Material Advantage

When construction is thriving and everyone wants the same construction inputs, commodity prices can soar. Strategies to predict and manage those fluctuating costs provide an edge.

Getting construction projects completed on time and within budget can be a complex undertaking. Market pressures in the form of fluctuating material costs — and a potential scarcity of resources that can result — increase the importance of clear and creative planning.

After all, blown budgets and schedule delays can become more than black eyes — they can imperil project completion entirely.

That's why efficiencies in design, process and purchase patterns take on considerable importance.

The U.S. economy has been in an expansion mode for nearly a decade following the Great Recession. Amid a hot construction market in the last couple of years, construction prices have increased dramatically. The shortage of skilled labor is a major factor, but fluctuating costs for inputs to construction have played a role as well.

In the year leading up to October 2018, the cost of many products used in nonresidential construction increased 6.7%, according to the U.S. Bureau of Labor Statistics and its Producer Price Index. This was led by double-digit increases in the price of materials like steel and asphalt paving mixtures, and an over 8% increase in the price of aluminum mill shapes. Prices for steel products rose more than 18% last year.

Commodity prices are expected to remain volatile for the most part but without a

distinct trend through 2019, according to IHS Markit. But pressure from supply disruptions, tariffs and trade wars could keep the pressure on.

"Last year we experienced a significant uptick in costs of steel and pipe, primarily driven by changes in trade regulations associated with Section 232 and 301 rulings enacted in the U.S.," says Kelly Jeffcote, director of procurement at Burns & McDonnell. "This year, commodity price escalation has been relatively soft; we haven't seen a lot of spikes.

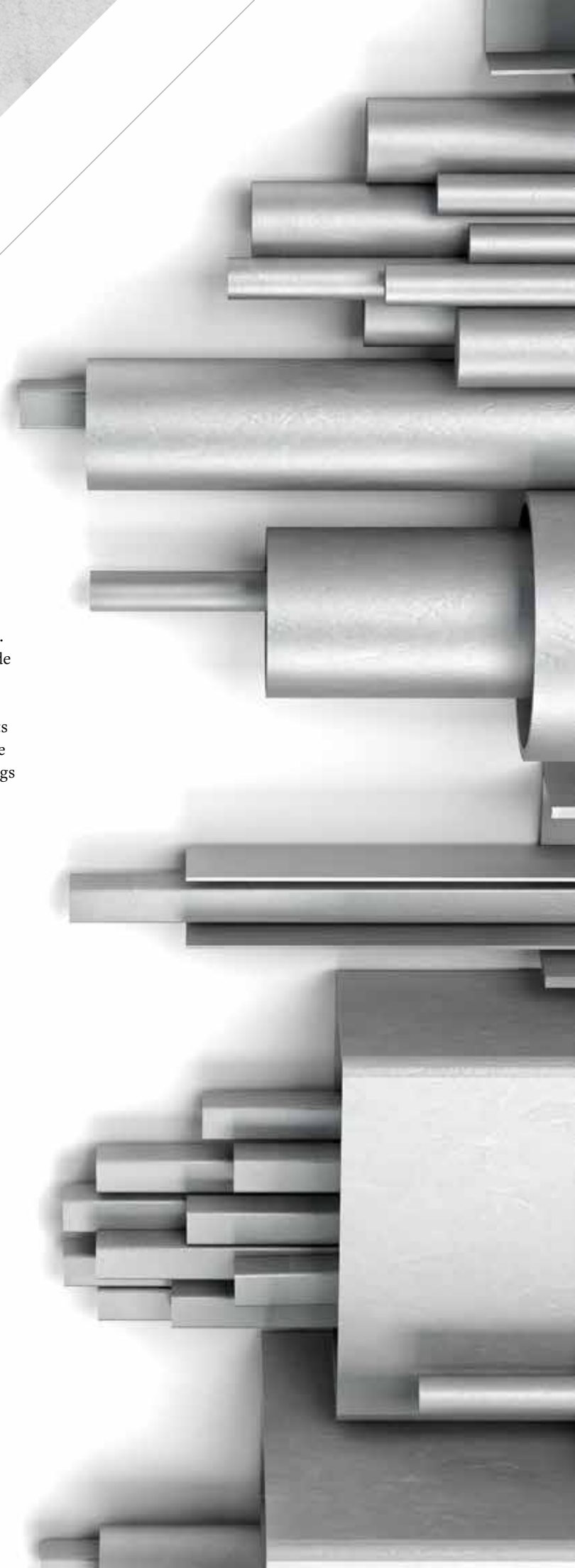
"One particular commodity that we have to keep an eye on is copper, because it currently is experiencing a global supply deficit. Over the next three to four years, copper pricing could increase more than 25%. We have to be strategic when purchasing goods with high copper content moving forward."

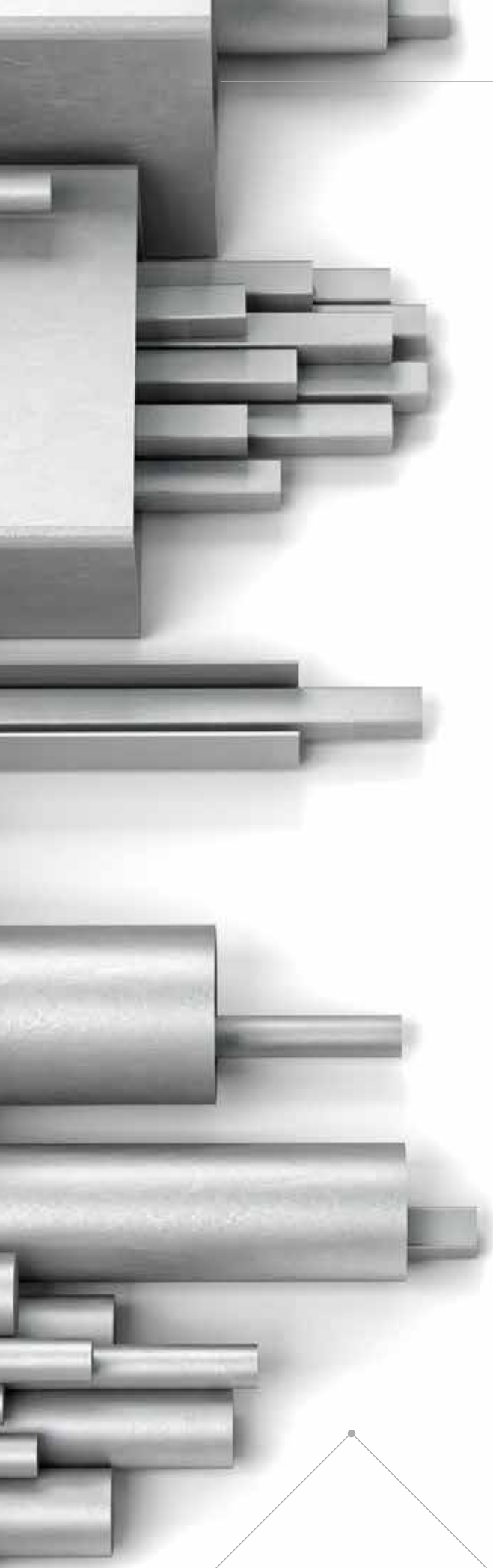
That could pose significant implications for projects containing large electrical scopes of work.

Getting the Price Right

Because material costs are not static, a premium is placed on the art and science of appropriate estimating.

"An estimate is built on cost today, with considerations included for the direction we think pricing and market conditions are headed throughout the anticipated project life cycle," Jeffcote says. »





Contractors must strike a delicate balance to protect their interests, mitigate the risks of rising costs and win work.

"From construction consumables to engineered equipment on a project, not anticipating demand correctly can cost jobs in many cases, especially in competitive bidding for work," she says.

With project success on the line and costs fluctuating, the fundamental question is when and how to spend money on materials. There are a number of factors that go into those decisions, Jeffcote says.

"Quality, schedule and cost considerations of the project are the primary drivers of our spending decisions, allowing us to generate predictable project success for our clients," she says. "That's why leveraging our spend is so important. Where we have the opportunity to maximize volume buys, we definitely take that into consideration as part of our spend strategy."

Paying attention to general market conditions and commodity pricing pays off. When anticipating an uptick in a commodity price, a buyer might decide to make a purchase sooner to take advantage of lower prices.

If a contractor knows how much product will be needed at a specific time, it could be sensible to lock in a price using a volume discount agreement — one subject to evaluating prices and making adjustments at specified intervals. But for a competitive contractor serving multiple markets and clients, such demand predictability might be difficult to determine.

Working Around Scarcity

Material prices were relatively static for a while after the Great Recession, according to James Isom, commercial construction manager at Burns & McDonnell, but in recent years they have begun moving sharply. As the construction market has picked up pace, suppliers are busy, and pressure is applied to the availability of certain in-demand items.

"There are issues that have arisen around the availability of materials and equipment, particularly when we need to buy them directly or when our subcontractors are buying major equipment packages," Isom says.

"That can cause us to potentially look at contingency plans or identify areas where we can be more proactive in our approach to a project."

For example, a large air handler unit that used to have a 20-week lead time could take a year to acquire now. What can be done about that?

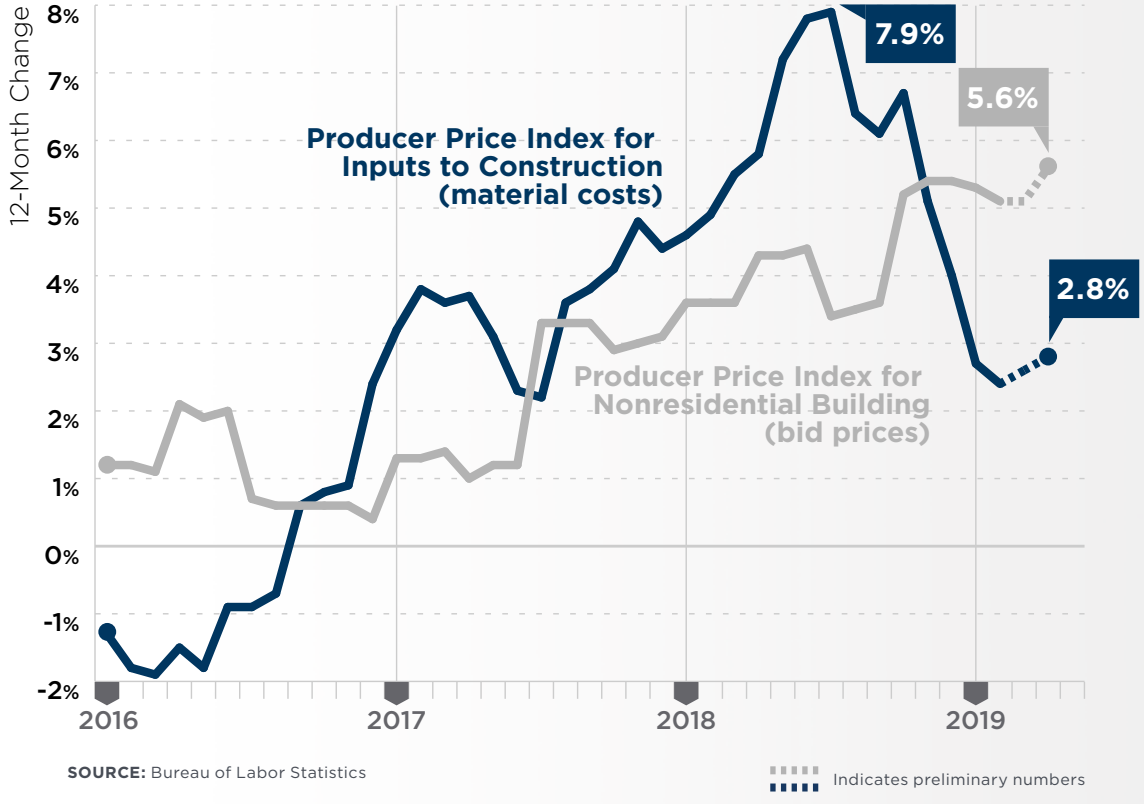
"Maybe if you went with a simpler design or picked a different unit, you could get back into that original time range," Isom says. "What do we need to change in other portions of the building, other elements of the design, to accommodate that request?"

These questions are worth asking when a particular element is a showstopper for the project and the extra time cannot be accommodated reasonably.

Isom notes that different project delivery approaches can help mitigate such challenges by incorporating elements of lean construction and greater integration of services. By bringing more project partners into the process early and probing different perspectives on identifying the most efficient systems, designs and more, a road map to a more efficient solution can come into focus. And greater efficiency leads to less waste, which is even more important when prices are escalating.

"While we can't accommodate all requests, it's our job to take everyone's requests and formulate a recipe that is optimized and makes the most sense," Isom says. "We're finding that getting feedback very early on helps uncover a lot of things." »

Material Costs vs. Bid Prices



SOURCE: Bureau of Labor Statistics

Indicates preliminary numbers

Gaining Efficiencies With 'Takt'

Efficient use of materials is one strategy to manage the cost of those materials. One approach to construction that draws on lean concepts is helping minimize waste on some projects.

"We're looking at how to install things on-site in more of a 'takt' approach," says James Isom, commercial construction manager at Burns & McDonnell. "Takt is a German manufacturing term; in this usage, it's about using smaller composite crews and breaking up work packages into smaller areas."

Imagine constructing a giant factory where craftspeople could pour all the concrete, then hang all the steel, then put on the roof panels and wall panels, and then perform the mechanical, electrical and plumbing (MEP) work. Takt, instead, breaks the process up into very small bays — and, in each bay, all those steps are performed before moving on to the next.

"Let's say you give yourself a week to do that first takt," Isom explains. "It might take a little longer than expected the first time; maybe it takes eight days. Then the second time it takes seven. The third takt takes six or five. By the time you get to the fifth or sixth or seventh iteration, the crew is very efficient. They've worked through the problems and idiosyncrasies of that particular job.

"They're finishing a little early, which allows them to do some quality control at an early stage in the project, as opposed to getting it all done and then trying to punch list an entire job or commission an entire job."

Isom says he's finding by the time you get about halfway through a building, takts are being completed in about half the originally planned time.

"That allows your quality control process to really be honed in," he says, "and instead of spending a ton of time commissioning at the end or chasing errors, you have a high-quality building at the originally planned time that can immediately go into startup."

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Identifying constraints early and utilizing the full team's brainpower and resources helps plan effective mitigation strategies to manage issues before they are encountered in the field.

Assembling the Building Blocks

Similarly, modularization is an execution strategy that can help accelerate construction and cut down on material waste.

"If we can modularize part of our construction scopes off-site in supplier facilities, that also saves on some of the need for construction labor on the job site," Jeffcote says. "We're finding that to be very beneficial."

Modularization can help mitigate material cost challenges in more ways than one.

"One of our philosophies for mitigating construction costs for utilities is to have a solid, simple plan that can be repeated," says Jackson Cutsor, a utility consultant in power system planning at Burns & McDonnell.

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"If you have everything in stock and have a standard conductor size, you simplify your warehouse and minimize time out in the field."

Modular substations are an innovative example of the approach, which aims to mitigate the risk of stranded investments.

"They have 40% of the footprint of a traditional substation but a comparable ratio of capacity," Cutsor says, noting that modular substations have been used in newer areas where the developer might not need full capacity right away.

He cites the example of a new subdivision that expected to need a huge substation but recognized the possibility it might never be fully utilized.

"Instead of building a $20 million to $30 million substation right off the bat, they built small substations at a couple million dollars apiece as the subdivision grew out," Cutsor says. "Not only are you saving on capital cost and reducing investment risk, but you're also extending the useful life of the assets because you're spreading the age over multiple locations instead of one."

Raw material costs might not typically be a key factor in determining whether a substation project will proceed, but the modular approach offers the flexibility of rightsizing capacity and greater ability to keep backups in stock.

"If you have six modular versus one regular substation, components are relatively small and inexpensive enough that you could have parts in your warehouse and replace components very quickly if something were to fail," he says. "Larger substations, however, cannot keep spare transformers on standby. They must build redundancy on-site or order them as needed, which could take many months."

What will prices do in the interim? It's a good question, and one that smart planners always keep in mind.