
Gaining the Edge in Industrial Construction

The Connection Between Job-Site
Profitability and Proper Electrical Design



The construction industry is facing global competition and intense price pressure. At the same time, overhead costs are driving down profitability. Major infrastructure projects have the power to be profitable and globally transformative, but they can only do so if they're done well.

The technology used in the creation of infrastructure projects continues to receive substantial investment, but according to a March 2020 survey by Panduit and EC&M, the majority of electrical engineers and electrical contractors are still struggling to collectively understand the full benefits of cable management in electrical design—and the risks of ignoring it. Short circuit calculations aren't being performed, and proper cable management solutions aren't being specified.

The end result is that nearly half of the survey's engineer respondents (48 percent) indicate that none of the power cable they specify is currently protected by cable cleats, and only 44 percent of electrical contractor respondents specify the use of cable cleats on their power cable designs. This puts the safety, productivity, ROI, and future scalability of entire projects at risk.

¹ Panduit and EC&M, Cable Management: Reality vs. Best Practice, March 2020



81% of engineers either never perform short circuit or fault calculations or do so rarely.¹



How Electrical Infrastructure Reliability Impacts Business Outcomes

SAFETY FIRST: PROTECT YOUR WORKFORCE AND YOUR INVESTMENT

Every employee has the right to work in a safe environment and every employer is responsible for providing that. This extends to having the proper infrastructure, which helps ensure workplace safety and minimizes risk.

Electrical hazards can result in serious injury or death, and any worker coming in contact with an inadequate electrical infrastructure is at risk of experiencing these life-threatening events. This approach to risk management will no doubt benefit the business, but also the worker. When workers are put at risk, accidents happen. When accidents happen, delays occur.

Electrical safety is best suited as a proactive process, and that means having the proper electrical infrastructure in place from the get-go. When managing site safety, it is vital that potential hazards are identified and minimized from the start by implementing the right electrical infrastructure.

As the complexity of industrial engineering and construction projects grows, two things are true: designs require more flexibility, and sites become riskier.

Compared to traditional pipe and wire electrical systems, cable tray systems provide more design flexibility and ease of installation. But without including cable cleats for short circuit and overload protection, cable tray designs can add risk to a project.

Both NEC and IEC standards require cables be secure in the event of a short circuit, but current NEC standards don't yet provide guidance on how to determine the right cable cleat for the job.

² Panduit and EC&M, Cable Management: Reality vs. Best Practice, March 2020



75%
75% of electrical contractors expect that engineers have performed short circuit or fault calculations—which they often haven't.²

In Europe, where cable tray systems have been common for decades, IEC 61914:2015 has evolved to include a robust methodology for testing the reliability of cable cleats for short circuit mitigation. In addition to resistance to electromechanical forces, IEC 61914:2015 outlines requirements for temperature rating, corrosion, UV resistance, and more to ensure a cable cleat can stand up to the harsh conditions of an actual construction site.

FROM PRODUCTIVITY TO PROFITABILITY

Getting the design and installation of electrical infrastructure correct plays a critical role in getting a favorable outcome for any infrastructure project.

By doing it right the first time with standardized processes, engineers and contractors can prevent rework that can wreak havoc on project timelines and create the need for extra, costly materials. McKinsey & Company reports that 98 percent of megaprojects suffer cost overruns of more than 30 percent. To make matters worse, 77 percent of them also ended up taking nearly 40 percent longer than expected.⁴

With the complexity of infrastructure projects always increasing, things won't be getting easier any time soon. This gives even small mistakes the potential to reverberate throughout a project. Companies that master the ability to deliver on these large investments are the ones that can position themselves to be highly successful in the construction industry by paying adequate attention to critical foundational elements like electrical design.

SCALING POWER CABLING FOR THE FUTURE

When a new infrastructure project or the expansion of an existing one is commissioned, delivering state-of-the-art solutions is always the goal. With technological shifts constantly altering the industrial landscape, the correct design guarantees the most effective project delivery. While the proper design can allow for flexibility in the current operational and production demand, it also allows for installation and adaptation down the road.

Having the right foundation in place even before a project's groundbreaking can determine its on-time delivery and overall success.

THE RELIABILITY THAT DRIVES ROI

There's no sign of demand for infrastructure projects slowing down. According to McKinsey & Company research, global investment in energy, infrastructure, mining, and real estate-related projects could be as much as \$13 trillion by 2030.⁴

Infrastructure investments in emerging markets continue to grow, and for companies that complete them successfully, megaprojects play a critical role in profitability. Furthermore, companies that excel in the successful completion of large capital projects can receive as much as 25 percent profitability premiums over other companies in their industry.⁵

When it comes to ensuring the performance and design consistency needed for this kind of success, electrical designs that adhere to the right electrical standards are essential; that, in turn, requires the right partners with the right solutions.



18% of electrical contractors and engineers have worked on a project that originally did not specify cable cleats but found out they were required after the project was underway, causing delays and cost overruns.³

³ Panduit and EC&M, Cable Management: Reality vs. Best Practice, March 2020

⁴ Sriram Changali, Azam Mohammad, and Mark van Nieuwland. "The construction productivity imperative." McKinsey & Company.

⁵ Detlef Schwarting, Matt McKenna, Mark Uffhausen, Paul Yates 2011, "Sourcing excellence: The key to profitability in capital projects,"



Achieving Optimal Electrical Design

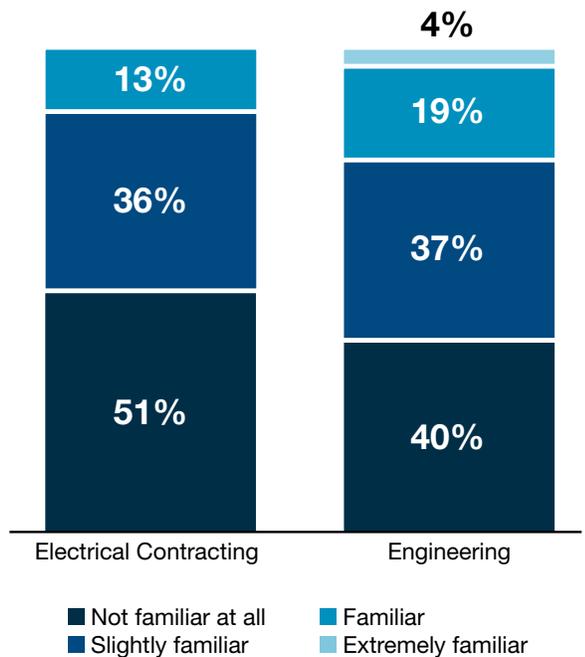
SETTING THE RIGHT STANDARDS

Electrical standards compliance plays a pivotal role in making any design and installation successful, and it provides engineers and procurement specialists with a baseline to read beyond a marketing promise. It allows for the comparison of like products and highlights a product’s credibility because it has already been tested rigorously to prove reliability. With most infrastructure projects reaching an international scale, standards are also critical in ensuring the seamless integration and safety of these proven products when working across borders.

As previously mentioned, the IEC 61914:2015 standard provides robust guidelines on specifying and installing cable cleats for short circuit protection. However, the majority of respondents to the Panduit and EC&M survey are either completely unfamiliar or only slightly familiar with the standard.

The majority of electrical contractors depend on the engineering team to provide guidance on cable cleats. But with only 25 percent of engineers claiming to have a working knowledge of IEC 61914:2015, it’s no wonder that contractors rarely feel they are receiving adequate information. Contractors who are unfamiliar with IEC standards are much more likely to feel this way, but even among contractors familiar with IEC 61914:2015, 45 percent feel that engineers rarely or never clearly communicate the use of cable cleats for short circuit protection.

Familiarity with IEC 61914:2015⁶



⁶ Panduit and EC&M, Cable Management: Reality vs. Best Practice, March 2020

CABLE CLEATS: A CRITICAL MISSING ELEMENT IN SHORT CIRCUIT PROTECTION

Well before most circuit breakers or protection devices have time to react, an industrial short circuit event can release a tsunami of force. In a millisecond, the damage has been done; with electromagnetic force ranging upwards of 10,000 pounds, the damage can be significant. This makes high-quality cable cleats a critical element of electrical system design.

Despite this, 72 percent of contractors still depend on plastic zip or cable ties to secure cables, and another 20 percent don't use any type of cable fixing system. This leaves infrastructure and workers unprotected from potentially deadly damage.

Panduit's cleat solutions were designed to withstand the stress of a short circuit event using a state-of-the-art ANSYS simulation software to model the dynamic forces at play. In addition, our design and testing process has also led to the development of the [Cleat kAlculator™](#) mobile and desktop app.

Many engineers do not specify cable cleats in part due to the necessary but time-consuming fault calculations required. The Cleat kAlculator™ streamlines the process significantly by allowing engineers, designers and installers determine the correct cable cleat simply by inputting the cable layout, cable diameter, and peak short circuit current.

All of Panduit's electrical cable cleats have been third-party validated to meet IEC 61914:2015. Because they exceed safety requirements of current U.S. electrical codes, they help future-proof your project against subsequent standards harmonization.

Conclusion

Infrastructure projects have the power to transform industries, shape our communities, and positively impact countless lives of individuals around the world. The risks associated with infrastructure projects are well documented, but so are the rewards reaped by the companies that master the ability to deliver successful projects. By placing a priority on proper electrical infrastructure design, this can be achieved.

The proper design and installation of electrical cabling and cable cleats that meet standards is important. Panduit takes a prominent role in the development of industry standards in order to ensure our solutions lead the industry when it comes to compliance and safety.

The right foundation, built on the right standards, will not only contribute to the productivity, scalability, reliability, and safety needed to deliver a project on-time and on-budget but solidify its future as well.





Since 1955, Panduit's culture of curiosity and passion for problem solving have enabled more meaningful connections between companies' business goals and their marketplace success. Panduit creates leading-edge physical, electrical, and network infrastructure solutions for enterprise-wide environments, from the data center to the telecom room, from the desktop to the plant floor. Headquartered in Tinley Park, IL, USA and operating in 112 global locations, Panduit's proven reputation for quality and technology leadership, coupled with a robust partner ecosystem, help support, sustain, and empower business growth in a connected world.

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