholas Hlavinka, Staff Electric executive vice president. "We don't want blame. We want feedback. Everyone knows that our estimating department is not afraid of feedback as long as they come with a positive attitude. We also have a lot of project managers who used to estimate, so they understand that sheet notes can be missed, and details and specs are overlooked."

WHO'S ON THE JOB SITE?

Electrical isn't the only trade struggling with a shortage of skills and supplies these days. That situation only exacerbates the

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Cancellations and postponements seem to be especially problematic in the residential construction market.

longstanding challenge of trade stacking, where electricians are tripping over or waiting on the plumbers, carpenters, and HVAC techs who were supposed to have cleared out days or weeks before.

"There's always somebody that doesn't have something that they need, so you're working around that issue," says Commonwealth's Davidson. "They either don't have enough people to get their material installed, or they can't get XYZ part that needs to go into the puzzle. So, you have to work around and then come back."

Two other factors are the number of apprentices on a job and their relationships with the electricians, journeymen, and foremen on a particular project.

"Maximizing the apprentices on the job site is key to help combat the shortage of skilled labor," Davidson says. "The electricians and foreman need to know the apprentices' skills to get the most out of them. Preplanning and proper management of apprentices is the key to success when using a higher ratio of apprentices to skilled electricians."

Shumway agrees: "We have nine electricians and six apprentices right now, and the apprentices work with all the electricians. The electricians need to know the apprentices' skills and get the most out of them."

NAVIGATING THE RESIDENTIAL MARKET

Scheduling is key for maximizing productivity, but it's particularly tricky in the residential arena.

"Our guys often do multiple service calls or estimates in a day," Shumway says. "That can be a lot of drive time in D.C. traffic. Traffic decreased a lot during the pandemic but has picked back up. We try to schedule our electricians' days to minimize drive time, but sometimes it is unavoidable. There are some route optimization software [applications] out there, but we do not use one."

Cancellations and postponements are longstanding challenges in the residential market as well.

"We are having cancellations or postponements on a daily basis, so we're scrambling to find jobs to move up on a daily basis," Shumway says. "We [recently] had eight same-day cancellations. That's out of probably 40 jobs. That's crazy."

COVID exacerbated this problem, such as customers calling at the last minute to cancel because they tested positive. But so far, this problem isn't waning along with the pandemic.

"We're still seeing a lot of it," Shumway says.

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Vehicle maintenance also directly affects productivity and profitability.

"If we need to get an electrician's vehicle worked on, we have to pay them to transfer his tools/some material to a spare van, pay two men to drop it off, pay two men to pick it up, and pay the electrician to transfer it back into their van," Shumway says. "On top of that, we lost the revenue the electrician would have made had he been doing electrical work. We've found keeping a new fleet cuts down on this time and keeps maintenance bills down."

But supply chain shortages are a problem there, too.

"The pandemic created a vehicle shortage, and replacing our vehicles became much more expensive," Shumway says. "Also, most of our guys prefer the smaller vans due to D.C. parking. But as of right now, after 2023, no manufacturers are planning to sell a small work van in the U.S. market."

LEVERAGING TECHNOLOGY TO MINIMIZE DOWNTIME

Some contractors, large and small, use cellular telematics services to track each vehicle's location and health. For example, the onboard module can send alerts when oil pressure, temperature, and other metrics go beyond recommended parameters.

One way that telematics services can help minimize lost labor hours is by identifying emerging problems so that vehicle can go into the shop the next day. That heads off a breakdown that would leave the electrician on the side of the road for a few hours.

Some contractors use telematics services not only for vehicles, but also for other high-value mobile assets such as equipment trailers, skid steers, and forklifts. One main reason is theft: They can get alerts when an asset moves outside a geofenced area and then tell law enforcement where it is to enable recovery. Another reason is identifying and retasking equipment that's sitting idle because a particular project no longer needs it.

Those location-based capabilities also can be used to ensure that all of the right equipment will be on site when electricians arrive. And if some of it isn't, supervisors and foreman can quickly check to see if there are any nearby jobs that aren't using that equipment.

In fact, some contractors see the most business value in using telematics to maximize productivity rather than thwarting theft. For example, one of MCA's clients has tools ranging from $250,000 to $750,000 apiece.

"If they can save one hour of the labor not moving material, that's $1.2 million," Daneshgari says. "When the owner looks at it, he says: 'I don't care about the tools. I do care about the labor losses.'"

On large, complex projects, another helpful technology is robotic total stations.

"Our engineers lay out points, whether it be hangers for conduit, floor boxes, or core drills," says Commonwealth's Davidson. "Those will be loaded into the computer and then transposed into the robotic unit. Then we go out in the field, set that up, and mark those points out on the floor or the ceiling. In the old days, you'd be out there with the tape measure and some strings. Now you can shoot hundreds of points in an hour. That's really helped our efficiency in the field."

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GETTING THE BID OUT ON TIME

Eight factors behind every quality bid that is submitted in a timely manner

By Don Kiper

The main purpose of the estimate is to allow the contractor to enter into a contractual agreement with confidence. The estimate must be accurate, organized, and complete. To make that happen, it takes time and an experienced estimator. Rushed takeoffs, crunching numbers, and not enough time to properly estimate a project will not create confidence on bid day.

When a bid is rejected because it is not delivered on time, the contractor must ask, "Why?" Delivering a timely bid starts long before the bid due date arrives. Valuable estimating time is wasted when the contractor does not have a good process and organizational structure to keep the estimating department functioning efficiently.

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It is detrimental to the contractor to constantly miss bids dates. Without proper planning — and having the right resources — valuable estimating resources are wasted.

Let us consider these factors that allow the contractor to produce a quality bid and submit it in an organized and timely manner. The following are some reasons that a bid is not produced and submitted in a timely manner:

1. Lack of sufficient experienced estimators. Trying to bid too many projects with too few estimators is unwise. Every contractor must manage and balance a proper workload for their estimating team. Overloading an employee is not considered the best process. This will cause a decline in quality work. It is better to produce four quality bids in a month than 10 bids that are rushed and not properly estimated due to time constraints.

2. Insufficient time for the estimator to complete the estimate. Especially in smaller companies, an estimator may also function as a project manager. Balancing the roles of estimator and project manager can be challenging. Depending on bid due dates, project meetings, and coordination of material and labor, an employee will be challenged to perform well in all responsibilities.

3. Underestimating the required time to complete the estimate. When an estimator is given a project, one of the first tasks should be to determine how much estimating time will be necessary to properly quantify and produce a detailed bid summary. The main reason for this is to communicate to his or her boss that assistance will be needed. This will also help in scheduling other responsibilities and obligations. Accurately estimating the time required to complete a project is a valuable skill.

4. Having the right experienced, skilled estimator matched to the type of project being bid. For example, when estimating a water treatment plant, there will be a learning curve that may require the estimator to perform some research into understanding materials and specific requirements of this type of project. Becoming a skilled estimator not only requires time, but it also requires being exposed to various types of projects. As an estimator gains experience with a particular type of project, his or her experience will produce an estimate efficiently.

TRYING TO BID TOO MANY PROJECTS WITH TOO FEW ESTIMATORS IS UNWISE. EVERY CONTRACTOR MUST MANAGE AND BALANCE A PROPER WORKLOAD FOR THEIR ESTIMATING TEAM.

5. Not providing the best estimating tools. Estimating with pencil and paper is from a different era. Yet, some contractors are still estimating with this outdated method today. Most responsibilities we have today involve the use of software. There are many software choices available to contractors for increasing estimating efficiency. Providing the best software and electronic methods for employees is especially important to finish the work in a timely manner.

6. Unhealthy company atmosphere and culture. Company management must provide employees a quality work environment. Tension, stress, and contention between workers and superiors will reduce employee productivity. In some offices, the "open cubicle" arrangement can be distracting. An office where the door can be closed will provide the estimator with a workspace free from most office distractions.

7. Failure to prioritize projects to be estimated. Not every project out for bid is worthy of your attention. You must bid the best projects that you have the greatest odds of winning and making a profit. If 10 or more contractors are bidding the same project, your chances are lessened to be a low bidder. Focus on projects that are best suited for your company's performance and profitability.

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8. Failure to prepare necessary bid documents several days before the bid date. Most projects require multiple bidding documents. Most federal and municipal projects will require the contractor to submit a bid bond. Other documents that may be required include an experience statement, list of subcontractors, and list of major equipment suppliers. Multiple copies of the bid may be required. Some projects also require unit prices. For example, an owner may request unit prices for a switch, receptacle, or fire alarm smoke detector. These prices include all material, labor, expenses, and overhead/profit. Most of these documents can be prepared a day or two before.

FINAL THOUGHTS

Bid day should not be a rushed frenzy. If it is, mistakes and omissions are sure to occur. Preparation for a great bid day starts days — if not weeks — before the actual bid must be submitted. Find the right estimator for the project, and allow him or her enough time to properly estimate the project. Every contractor must strive to provide their employees an excellent work environment with the best tools that will allow for maximum efficiency and productivity. There is no need to be rushed on bid day filling out certain bid documents, when these should and could have been completed days before.

Hoping for an extension of the bid date is not always the answer, although this may be helpful in some cases. If the contractor is constantly asking for or hoping that the bid date will be extended, that is a sign of more structural problems within the company.

BID DAY SHOULD NOT BE A RUSHED FRENZY. IF IT IS, MISTAKES AND OMISSIONS ARE SURE TO OCCUR. PREPARATION FOR A GREAT BID DAY STARTS DAYS — IF NOT WEEKS — BEFORE THE ACTUAL BID MUST BE SUBMITTED.

If there is anything that the contractor should have on bid day, it is confidence that the estimator has produced a quality estimate that will allow the contractor to enter into a contractual agreement and that, if awarded the project, the company will have the opportunity to generate a profit. After all, a company should be in business to make a profit, not just submit bids.

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