

The Value of Using Published Metrics for MEP Estimating

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Abstract

The construction industry lacks standardization and clear best practices when it comes to formulating estimates, particularly in the mechanical, electrical, and plumbing (MEP) trades. In this paper, noted MEP estimating expert Pete Melucci provides an overview of how estimates are typically produced on construction projects, identifies the drawbacks of the conventional and non-standardized approaches, and argues for the wider incorporation of published metrics into the practice of estimate formulation. You will learn why published metrics are so valuable in producing estimates, and how their widespread adoption will enable the estimating process — and construction projects overall — to be more efficient, reliable, and transparent.

Overview

In the construction industry, there are various methods of generating quantities and dollar amounts for labor, materials, productivity, and mark-up structure, as well as other measurable project components. It is important for companies and individuals operating at the subcontracting level to use only the most granular and accurate of these methods, especially on larger and more complicated projects. Whenever possible, the subcontracting community — the mechanical/electrical/plumbing (MEP) trades in particular — should utilize industry-standard metrics as a basis for their estimating.

These industry standards, which are referred to as “published metrics,” provide a sound foundation for accurate measurements and forecasts, and represent a key best practice in the MEP estimating discipline.

Some of the better-known examples of published metrics include:

Organization	Metrics
Mechanical Contractors Association of America (MCAA)	Piping labor productivity
Sheetmetal and Air-conditioning National Association (SMACNA)	Ductwork labor productivity
National Electrical Contractors Association (NECA)	Electrical labor productivity
Harrison Publishing House	Piping materials
Trade Service	Electrical materials

These standards create a universal language and a platform for discussion, which is why they are so effective when used as foundational data for building an estimating database. On any given assignment, the data can be adjusted to arrive at the desired quantity for each task or project. However, the basis of that data — that is, the published metrics being used — do not change. This dynamic allows for a stable and agreed-upon reference point against which estimating activity can be properly understood. For example, an estimator on a project may state that his estimated labor productivity for piping is “80% of MCAA,” giving that estimate valuable context in a manner the entire team understands and is familiar with. **Additionally, estimators can combine this contextual framework with empirical data from previously completed projects to make as-needed**

adjustments to the estimate. No two projects are equal, so published metrics alone are not a panacea. Flexibility and common sense are also key.

Prior to these standards, companies utilized many different methods of calculating labor, material, productivity, and other measurable cost factors. In fact, many companies still prefer self-generated methodologies for various reasons. These firms may trust their own metrics more than the industry standards. They may be rarely (or never) required to use the referenced standards, or perhaps they find access to the standards to be cost prohibitive. Still, these firms are dwindling in number and most contractors (especially those building the larger and more complex projects) have now adopted these standards.

Formulating Estimates the Conventional Way

There are various levels of due diligence and precision in formulating estimates. This is particularly true for estimating conceptual, schematic, design development, and other incomplete documents. The level of precision on a given estimate typically correlates with the amount of risk assumed by the company undertaking the estimate. For this discussion, we will focus on larger and more complicated projects where the assumption of risk is high. A common process and approach for these kinds of assignments (focusing on the roles and responsibilities of the subcontractor, GC/CM, and owner's representative) is described in the following subsections.

Subcontractor

When formulating estimates, the subcontractor assumes the most risk — therefore, they require the most current and precise information when generating their estimates. This is because they need to be as close to perfectly accurate as possible. They are utilizing their estimates to purchase goods and services as well, which further increases the need for accuracy. Because of these factors, subcontractors tend to have the strongest and most detailed estimators as well as the most granular software and metrics. It is important to note that estimating groups within subcontracting firms are typically identified as “overhead” from an accounting standpoint, which means there are generally no revenue pressures on that group. This freedom allows them to spend extra time analyzing project details, but comes with a potential downside: their heavy concentration on minute details can hamper their ability to accurately project costs during the early design stages. This is because the predominance of a subcontractor's estimating department practices are on mostly or fully drawn documents. Their systems and data are geared for those late design phases. Additionally, conceptual estimating requires a different skillset (and significant experience) to properly execute. There can be dynamic changes during early design as well. A subcontractor often maintains fewer tools and personnel for the conceptual stages because the percentage of conceptual work is lower overall. Knowing and accounting for this ahead of time is key.

General Contractor / Construction Manager (GC/CM)

The GC/CM is primarily responsible for establishing budgets and cost projections. They do utilize estimating tools, but these tools are often not based on published metrics. Their risk level is lower than that of a subcontractor, and their tools are often less detailed or precise. On the other hand, they are typically quicker in generating projected

costs. The GC/CM is ultimately responsible for the project's construction, as well as the material and financial results. Their estimating occurs primarily at the earlier stages of the design, so changes and evolution are likely.

The MEP estimators within a GC/CM firm often solicit the subcontracting community for budgets and input, which they then consider when formulating their estimates. GC/CM firms that do not have MEP estimators on staff may rely entirely on the subcontracting community for estimating. As with a subcontractor, estimating groups in a GC/CM firm are typically included as “overhead” from an accounting standpoint. This is not universal; there are some firms that are structured to concurrently offer billable consulting services in addition to overhead support. If the company or group provides both construction and consulting services, this can sometimes become a problematic distraction. It is of note that GC/CMs with self-performing trades may have internal groups that more closely resemble the subcontracting approach — this is because self-performance assumes much more overall risk.

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Owner's Representative (OR)

OR (or CM-for-fee) firms typically have the least amount of risk. These firms are often pure consulting outfits and their structure is similar to a law firm or accountant from a fee structure perspective. The majority of these firms use a database estimating system, wherein the data is empirical and/or from a published database that is not aligned with the subcontracting community. The published metrics referenced earlier in this paper are not utilized and there may be numerous line items in the estimate that can be overly general, which is to say they are less detailed and likely less accurate. While the estimates produced in this manner can work well in some situations, they typically do not reflect the “language” of the subcontracting industry. On the other hand, OR firms are often stronger with benchmarking tasks and analyzing similar projects in order to arrive at projected construction costs. Additionally, their fee structure does not usually allow for as many calendar days or funded hours to exert the same amount of diligence as provided for in the subcontracting community.

Overview

The preceding paragraphs describe how estimates are typically formulated by subcontractors, GC/CM firms, and owner's representatives. It is evident that although there are positive aspects to the current way of doing things, there is much room for improvement. In short, by incorporating published metrics, the estimating process can be made both more efficient and more accurate, thus leading to increased likelihoods of project success. In the following paragraphs, we will look at how this effort would impact the work of subcontractors, GC/CM firms, and owner's representatives.

Subcontractor

Simply put, subcontractors should be using published metrics if they are not already, and they should be communicating to the project team accordingly, with those metrics as a framework or reference point. [By using the very granular detail that is provided in these metrics and using them to build "unit costs" or "assemblies," subcontractor firms can improve the clarity and reliability of their estimates.](#) For example, a subcontractor could create assemblies based on the replication of one hundred feet of linear piping of a specific type, the details of which are described granularly in the published metrics. These assemblies, in turn, could be utilized for more accurate conceptual estimating — one of the weak areas for subcontractors under the standard model described earlier — and assist the subcontractor in working effectively with GC/CM and OR firms.

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General Contractor / Construction Manager (GC/CM)

The GC/CM can improve the quality of their estimates by 1) employing qualified MEP estimators with actual subcontracting and/or engineering experience, and 2) subscribing to published metrics for use in creating their own unit costs and assemblies for comparison with others. These two steps allow the GC/CM to not only join the conversation in a compatible way, but they also enable the GC/CM to challenge, compare, and brainstorm cost/design strategies more realistically. While the GC/CM community is currently mixed on employing and utilizing people, systems, and metrics of this type, they are trending toward a more granular, metric-based approach supported by increased employment of in-house MEP estimators. This positive development should be encouraged to continue.

Owner's Representative (OR)

As with the GC/CM, the OR firm can easily add additional value through utilizing in-house MEP personnel who in turn utilize published metrics for estimate development. In lieu of providing very high-level analysis only, or unit pricing based on sometimes questionable information, they would instead be on the same platform as the subcontracting and general contracting communities. At a bare minimum, this system promotes a shared foundation, which in turn allows for meaningful discussion and comparison; but it can do much more. For example, estimates or assumptions that are overly conservative or aggressive (or otherwise incorrect or insufficiently formulated) can be challenged and demonstrated as outside of norms. By utilizing MEP specialists along with published metrics, the OR firm can deliver estimates that are less opinion-based and more provable, while also contributing to the overall project team in a more meaningful manner (such as contributions during the value engineering process). While some OR firms have successfully invested in the specialized personnel and metrics needed to “join the platform,” the majority of such firms are not currently employing this strategy. This needs to change.

Summary

On many projects, not only are the subcontractors and engineers alone in employing MEP-specific personnel, but each firm involved on the assignment may be using its own metrics. In these situations, to say there is a lack of communication and agreement is an understatement. Parties that do not have qualified personnel and cannot communicate on an appropriate technical level generally cause the bulk of the issues for the overall project team. It is important to note that both elements (the MEP estimating specialists and the use of published metrics) are essential. A company that utilizes the necessary specialists but does not use published metrics is better off than a company that utilizes neither, but the lack of the shared platform that published metrics provide will

still be a limiting factor in how effectively and efficiently that company (and the entire project team) can do their work.

When all parties are aligned with regard to personnel and metrics, the estimating processes between different companies become much more efficient and transparent. On projects where all companies involved are working in this manner, it is easier to compare data, assumptions, and projections, leading to fewer cost fluctuations and surprises. This is indeed happening/progressing on a growing number of projects, but there is still massive room for wider awareness and adoption.



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Pete Melucci is a 30-year industry veteran with particular expertise in estimating the MEP trades. At Cumming, he oversees the company's MEP group, which he has grown from a handful of people five years ago to 27 people today. He holds several degrees, including a master's in energy management; is a member of multiple industry organizations, such as the Alliance for Construction Excellence and the American Society of Heating, Refrigeration, and Air Conditioning Engineers; and is a LEED Accredited Professional. Pete has estimated more than 1,000 projects of all types, from education, government, and tech, to healthcare, hospitality, and themed entertainment, among others.