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DESIGN/CONSTRUCTION PROFESSIONALS HOPE THEIR PROJECT DESIGNS PROCEED WITHOUT MISSTEPS OR COMPLICATIONS. OF COURSE, THAT RARELY HAPPENS. THE LIGHTING PRODUCT SPECIFICATION AND BIDDING PROCESS IS COMPLEX, AS IT INVOLVES MANY INTERESTED PARTIES, EACH WITH ITS OWN STAKE IN WHICH PRODUCTS ARE ULTIMATELY INSTALLED IN THE PROJECT AND ITS OWN DEFINITION OF SUCCESS WHEN IT COMES TO FINAL LIGHTING CHOICES. LUCKILY, THERE ARE TRIED AND TRUE WAYS TO SIMPLIFY THIS PROCESS.

Ensuring a Win in the Lighting Specification Process

Knowing the amount of funds allocated for each building system is key to the successful design and completion of a project. Starting with either a total dollar amount or a budget per square foot helps orient the design in the right direction. It is equally important to be clear on whether that amount covers only lighting products or both products and installation. Typically, the total budget amount refers to both. For example, with a total budget of \$12/sf for lighting, including the installation, there may be only \$6 to \$8/sf remaining to purchase the luminaires and controls. Given lighting products are more expensive than ever and there is a significant trend toward more advanced controls, it is important to work with the architect or owner to clearly define a lighting budget before embarking on any design process. Without a defined budget, the probability of needing some 'value engineering' down the road becomes very high.

Unfortunately, nailing down a lighting budget from the owner or team leader is often difficult. Generally, someone with authority over the project allocates a portion of the overall construction budget for lighting fixtures and controls—but when lighting is not accounted for, the lighting specifier must rely on other means to support a starting budget. For example, he or she may have to refer to recent completed projects in which the final lighting costs are known. Whenever possible, it is a good idea to try to track this information for use as supporting data for future



The heavy involvement of the lighting specifier throughout this project at Inova Health System in Falls Church, Virginia, allowed for necessary testing to ensure the lighting controls functioned as planned.

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If the design path focuses only on what will make the biggest visual impression without regard for budget, function, or controllability, there are sure to be bumps along the way resulting in a redesign effort.

budget estimates. Another useful method for building a solid budget upfront is getting any product pricing information from local lighting representatives who can provide guidance on probable worst-case lighting costs. Additionally, some product costs can be found through online advertisers, although these are typically consumer-focused products rather than commercial options.

However, none of these solutions provide any indication of labor costs. One traditional way to address such costs is to refer to an estimating service such as RS Means or National Construction Estimator. This data can be adjusted for a variety of criteria such as location or quality of construction.

If the design path focuses only on what will make the biggest visual impression without regard for budget, function, or controllability, there are sure to be bumps along the way resulting in a redesign effort. Some designers even build in a 'good-better-best' system to head off the need for later value engineering. In that scenario, any of the good, better, or best options would meet the basic design criteria for the project. Perhaps the 'good' final product has the necessary light output, is an appropriate physical size, and has a satisfactory aesthetic appeal, but only dims down to 10 percent of the full light output, and a lower dimming level is preferred. The 'better' product might dim to one percent, with all other factors equal to the good option. The 'best' product could have a similar light output and size and not only dim to the desired level, but also have extra features—for example, 'warm-glow' dimming or special color-changing effects. Without a committed lighting budget, it is advisable to start with the better product, since the best option might be too expensive. When specifying the middle-ground better product as the basis of the design, one good option that can get the job done could be kept in the background in case there may be a value engineering challenge down the road. It is better to be proactive than reactive when it comes to a project's budget.



Of course, there is the possibility even the good product is more than the project budget will support. In that case, there may be a breakdown in the quality of communications between the project leader and other members of the design team—an issue considered later in this article.

Preparing for the contractor's bid

After reviewing the project's lighting applications and any budget information available, the lighting specifier begins to consider which products would produce the desired effects (e.g. illumination levels, aesthetic appeal, good integration with the architectural features, etc.) in each space or application. This leads to the preparation of a lighting schedule, which is a table describing each

The lighting specifier was able to provide a lighting solution within the owner's budget due to key involvement throughout the entire Queens University project. Photo © Mark Remick Photography LLC.



The original lights for this project for Trident Technical College (TTC) Nursing were deemed too expensive, and new, less costly lights were selected in collaboration with the manufacturers. The fact all parties worked as a unit instead of as separate branches of the project meant a better result could be produced for the owner.

Photo © Matt De

type of luminaire in the project. For example, Type A might be a 0.6 x 1.2-m (2 x 4-ft) fluorescent troffer, Type B a recessed light-emitting diode (LED) downlight, and so forth.

These descriptions are a start, but quite a bit more information differentiates products from each other. A lighting specifier knows how each of these products must perform, what they look like, and other details. Providing less information on the bid documents risks lowering the quality of the lighting project and the reputation of the design team, as well as possibly shortchanging the owner. A loosely written lighting schedule leaves interpretation up to parties who may not represent the owner's best interests.

An excellent way to ensure protection of the design intent is to describe one product as the basis of design, then add in one or two equal products by other manufacturers. To equip the bidding environment for the most cost-effective bid, it is a good idea to provide at least two equivalent manufacturers selling essentially the same types of products. Although definitions can vary from one written specification to another, one typical interpretation of 'equal' is where all products named on the lighting schedule are functionally interchangeable within a given application. They should be able to perform in essentially the same manner and have very similar physical characteristics. Providing three product names means one manufacturer is not guaranteed

the successful bid and must therefore compete with others. This helps ensure the owner gets the best value, provided the specifier can find at least two equivalent products meeting the design criteria.

Many federal, state, and local entities require that each specification must include three equal manufacturers' products from which to choose. For the majority of lighting applications, where the most common types of fixtures are being specified, it is not difficult to find three equal products. However, in both privately and publicly funded projects, there are instances where either a specific product type is desired to fulfill a certain task, or the owner has a standard in place and—for the convenience of parts replacement and continuity—a proprietary product is preferred. In such cases, a performance specification is written to describe a specific product.

There are two concerns when the performance specification route is chosen. First, when the performance specification is written too narrowly, it can eliminate competition, circumventing the fair bid process required by public projects and strongly desired by most private clients. Second, there is still a risk the submitted or bid product provided may look and act like the one described in the performance specification, but fall very short in terms of overall quality. This is hard to assess unless two working products are compared side by side.

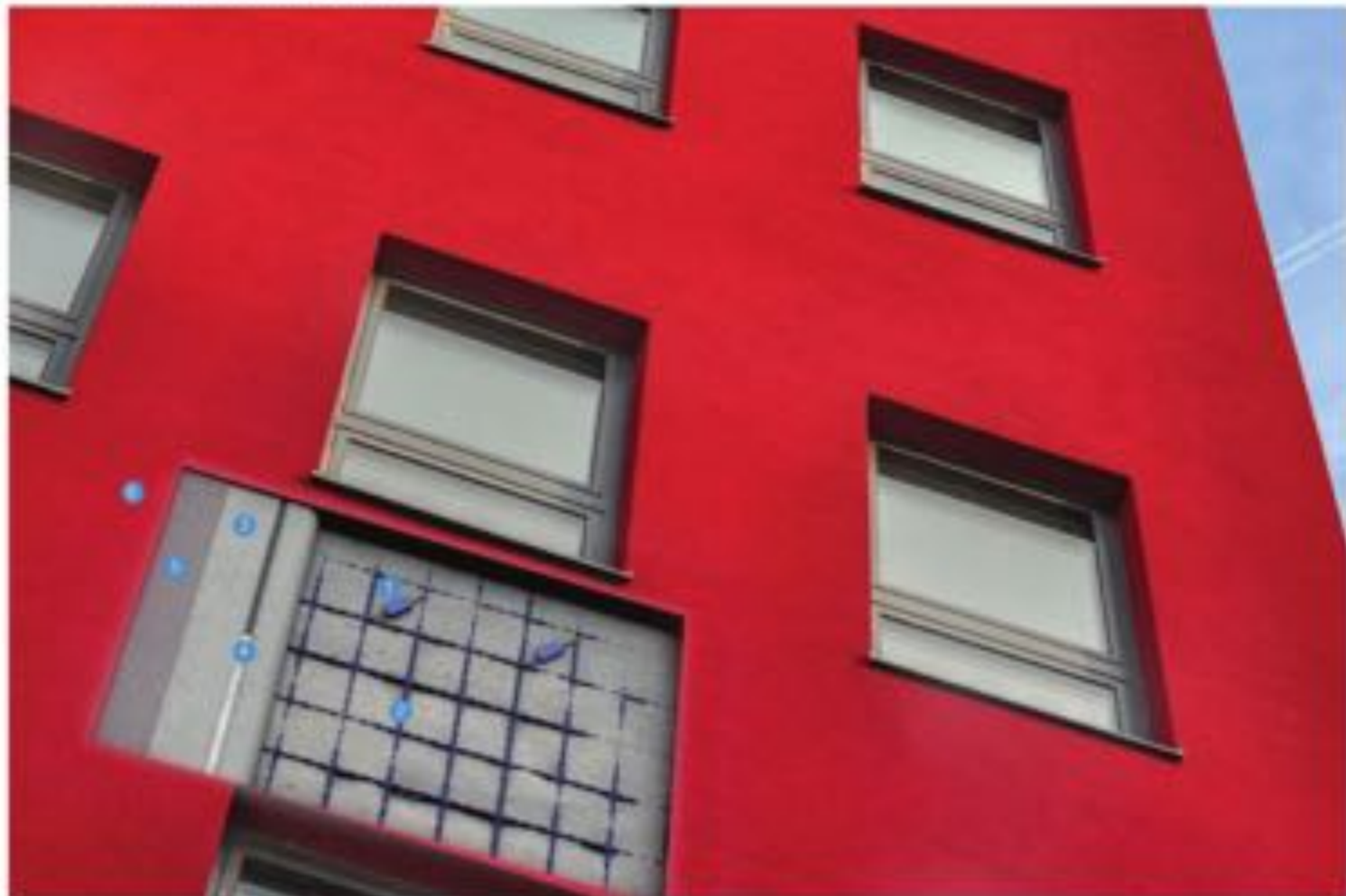
Perhaps a better way to specify a proprietary product is naming an alternate option. In this case, the preferred product as well as two other relatively similar products may be listed together on the specification as part of the base bid. Then, the preferred product is named as an alternate with a directive the bidding contractors are to provide separate pricing solely for that product. This sets the stage for the owner to procure a specific product, distinguishes it from the other products on the schedule, and makes the bid clearer for all parties. However, in any publicly funded project, the lighting specifier must be careful to comply with all state laws and local ordinances related to bidding of lighting product systems. Each state or local authority having jurisdiction (AHJ) has its own requirements, so it is imperative to know which regulations affect each project. The way products are specified makes a difference in creating a fair bidding environment and in how a lighting specifier's performance is viewed by the client.



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Early involvement of the lighting specifier can ensure project success.

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For this student health center project, there were not three manufacturers who could provide the particular light desired, so the lighting specifier wrote a performance specification and created drawings of the ideal fixture to allow the manufacturers to custom-build it. This maintained competition during the bidding process.

Photo © Mike Decker/Frederic Photography

Building trust with the owner

A lighting specifier may not be involved early in the design process, because lighting is often considered secondary in a building project. As a result, the lighting specifier may miss out on some important interactions between the owner and other design team members. It is important to try to participate in the design process as early as possible, because lighting is an essential ingredient in the full project package. Lighting factors can play a big part in how a project develops.

A good designer has technical expertise and a voice that should be included in most of the process, from early design development all the way through construction administration.

During design development, critical decisions are made that could affect lighting direction—there is still plenty of time to make some crucial shifts if necessary. For example, when decisions are made about ceiling heights and finishes, consulting the lighting specifier might help avoid problems (e.g. using incorrect lighting for the height of the ceilings or reflectiveness of the surfaces in the space) later in the process. Thus, it is crucial to have lighting specifiers involved at the start of the project, as they can often provide insight into which lighting systems will work best within the architectural design. Ensuring certain lighting decisions are made early on can also spark thought in other trades, such as where ductwork or piping can be routed, what controls need to be selected to coordinate with other systems, and decisions regarding the budget.

When it comes to controls, the lighting world is blessed with many choices. Architectural LED lighting product development occurred faster than many experts first anticipated, and along with this trend came many more lighting control opportunities and exponentially more product choices. However, the lighting specifier's job is not only to provide choices to the entire design team, but also to advise on what is practical, affordable, and functional. Not every project requires the latest highly sophisticated control system. Luminaires can still be controlled in new and innovative ways that are not extremely expensive. It is important the lighting specifier knows the options and can negotiate the needs of the owner during the design process. He or she should be available and as involved as possible with the architect and the owner throughout this process, not just at the submittal stages or after all other building decisions have been made.

The need for designer involvement continues through the construction administration phase as well. The fact the design is complete does not mean that the lighting specifier's work is done. Contractor submittals should be reviewed to determine the specification intent has been met and that every detail matches those of the bid documents. Further, because contractors have so much field experience, they tend to be very good at bringing up questions that may not have been covered completely in the bid documents. These questions should be directed to the designer of record, not just any field person standing in to oversee the project build.

Early coordination with the design team, as well as vigilant scrutiny of submittals and installation, can ensure the best outcome while building client trust in the process.

For the Durham City Hall project in North Carolina, the lighting specifier reviewed samples for the facade lighting with the design team, and was involved throughout the process to ensure accuracy and a quality final product.

Photo © Sterling S. Stevens
Design Photo



More often than not, some information in the submittals needs to be reviewed by the contractor and perhaps resubmitted. For instance, the lighting specifier may find the light output, type of control, or a product finish desired by the owner is not correctly represented. This is the last chance to ensure the design intent is met and the owner is getting what is expected before the contractor purchases products. If those documents are not completely reviewed for accuracy and compliance, various problems could result in the field. Nobody likes an installed surprise that does not meet the specifications—therefore, it is the lighting specifier's responsibility to step up and engage in the design process rather than waiting to be asked.

Finally, as the project is being constructed, the lighting specifier should be involved in the field in order to confirm:

- the products being installed are exactly the same ones approved during the submittal process.

ADDITIONAL INFORMATION

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Abstract

This article approaches the lighting design process from the joint perspectives of the designer and electrical engineer. It details how to plan for success in the lighting specification process to deal effectively with common issues faced in the industry, such as preparing a fair bid, budgeting, planning for multiple options, working directly with owners and building trust, thinking through how controls will be used, and being sure the owner gets what they paid for.

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- installation of both luminaires and controls is as intended; and
- all are functioning properly.

Constant project involvement pays off in dividends at the end of the project with successful installations and satisfied owners.

Conclusion

The lighting specification process includes many players, each with a different definition of success. For the lighting specifier, success means delivering a design that achieves the proper aesthetic and energy goals of the project, creating a fair bidding environment in which product manufacturers may compete, staying within a budget, and specifying appropriately controllable and maintainable lighting systems for the foreseeable future. This is a difficult balance to achieve, but everyone wins if the lighting specifier is careful and plans ahead.

By establishing a budget very early on and by considering a good-better-best design approach from the beginning, the lighting specifier may succeed at keeping the project cost within expectations and avoiding a redesign effort or value engineering later. A fair bid process results



only when the lighting specifier is careful in development of the specification. Early coordination with the design team, as well as vigilant scrutiny of submittals and installation, can ensure the best outcome while building client trust in the process. The very best lighting specifiers will seek engagement with every stakeholder early and often to ensure success for all. **CS**

This project was able to meet high technology wishes despite a very conservative budget, thanks to the involvement of a lighting specifier with a thorough understanding of which lighting options within the budget could pair with high-tech controls.