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Postpandemic supply chain disruption and cost escalation

How construction owners, developers, and contractors can tackle cost and schedule uncertainty on large capital projects and programs

KPMG Engineering & Construction
Infrastructure and Project Advisory Group
September 2022

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Owners, contractors, and developers are facing extraordinary construction market challenges caused by supply chain disruption and rapidly fluctuating equipment and material costs. Entities that take deliberate steps today to manage market challenges and mitigate risks will emerge more resilient and better prepared for the challenges of tomorrow.

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Content

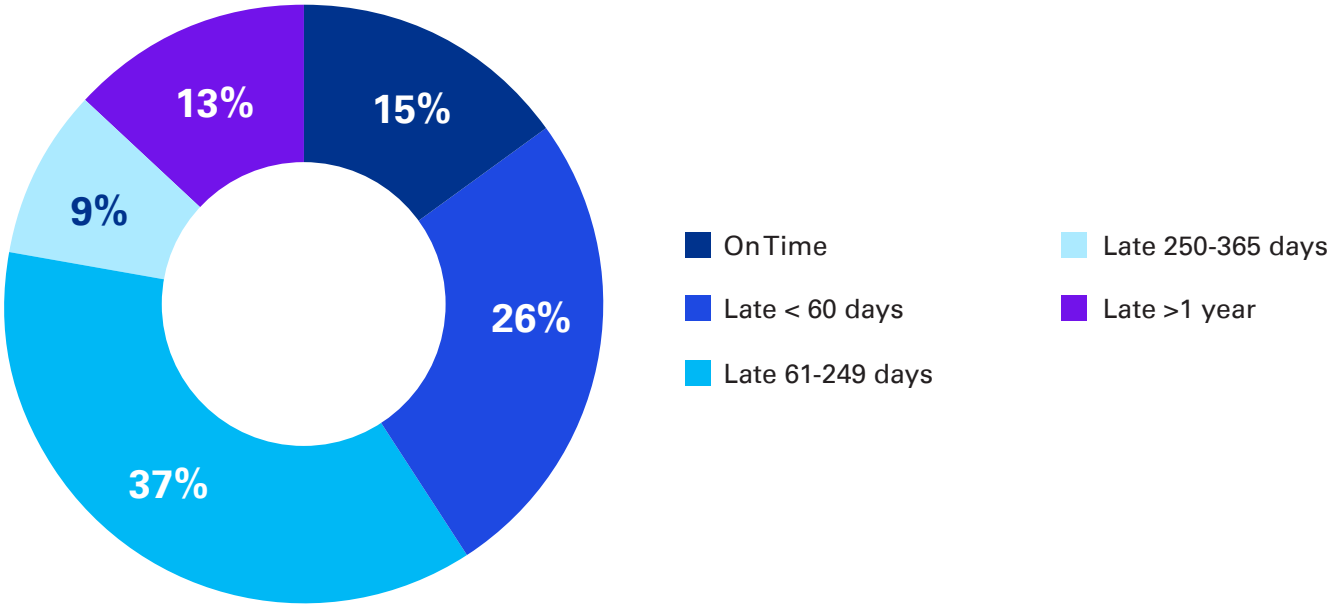
Today's construction market

Before the global pandemic turned supply chains upside-down and interrupted stable cost trends, construction owners, developers, and contractors could reasonably predict the costs and benefits of large capital projects and programs. In Q3 2022, predicting project success is more uncertain due to supply chain disruption and rapidly fluctuating equipment and material costs. The result is that more projects are exceeding cost and schedule targets than in the recent past.

Faced with long lead-times for construction materials, escalating material and labor costs, and labor shortages, 42 percent of contractors surveyed by Dodge Data & Analytics in partnership with the U.S. Chamber of Commerce reported that they are turning down work to mitigate risk.[1] Even so, owners with immediate expansion plans and critical infrastructure needs are moving forward with their large capital projects and programs. Today's owners, contractors, and developers are looking for new ways to elevate the certainty around project benefits and mitigate the impacts of cost drivers in the current market.

Regardless of your progress in the development lifecycle of a large capital project or program, understanding today's challenges and the ways that leading construction owners are addressing them is critical for the health and growth of your business. In this paper, we help provide a better understanding of current market challenges and their impacts on the construction industry combined with processes and tools that owners can use to improve project success.

Pandemic-era large-scale project delivery



Source: New Civil Engineer, "Delays to large-scale construction projects more than double since start of pandemic," Rob Horgan (January 12, 2022).

[1] U.S. Chamber of Commerce, "New Report Finds Construction Contractors Struggling to Find Workers, Materials," Thaddeus Swanek (September 22, 2021)

Supply chain volatility

Efficient supply chains in the construction industry rely on global sourcing of equipment and materials. The global pandemic severely disrupted supply chains due to government-imposed shutdowns, demand instability, labor shortages, and bottlenecks in shipping and transportation. Even though supply chain pressures have eased in the second half of 2022, demand for construction equipment and materials is on the rise, and competition for limited product inventories is high.

The delay or outright unavailability of construction equipment and materials contributes to project delays. Contractors are reporting that lead times for equipment and materials have doubled since 2021, a trend that continues to impact the commercial construction and housing sectors in particular.[2] Project delays expose contractors to extended performance costs, subcontractor claims, and liquidated damages. Delayed projects impact owners by increasing development and financing costs and reducing the expected revenue stream from completed assets.

Heavy equipment dealers are reporting supply chain disruption and inflation resulting in shortages of construction equipment and parts. According to Equipmentworld.com, steel and materials-intensive heavy equipment prices are increasing at an annualized rate of approximately 10 percent. Manufacturing lead-times for construction equipment have increased from three months to more than eight months.[3] Prior to the pandemic, contractors relied on equipment leases and rentals to lower their financial exposure, rather than outright ownership. Due to manufacturing production cuts during the pandemic, along with a current surge in demand for construction, rental fleets are depleted. Some dealers predict that shortages in equipment rental fleets will last through 2023 and into 2024.[4]

Compounding the disruption to supply chains for the manufacturing of construction equipment and materials are delays in transporting goods to the project site. There is significant volatility in the price of goods shipped by sea, although the global container freight rate index has fallen by about $3,600 (35 percent) since its high in September 2021. Within the U.S., the high cost of diesel fuel (75 percent increase YoY from June 2021) continues to impact the price for transportation of goods by truck and rail.[5] Supply chain costs continue to be unpredictable as a result.

The decline of skilled construction labor in the U.S. has also added to supply chain disruption. In a February news release, the Associated Builders and Contractors predicted that "the construction industry will need to attract nearly 650,000 additional workers on top of the normal pace of hiring in 2022 to meet the demand for labor." From a pandemic low in the middle of 2020 of around 243,000 job openings, March 2022 saw this figure rise to 434,000, or a 79 percent increase.

Competition for labor has pushed the average earnings of a construction professional from $30.70 per hour in June 2019 to $34.10 per hour in March 2022, an increase of 11 percent.[6] Labor challenges drive up the cost of projects not only due to increased hourly rates but also by extending projects, as fewer workers are physically available to progress the work.

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[2] Consigli Market Update, Peter Capone & Jared Lachapelle, (April 2022); Consigli Market Update, Peter Capone & Jared Lachapelle (October 2021)

[3] Equipment World, Tom Jackson (June 3, 2022)

[4] Equipment World, Tom Jackson (March 15, 2022)

[5] U.S. Energy Information Administration, "Gasoline and Diesel Fuel Update" (August 2022)

[6] Federal Reserve Economic Data, Federal Bank of St. Louis & the Bureau of Labor Statistics

Cost escalation challenges

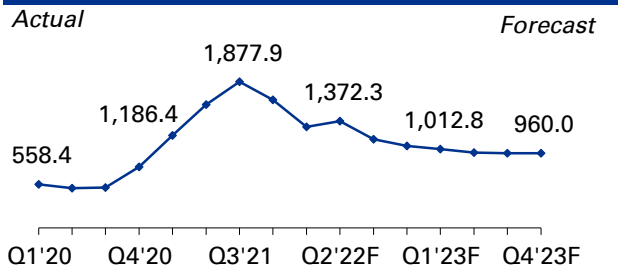
The Construction Material Producer Price Index, which measures the average change in prices obtained by U.S. producers each month, continues to rise. When benchmarked against May 2020, commodity prices have increased more than 50 percent. The ripple effect on owners is tremendous, as contractors, subcontractors, and suppliers apply profit markups at each contracting tier.

The following charts track the price volatility and summarize the causes for some of the most common construction commodities: steel, aluminum, lumber, and cement.

Steel

- Fueled by government stimulus packages, tariff concerns, and a general recovery from COVID-19, steel prices peaked in the second half of 2021.
- Beginning with the first half of 2022, prices began to decline until a spike due in part to the Russia-Ukraine war. The war even disrupted the supply of semifinished and raw steel.
- Prices are expected to stabilize in 2023.

Steel – Domestic HRC prices (US$), (Q1'20 – Q4'23F)

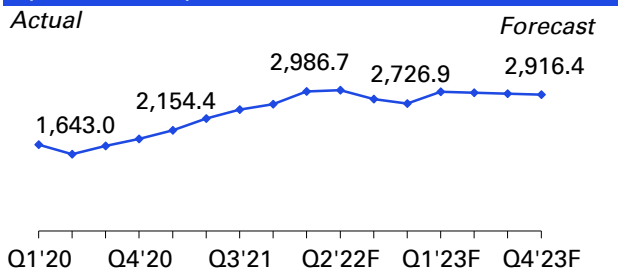


Prices are in dollars per ton, data obtained from S&P Capital IQ, accessed July 2022

Aluminum

- In 2021, prices of aluminum increased due in part to issues at production centers:
  - Strike at Kitimat smelter in Canada
  - Chinese government regulations on energy consumption.
- Prices remain elevated in 2022 due to increased cost of energy and a general decrease in inventories.

Aluminum – LME Cash official (US), (Q1'20 – Q4'23F)

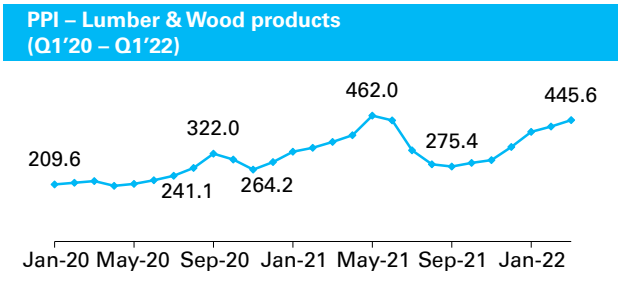


Prices are in dollars per ton, data obtained from S&P Capital IQ, accessed July 2022

Lumber

- Prices for lumber have experienced relatively volatile changes through the pandemic.
- Initially, mandated quarantines pushed homeowners towards DIY projects while simultaneously slowing lumber mill production.
- Later, the U.S. government further constrained supplies by increasing import tariffs from Canada. Canada intends to challenge the final results of the third administrative review, including through launching a dispute settlement process under Chapter 10 of the Canada-United States-Mexico Agreement (CUSMA).[7]

PPI – Lumber & Wood products (Q1'20 – Q1'22)



Production price index shown, data obtained from S&P Capital IQ, accessed July 2022

[7] Official Statement by Global Affairs Canada (August 2022)

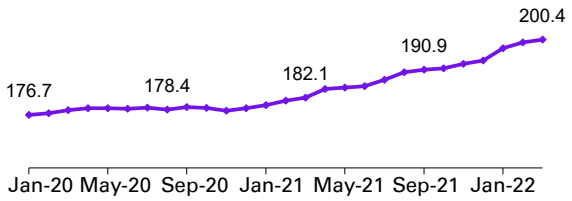
Cement

- Post-COVID-19, demand for cement increased while supply dwindled as a result of production cuts, maintenance delays, and labor shortages.
- Prices are expected to rise through the end of 2022 as we do not see a curbing of demand until 2023 where the growth of demand will slow.

Copper

Copper prices for construction cable and wire, currently at $3.56 per pound, have retreated from a pandemic high of nearly $4.90 per pound.[8] However, copper remains a volatile commodity subject to wide price swings due to declining output and global supply risks.

PPI – Cement & concrete Mfg. (Q1'20 – Q1'22)



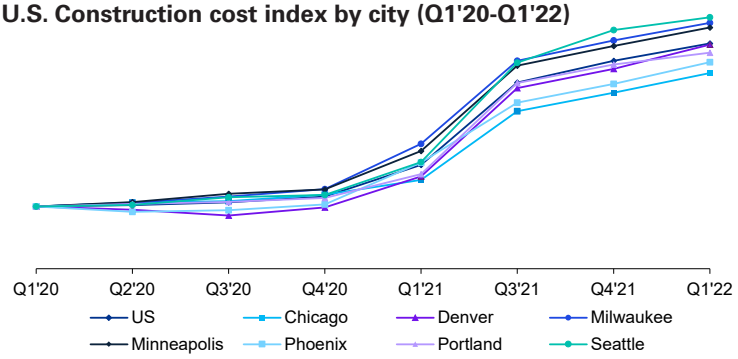
Production price index shown, data obtained from S&P Capital IQ

Overall

Overall, the U.S. has experienced a substantial increase in the cost of construction projects since the onset of the pandemic. On average, costs are 26 percent higher in Q2 2022 that in Q1 2020; however, most of this increase was observed in the 2021 calendar year.[9] Regional cost escalation differences within the U.S. were due to circumstances such as changing weather conditions, labor wage rates, and owner attitudes towards the selection and use of sustainable building materials. The table and chart below show differences in construction cost escalation for the U.S. overall and for seven major metropolitan areas, per M. A. Mortenson Company.

Regions/ time period	U.S.	Chicago	Denver	Milwaukee	Minneapolis	Phoenix	Portland	Seattle
Q1'20	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Q2'20	100.2	100.7	99.5	100.6	100.7	99.1	100.4	100.3
Q3'20	100.7	100.9	98.6	101.6	102.0	99.4	100.8	101.5
Q4'20	101.6	101.9	99.9	102.8	102.7	100.4	101.4	101.9
Q1'21	106.7	104.3	104.8	110.1	109.0	107.1	105.2	107.2
Q3'21	120.0	115.3	119.1	123.5	122.7	116.7	119.9	123.2
Q4'21	123.5	118.3	122.2	126.7	125.8	119.7	122.9	128.4
Q1'22	126.3	121.5	126.1	129.6	128.8	123.2	124.8	130.5

U.S. Construction cost index by city (Q1'20-Q1'22)



[8] COMEX CME Group, data pulled August 4, 2022

[9] M. A. Mortenson Company, "Construction cost trends that will shape 2022 and beyond" (Q2 2022)

Implications for construction owners

The main implications of supply chain disruption and cost escalation to construction owners and contractors are the uncertainties of cost targets and schedule milestones. Large, multiyear capital projects that received investment decision approval over the last couple of years will likely see cost growth and schedule delays this year and into 2023. Projects currently in the planning and development stages with already low expected returns may no longer be attractive.

Supply chain disruption and cost escalation impacts may well depend on how far into the project lifecycle a project has progressed. On the prefunding side, lenders may demand higher interest rates, more stringent financing terms, greater equity contribution, or larger debt service reserves in the current construction environment than in prepandemic years. Owners, contractors, and developers will need to update project cost estimates and schedules with the latest data and trends, and include potential disruption and cost escalation events in the project risk register. Contingency funds may need upward adjustment due to the higher likelihood of future cost and schedule volatility, and construction owners may opt to rerun a project's financial model to see if return on investment, internal rate of return, and payback periods are still in line with internal targets.

Even after a project is approved for execution, construction owners and developers must remain alert to negative cost and schedule trends. Negative trends can be caused by delays in completing engineering designs, delays by contractors and subcontractors in commencing on-site work, and delays resulting from the late delivery of critical equipment and materials. Shortages of experienced craft labor in the vicinity of the project may demand that construction owners offer travel per diems and pay higher wages. Contractors must be able to measure and control on-site labor productivity, so that any slips do not affect critical path activities.

Supply chain disruption may lead to an increase in contractor claims and disputes. Contract terms will determine whether an owner or contractor bears the responsibility for supply chain risks and what actions must be taken to mitigate cost and schedule impacts. Where the owner retains the risk for providing engineering designs and owner-furnished equipment and materials, the contractor may be entitled to a change order for delays to the project's completion date. Entitlement to extended performance costs and consequential damages may also be warranted. Escalation clauses in construction contracts will determine the procedure for resolving supply chain disruption and cost escalation claims.

Although some contractors are willing to continue performance while generating claim correspondence, others have closed their doors, derailing entire projects and leaving owners with little recourse. Owners must then resort to an expedited competitive bidding process for completing the remaining work or negotiating with a single source contractor. Under these circumstances, an owner has minimal leverage in negotiations. For projects that do not require performance bonds and guarantees, construction owners and developers can be exposed to cost and schedule impacts far exceeding the remaining budget-to-complete.

Mitigation strategies

Leading construction owners, contractors, and developers are finding ways to mitigate the impacts of supply chain disruption and cost escalation. Many of the processes and tools used to mitigate impacts are a continuation of proactive initiatives started in 2020 to develop comprehensive strategic, operational, and programmatic responses to the pandemic. Construction owners, contractors, and developers that began mitigation initiatives early in the pandemic are realizing benefits in the form of lower costs compared to industry peers, predictable construction timelines, and successful growth strategies:

Advancing design maturity—Some leading construction owners and developers have decided to advance the design maturity of projects before soliciting contractor bids. By "decelerating" the typical fast-track processes used for large capital projects, owners can reduce risks by clarifying scope, increasing confidence around construction quantities, and focusing on the appropriate level of quality specified for equipment and materials. Advancing design maturity also permits construction owners to evaluate the trade-offs between sourcing equipment and materials locally instead of sourcing from international suppliers. It also results in obtaining current and more accurate project estimates, which can influence an owner's go/no-go decision or lead an owner to defer the start of a project until markets stabilize. This strategy also works well if there is an anticipation that cost inflation will level or decrease as it allows for more time to finalize the scope as the cost outlook and forecasts become clearer.

Re-evaluate supply chain contractual provisions—Construction owners, developers, and contractors are also scrutinizing and revamping construction contracts to address risks associated with supply chain disruption. This is especially true for design-build and construction management contracts where payments are based on cost plus a fixed fee. Contracts may address supply chain delays by limiting the contractor's recovery to direct cost only, with no markups for overhead and profit. Alternatively, owners and contractors may agree to a fixed rate of compensation per day for delays to a project's critical path.

Balance commodity price risk sharing—For cost escalation, sharing risk between an owner and contractor can be addressed by clearly identifying the unit prices of major commodities—like concrete, structural steel, lumber, and cable—that serve as a basis for the cost of construction. If actual costs increase above (or below) a certain threshold (15 percent is a common range), then the contract may provide for an adjustment of the contract price. Cost escalation adjustments are supported by changes to construction commodity indices published by reliable industry sources. Cost sharing can be an effective way to balance the risk in a highly fluid market and avoid one side bearing the upside or downside risk as costs change throughout the project lifecycle.

Pre-execution resource reviews—In the pre-execution phase, before contracts are signed, owners are demanding greater visibility into the capacity and resources available to their suppliers/contractors. Owners are asking their design-builders and construction managers to demonstrate internal capacity and capability to take on additional work and to disclose their sources of supply for equipment, materials, and construction labor. Leading owners and contractors negotiate trade-offs between cost and reliable sources of supply to reduce the overall risk on their projects and increase the likelihood of project and program success.

Modular construction—Many projects are pursuing strategies to modularize and replicate project components to reduce on-site assembly, speed the time from design to operation, and achieve consistent high-quality workmanship. Modular construction is the process in which a building or project component is constructed off-site, under controlled conditions, to the same codes and standards as conventionally built facilities. Modularizing optimizes labor use, minimizes on-site storage of materials, lowers the volume of waste, and virtually eliminates the impacts of adverse weather on projects—all leading to cost and schedule benefits.

Technology efficiencies—Leveraging technology in the design, procurement, and management of large capital projects can also reduce supply chain risks and mitigate cost escalation. Leading construction owners, in both the private and public sectors, leverage integrated technology solutions for Building Information Modeling (BIM), digital twins, automating procurement processes; managing the flow of equipment and materials to the project site; communicating with stakeholders; and managing budget, schedule, costs, and changes. Automation can replace and speed up manual tasks and provide accurate, real-time intelligence for faster decision-making.

Strategic equipment sourcing and planning—To mitigate supply chain disruption and lock-in volume discounts, leading construction owners, developers, and contractors are optimizing project portfolios through integrated resource planning and sourcing of equipment and materials from qualified single-source suppliers. Negotiating multiyear framework agreements for equipment and materials based on needs estimates for multiple projects can produce efficiencies for both owners and suppliers. Efficiencies can result in "most favored customer" pricing and improve delivery times for specialized equipment and long-lead items.

Industry outreach and awareness—Owners, developers, and contractors are also partnering with construction industry associations and local community leaders to encourage high-school students, minorities, veterans, women, and others to pursue a career in the building trades. Workforce development programs, such as the one sponsored by the Associated Builders and Contractors, have committed to educate and develop more than 500,000 construction workers over the next five years. Owner sponsorship of training programs and partnering with industry raises your company's visibility in the construction market and helps to ensure a strong supply of construction workers into the future.

Conclusion

Postpandemic uncertainties in construction supply chains, cost escalation, and overall ambiguity in cost forecasts continue to plague large capital projects and programs. Rapidly fluctuating equipment and material costs and delays seem to be the new normal. However, leading construction owners are taking proactive steps to minimize and mitigate the impacts of supply chain disruption and cost escalation. They are also implementing strategies that do not overcorrect or are one-sided leaving them paying higher equipment and material prices even if cost escalation levels off or comes down. How will your organization respond to the challenges of 2022 and beyond?

Contact us for more information on how KPMG can help accelerate rapid organizational response to construction challenges and position your organization for resilience and growth. Please visit our industry portal for the latest KPMG insights, thought leadership, and events.

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