constructsteel

Monthly update for the construction industry
July 2022

Construction market trends

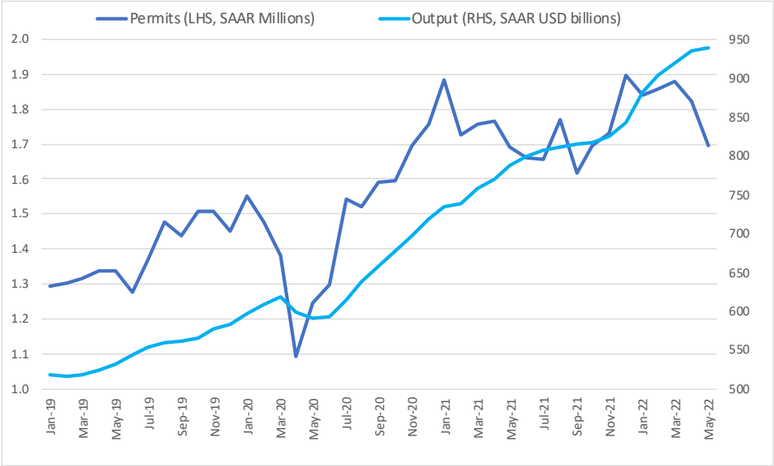
United States

Residential output and building permits weakening as rising interest rates slow the economy.

Private residential output up 0.2% m-o-m in May (19% y-o-y); building permits down for the second straight month and by -7% (0.2% y-o-y). Private non-residential output down -0.4% m-o-m in May (3.7% y-o-y). Architecture Billings Index (ABI) down to 53.5 in May from 56.5 in April (>50, expansion).

Private residential permits vs output

Source: US Census, American Institute of Architects



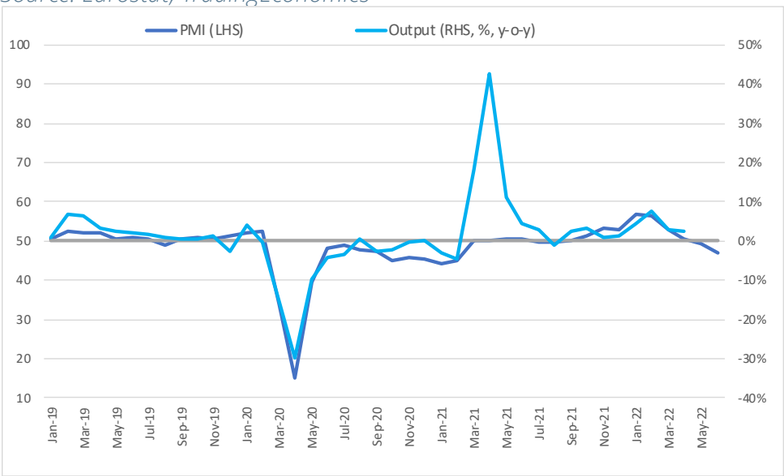
Europe

Higher raw material prices and supply-chain disruptions continue dampening the Eurozone's construction output and demand.

Construction down -1.1% m-o-m in April (2.5% y-o-y); Buildings up 0.1% m-o-m (3.2% y-o-y); Civil works down -5.5% m-o-m (-0.8% y-o-y). The IHS Markit Eurozone Construction PMI dropped to 47 in June from 49.2 in from May (< 50, contraction) with output contracting for two straight months.

Eurozone construction output vs PMI

Source: Eurostat, TradingEconomics



Knowledge partner:
McKinsey & Company

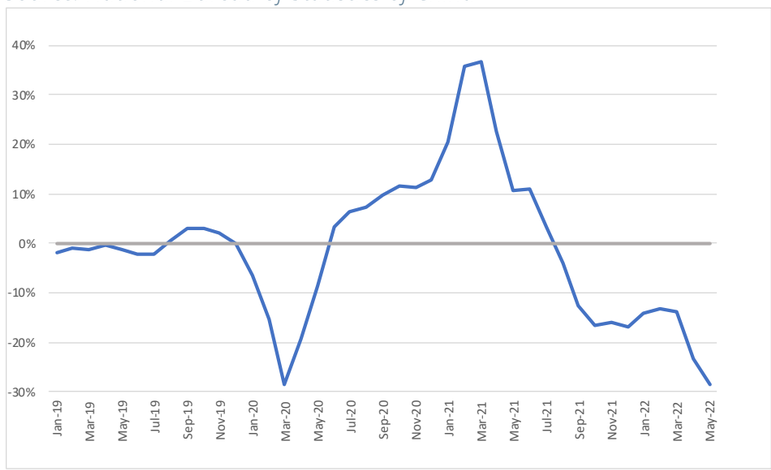
China

Real estate remains under pressure but signs of improvement emerging after local governments eased buying curbs and authorities cut mortgage rates.

The 3 month moving average y-o-y growth in floor space started fell -36% in May; floor space sold down -29% y-o-y.

Floor space sold (3 month moving average, %, y-o-y)

Source: National Bureau of Statistics of China



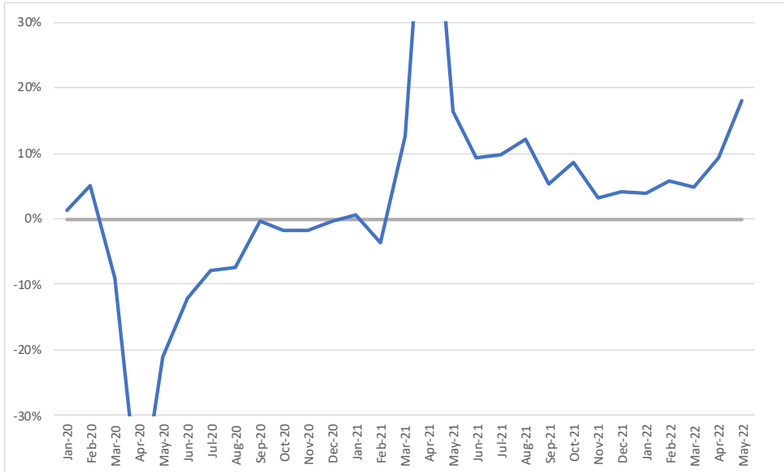
India

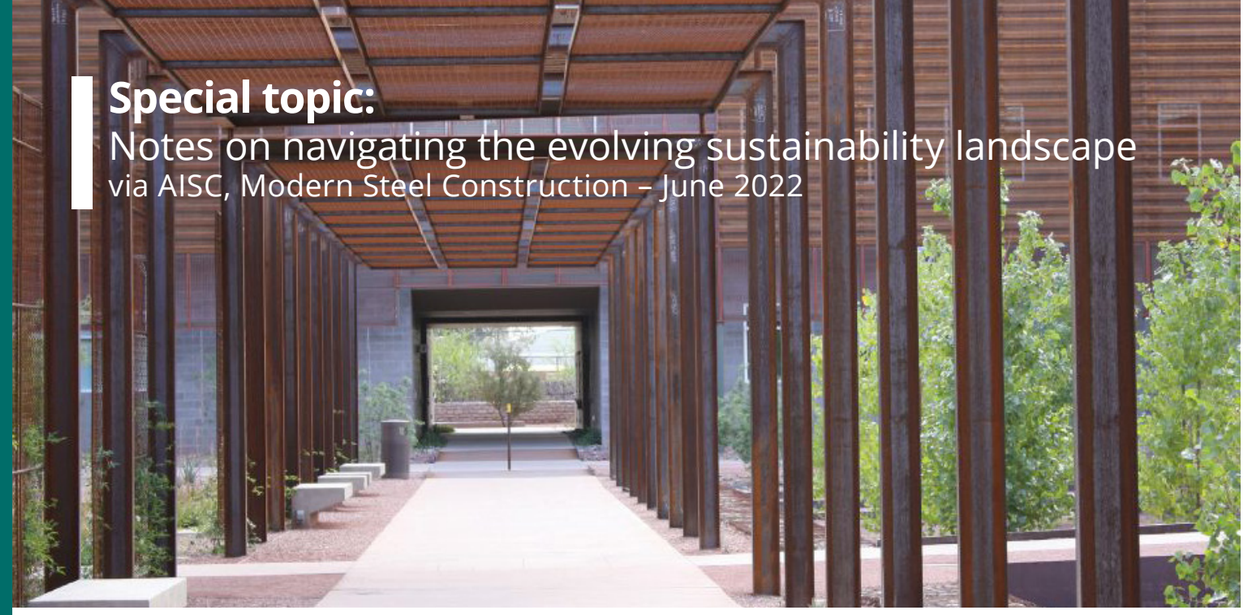
The core industries sector grew by the fastest rate in 13 months but helped by a weak base of comparison y-o-y. Underlying activity picking up.

Weighted average of eight core industries output increased 18.1% y-o-y in May; production of steel up 15%; cement up 26% y-o-y.

Weighted average of eight core industries industrial production (%, y-o-y)

Source: Ministry of Commerce & Industy, India





Special topic:
Notes on navigating the evolving sustainability landscape
via AISC, Modern Steel Construction – June 2022

Laura Micheli, PhD,
Bruce Brothersen, SE, PE, PEng,
Scott Russell, SE, PE. Peng

In the last decade or so, sustainability and environmental impacts have gained significant relevance in the structural design and construction fields.

As a result, terms such as Life-Cycle Assessment (LCA) and Environmental Product Declaration (EPD) have become part of the common Architect, Engineering, and Construction (AEC) vocabulary. When it comes to designing and building steel buildings, it's important to recognise the meaning of these terms—and other related terminology—and how they can help provide a better understanding of the environmental impacts of steel and how it compares to other structural options. And for those of you who are already familiar with these terms, a refresher never hurts.

Life-Cycle Assessments

Let's start with LCA, which is a standardised method to evaluate the environmental impact of consumer products throughout their lifetimes, as defined by the International Organization for Standardisation (ISO). While still gaining traction in the AEC industry, LCAs are widely used in the consumer product manufacturing world to quantify the carbon emissions associated with different stages of a product's life, ranging from raw material extraction to end-of-life. The environmental impact is typically estimated based on the energy inputs and greenhouse gas (GHG) emissions at each stage of the product's production, construction, use, and end-of-life.

Typical life-cycle stages are depicted in Figure 1, including production (A1-A3), construction (A4-A5), use (B1-B5), and end-of-life (C1-C4) stages. An LCA can include all or only some of the life-cycle stages, depending on the scope and intended use of the assessment. When the LCA comprises only the production stage, the term "cradle-to-gate" is usually employed to designate the boundaries of the LCA, from resource extraction (cradle) to leaving the manufacturing facility (gate). The gate is typically the steel fabricator in the case of buildings and structures. If all four life-cycle stages are included, the LCA is referred to as "cradle-to-grave." (Note that steel can be thought of as a "cradle-to-cradle" material, given that it is infinitely recyclable.)

The results of the LCA are presented in a tabular format, which includes six impact categories, namely global warming potential (GWP), ozone depletion potential, acidification potential (AP), eutrophication potential (think oxygen-hungry algae blooms in bodies of water), smog formation potential, and abiotic depletion potential (the usage of nonrenewable resources for energy production). The most well-known impact category indicator is the GWP, which is measured in kilograms of carbon dioxide equivalent (kg CO_2 eq.) and represents the amount of energy/heat the emissions of one ton of a given gas will absorb over a given period of time, relative to the emissions of one ton of carbon dioxide. The larger the GWP value, the more a given gas warms the earth compared to carbon dioxide over a period of time, usually taken as 100 years.

Environmental Product Declarations

Another important sustainability term is an EPD, which is a report that summarises the LCA results of a given product, communicating its carbon footprint in a transparent and comprehensive way. For construction materials, EPDs are regulated by ISO 14025, ISO 21930, and EN 15804; in addition, the EPD must follow the guidelines and requirements of the appropriate product category rule (PCR); the PCR governing EPDs for structural steel is the "Product Category Rule (PCR) Guidance for Building-Related Products and Services." While all the stages reported in Figure 1 could be included in the background LCA, EPDs typically include life stages A1 through A3 (cradle-to-gate). Note that the beyond end-of-life stage (D1-D4) is not considered a life-cycle stage by ISO 21930, but it could be included in the LCA as additional information.

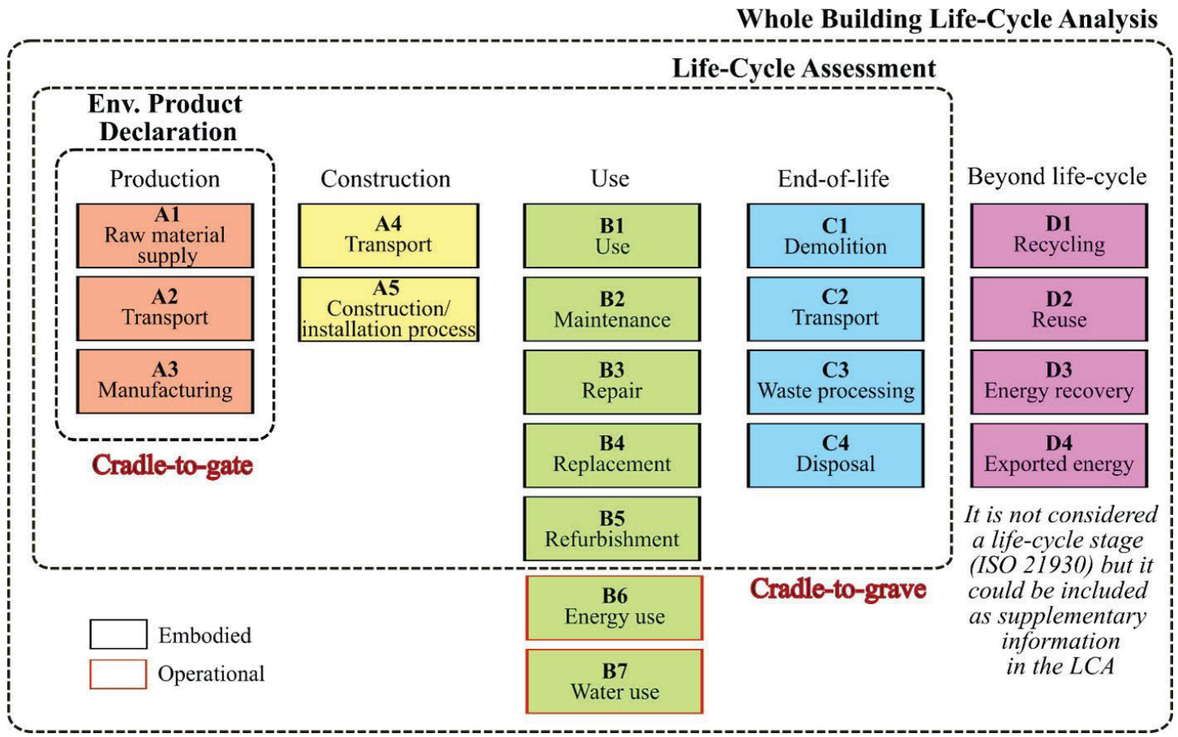
An EPD must contain a description of the product and the life-cycle stages considered in the analysis, referred to as system boundaries. The LCA results are expressed in terms of environmental impact indicators, calculated based on a declared unit, such as one ton of product, as is the case of steel products EPDs. To ensure a transparent process, the EPD study commissioner must rely on a third-party company (the LCA practitioner) to perform the LCA study, which feeds data into an EPD, as well as an additional third-party company (the program operator) to review and verify the EPD. On the other hand, industry-average EPDs report the weighted industry average production for a number of companies manufacturing the same product. As an example, Table 1 summarises the industry average EPD of fabricated hot-rolled structural sections. Industry average EPDs of steel products can be found on the following websites:

- Fabricated hot-rolled structural sections, fabricated steel plate, and fabricated hollow structural sections: aisc.org/epds
- Open-web steel joists: steeljoist.org/about-us/environmental-product-declarations
- Primary structural steel frame components (columns, rafters), secondary structural steel frame components (cold-formed steel purlins), roll-formed wall panels, and roof panels: mbma.com/environmental_product_declarations.html
- Steel roof and floor decks: sdi.org/publications-2/epd

It should be noted that EPDs of different construction materials (e.g., timber, steel, and concrete) are based on different PCRs and declared units. Therefore, a direct comparison between the data reported in their EPDs may lead to inaccurate results. Furthermore, choosing the material with the lowest GWP in the EPD doesn't necessarily imply selecting the product that will yield the lowest overall carbon emissions since the entire life cycle of a building needs to be considered in the analysis. An accurate comparison of different construction materials can be achieved by accounting for the difference in declared units and considering all the life stages of the structure, from raw material supply to end-of-life. Using manufacturer-specific EPDs in lieu of industry-average values can also lead to more accurate estimates of embodied carbon. An example of this in the steel industry is the EPD difference between an electric arc furnace (EAF) recycling steel from scrap and a blast furnace making steel from ore. Another distinction is the country in which the steel is manufactured. In most cases, domestic steel production has less of a carbon footprint than imported steel.

Whole Building Life-Cycle Analysis

Taking the concept of a product LCA to a different level, the whole building life-cycle analysis (WBLCA) has emerged as a tool to estimate carbon emissions and energy consumption for an entire building. WBLCAs employ the same principles outlined above for LCAs and enable engineers and other stakeholders to compare the environmental impact of different design solutions by providing information on embodied carbon and operational energy. In addition to stages A, B, and C, WBLCAs can also include stage D, which considers the carbon emissions related to recycling or reusing construction materials at the building's end of life. Lastly, stages B6 and B7 (Figure 1) can be added to a WBLCA to account for operational energy, such as energy and water consumption.



**Views expressed in this article are those of the authors and do not necessarily represent the views of constructsteel and worldsteel*

Table 1

Industry Average EPD of Fabricated Hot-rolled Structural Sections (LCA results per one metric ton of product)			
Parameter	**Symbol**	**Unit**	**Total (A1+A2+A3)**
Global warming potential	GWP 100	kg CO_2 eq.	1.22E+03
Ozone depletion potential	ODP	kg CFC 11 eq.	1.63E-09
Acidification potential	AP	kg SO_2 eq.	2.98E+00
Eutrophication potential	EP	kg N eq.	1.56E-01
Smog formation potential	SFP	kg O_3 eq.	4.58E+01
Abiotic depletion potential	ADP_{fossil}	MJ surplus	1.43E+03

WBLCA is usually performed by inputting the bill of materials for a given design into specialised software. The software output will be a summary of the six above-mentioned environmental impact indicators. Commonly used software packages are Athena, Tally (Revit), and One-Click LCA. In addition, the SEI Sustainability Committee has developed ECOM, a web-based platform that allows users to approximate the embodied carbon for construction materials and structural frames. The carbon footprint of various design scenarios can be compared by performing the WBLCA of different design solutions.

It is essential to understand that uncertainties inherent in the WBLCA results exist, as each software has its own database, inputs, bias, and assumptions. It is advisable to use multiple software programs and compare the results. Analysing the same building configuration with different software could lead to a different carbon footprint, and failure to include relevant life-cycle stages or processes could yield incomplete results. For instance, when biogenic carbon is included in the LCA of timber structures, it is appropriate to extend the analysis to stage D to avoid considering full carbon sequestration without accounting for the possible CO2 release in the beyond life-cycle stage. As EPDs, LCA processes, and related software evolve over time, the GWP values they produce may change for a particular building or structure.

Buy-Clean Laws

As the sustainability landscape continues to evolve, so do federal and local regulations aimed at reducing the carbon emissions of new and existing buildings. The Buy Clean California Act(BCCA) pioneered regulations on embodied carbon reduction, introducing GWP thresholds for four construction materials: structural steel, concrete reinforcing steel, flat glass, and mineral wool board insulation (note that BCCA only applies to federally funded projects). The maximum acceptable GWP values for these materials are reported in Table 2. With public works projects contracted by the State of California, the awarding authorities are responsible for verifying that the four eligible materials have a GWP that does not exceed the BCCA thresholds. Note that the limits reported in Table 2 are valid for "unfabricated products," while the values reported in Table 1 refer to "fabricated products." Thus, a direct comparison between the GWP in Tables 1 and 2 would not yield consistent results.

Following California, Colorado passed the HB21-1303: Global Warming Potential for Public Project Materials in 2021. According to this act, the Office of the State Architect and the Department of Transportation will be required to establish GWP thresholds for eligible materials by 2024 and 2025, respectively.

Also, in December 2021, the Biden Administration signed a new federal sustainability executive order. Although specific GWP thresholds have not been set yet, the sustainability order explicitly promotes the use of construction materials with lower embodied carbon in federally funded projects. Additionally, the sustainability executive order supports a transition to a circular economy, aiming to drastically reduce the construction and demolition waste lying in landfills by 2030. Materials that are highly recyclable, like steel, have advantages in the beyond life-cycle stages (D1-D4). The executive order also emphasises the importance of energy efficiency for new and existing buildings, pursuing net-zero emissions buildings through electrification strategies, deep-energy retrofits, and water conservation measures.

Table 2

Buy Clean California Act GWP Thresholds for Unfabricated Products	
Material	**GWP limit**
Hot-rolled structural steel sections	1010 kg CO_2 eq./1 metric ton
Hollow structural sections	1710 kg CO_2 eq./1 metric ton
Steel plate	1490 kg CO_2 eq./1 metric ton
Concrete reinforcing steel	890 kg CO_2 eq./1 metric ton
Flat glass	1430 kg CO_2 eq./1 metric ton
Light-density mineral wool board insulation	3330 kg CO_2 eq./1 m^2
High-density mineral wool board insulation	8160 kg CO_2 eq./1 m^2

It is expected that the new state and federal regulations will fuel a sustainability renaissance in the construction industry, promoting the transition to clean, zero-emission technologies. In the near future, in addition to cost, schedule, constructability, aesthetics, and space usage, decision-makers will likely be required to consider sustainability as well—and in many cases have already been doing so. The demand for LCAs, EPDs, and WBLCA will continue to grow, along with new legislation regulating embodied carbon limits. It is also important to understand the uncertainties inherent in the direct comparison of different construction materials due to the different PCR assumptions, units of measure, and database variability. Steel has a great sustainability potential, especially regarding how it fits into a circular economy. Sustainability is here to stay, and we should all be familiar with its vocabulary.

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In EAFs, steel is produced from scrap, with the addition of a small percentage of direct reduced iron. At the end of its useful life, steel products can be recycled, remelted, and used to produce new steel products. This circular process makes steel a cradle-to-cradle material, ideal for supporting a circular economy and zero-waste policies. Many steel components, such as open-web steel joists and wide-flange beams, can also be reused after a building is decommissioned.

Technical trends:
Closing labour gaps to revitalise US infrastructure
McKinsey & Co., Voices on Infrastructure
June 9, 2022 – For full article, see Link

US construction projects are short-staffed today, and the problem is set to get worse. Here's what the sector can do to close the gap.

The US construction sector seems set for a jobs boom. The US Bipartisan Infrastructure Law projects $550 billion of new infrastructure investment over the next decade, which McKinsey's modelling suggests could create 3.2 million new jobs across the nonresidential construction value chain. That's approximately a 30 percent increase in the overall US nonresidential construction workforce, which would mean 300,000 to 600,000 new workers entering the sector—every year.

That said, a rise in rates could bring the economy and housing investment to a stop. Even if infrastructure remains strong, building construction could suffer. In addition, the industry is already struggling to attract and retain the workers it needs. Between December 2019 and 2021, construction wages grew by 7.9 percent, reflecting intense competition for employees.[1] And the prospect of higher pay and better working conditions is tempting experienced personnel away from construction and into sectors such as transportation and warehousing, where wages grew by 12.6 percent over the same period.

No end in sight
The labor supply imbalance in construction has multiple root causes, and some are likely to persist. For example, the pandemic accelerated the retirement of many in the baby boomer generation, with an estimated 3.2 million leaving the US workforce in 2020. According to the American Opportunity Survey, among those who are unemployed, concerns about physical health, mental health, and lack of childcare remain the dominant impediments preventing reentry into the workforce. Record job openings and quit rates highlight employees' growing emphasis on feeling valued by their organisation, on supportive management, and on flexibility and autonomy at work. And the pipeline of new construction workers is not flowing as freely as it once did: training programs were slow to restart operations after the pandemic, and falling migration rates have made it more difficult to attract the international workforce that has been an important source of talent for engineering, design, and contracting activities.

Impact on projects
The interconnected nature of the construction value chain means the labor mismatch generates knock-on effects across the project life cycle and supply chain. By late 2021, project owners reported that up to 25 percent of material deliveries to sites were either late or incomplete. In project execution, the combination of higher hourly rates, premiums and incentives, and overtime payments resulted in overall labor costs that were as much as double pre-pandemic levels. Meanwhile, difficulty accessing skilled and experienced people led some owners to report project delays related to issues with the quality and productivity of on-site work.

The industry knows from recent experience that skills shortages can hit productivity hard. In the shale-oil boom, the productivity of some tasks fell by 40 percent or more during construction peaks (exhibit). Overall productivity declined by about 40 percent per year when labor was in short supply, forcing owners to extend project timelines by 20 to 25 percent. The impact of a long-term, nationwide labor mismatch might be even more severe than the shale industry's experience, given that oil companies were able to attract new workers from around the country.

Getting back into balance
To avoid a decade or more of rising costs, falling productivity, and ever-increasing project delays, companies in the industry should consider thoughtful actions now.

Those actions could address three components of the challenge. First, companies could do everything possible to maximise productivity through measures aimed at improving efficiency across the value chain. Second, they could expand the pool of available labor by doubling down on accessing diverse talent and working harder to retain the employees already in their organisation. Finally, they could consider making labor a strategic priority, giving it attention from senior leadership within companies.

Improving construction productivity
Rigorous control of project scope, design simplification, and standardisation can improve productivity long before work starts on the ground. Increasing the use of off-site and modular construction, for example, could allow projects to capture multiple benefits, including accelerated design cycles; the greater productivity associated with industrialised, factory floor manufacturing techniques; automation; and less time spent on site.

During project delivery, smarter execution management, enabled by digital technologies and analytics techniques, could drive better, faster decision making. Real-time data collection, for example, gives project managers earlier, more detailed insights about progress, allowing them to intervene more effectively to maintain productivity and keep projects on track. And lean construction is a proven

1. Quarterly Census of Employment and Wages, US Bureau of Labor Statistics, accessed March 10, 2022.

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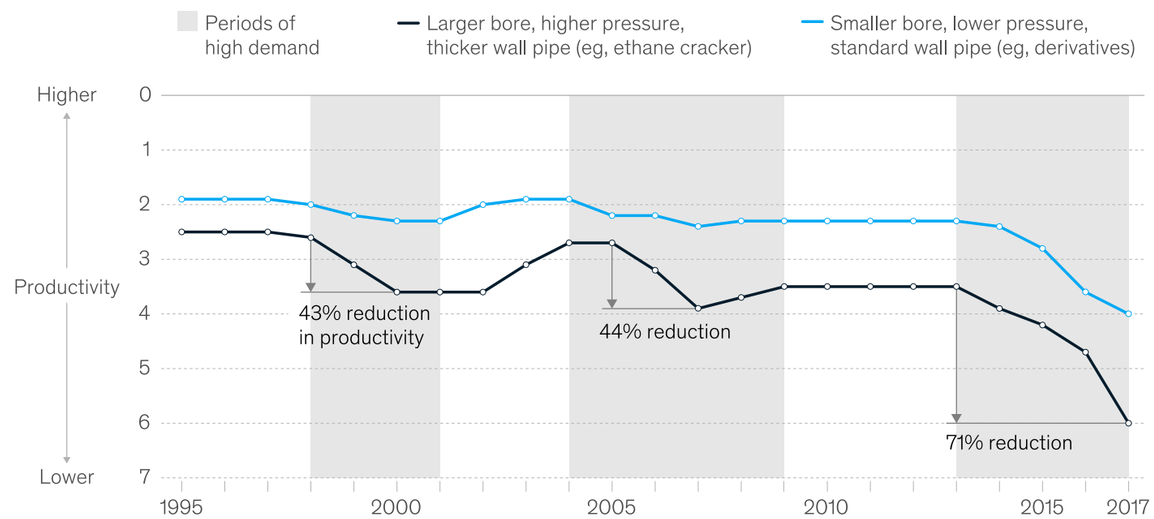
During the shale-oil boom, tight labor market conditions correlated with steep productivity declines.

US Gulf Coast piping productivity for major process-industry projects, work hours per linear foot of pipe



Source: Westney Capital Analytics Construction Insider

way to drive significant and sustainable productivity.

Reimagining talent

To ensure access to the skills they need, construction sector companies can accelerate the onboarding of recruits, boost retention by revisiting what employees want beyond wages, and invest more in developing their pipelines of future workers.

In the near term, employers could prioritise the review of job applications and reduce the number of steps in both the interview and the onboarding process. Competitive wages are now table stakes. Research on attrition in the post-pandemic workplace has shown that employees are placing more emphasis on autonomy, flexibility, support, and upward mobility. In the medium term, both the public and private sectors could look to reduce hiring timelines and shift to a skills-based approach when hiring.

In the longer term, the construction industry can consider a new approach to talent attraction, development, and retention. Talent acquisition could begin early through partnerships with educational institutions, including universities, colleges, and high schools. Companies could also look more widely for potential recruits by considering individuals who have taken alternative educational paths, such as technical degrees or hands-on experience. The Rework America Alliance, a Markle-led coalition in which McKinsey is a partner, illustrates the importance of skills-based—rather than credential-based— hiring. Moreover, identifying and attracting talent from outside the traditional paths used by the construction industry could also help it to increase the diversity of its workforce. Today, 88 percent of the sector's workforce is White, and 89 percent is male.[2]

Looking at labor through a strategic lens

Labor and skills shortages have the potential to slow growth and erode profitability across the construction value chain. For C-suites, there's no other single issue that could protect against significant cost erosion. Companies could consider establishing a systematic talent acquisition and retention program that is led by a C-level executive and is a core part of the CEO agenda. That program could be tasked with building a robust fact base focused on current and emerging labor availability gaps, as well as with identifying a bold set of initiatives that address labor-related issues across the value chain. Leadership will likely need to be increasingly present in the field and on the job-site too, celebrating and recognising top talent throughout the organisation.

The labor challenge extends well beyond corporate boundaries. Since the successful delivery of a project could be jeopardised by labor shortages in a single value chain participant, project owners and contractors may want to adapt the structure of project relationships and contracts. Moving away from traditional contracting methods to collaborative contracts, for example, allows participants to share market risks and opportunities as a project evolves.

The US construction sector is poised to revitalise, replace, and expand the country's infrastructure. Done right, this will power inclusive growth and set up the economy for success in the 21st century. To do so, the sector will need to address its labor challenges. This calls for the application of a diverse set of tools and approaches to create better jobs, get the most out of its people, and optimise agility and collaboration across the value chain.

2. Labor force statistics from the Current Population Survey Database, US Bureau of Labor Statistics, accessed March 10, 2022.

Construction steel news headlines

construction market and regulations

Europe/North America: Arcadis has announced that tender price inflation in the UK will be between 8% and 10% this year, following initial estimates of 5-6%. Ukraine war is single-handedly responsible for adding a further 3-5% to the costs of most construction projects; for projects with a greater exposure to the steel market, including the logistics sector and some infrastructure sectors, the extra inflation will be even higher, ranging from 5 to 8%. Link In the meantime, an index for new nonresidential building construction in the US – a measure of what contractors say they would charge to erect five types of nonresidential buildings – rose 0.4% for the month of May and 19.3% from a year earlier. Link

North America: President Joe Biden's proposal to try to curb the runup in gas and diesel prices by suspending federal motor fuels taxes for 90 days—and use "other revenues" to offset the hit to the Highway Trust Fund—has sparked criticism from construction and engineering groups. A key concern for construction and engineering groups is the proposal's impact on the Highway Trust Fund, which draws on income from the gas and diesel taxes. Link

Europe: The number of new homes completed in England in the first quarter of 2022 was down by nearly 11% on the previous quarter. 40,720 new homes were completed between January and March this year, compared to 45,610 between October and December last year – a drop of 10.7%. However, the number of new homes started did see an increase in England – 42,820 homes were started in Q1 2022, up 18.8% compared with 36,030 in Q4 2021. Link

Europe: The volume of product sold by Britain's builders merchants in April 2022 was 15% down on April 2021. April 2022 was the first month since January 2021 that year-on-year volume sales have been down. Money taken through builders merchants cash registers was down just 0.9% in April, year on year, but with price inflation running at a whopping 17.0% for their merchandise, a lot less product went out of the door – 15.1% less, to be precise. Link

Asia: Chinese state-owned enterprises plan to invest some $1.5 trillion in non-traditional infrastructure projects between 2021 and 2025 as the government acts to sustain economic growth. Senior state-asset regulators said that the money would be spent on more than 1,300 "new infrastructure" schemes, meaning facilities that make use of emerging technologies such as 5G, AI and the internet of things. Link

Asia: Work will start on the construction of a 55km railway line connecting Manila with the city of Calamba in the Philippines following a US$4.3 billion loan from the Asian Development Bank (ADB). The project includes the construction of 18 stations designed to provide safe access for all, and a connecting tunnel to allow the operation of direct trains from Calamba to stations on the future Metro Manila Subway system. Link

Middle East: A consortium led by Saudi Arabian energy company ACWA Power is to build a US$1.5 billion onshore wind farm in Egypt that will be capable of providing electricity for over a million households. Described as an important milestone in the decarbonization of Egypt's energy sector, the facility will have a maximum capacity of 1.1GW and will feature wind turbines with blade heights of up to 220m. Link

Building materials & construction technologies

North America: Cityzenith, a Chicago-based digital twin platform, announced partnering with the Los Angeles branch of the U.S. Department of Energy's Better Buildings Challenge to help construct a digital twin, or virtual replica, of a section of the city to help make its buildings more sustainable and reduce carbon emissions. They provide cities with a digital twin free of charge, allowing potentially costly decarbonisation efforts to be tested virtually before a data-driven decision is made in the real world. Link

Europe: ProjectPay, a building and construction industry payments platform, has partnered with digital product creators Komodo to build a carbon emissions calculator for the construction sector. The calculator is said to break down Scope 3 embodied carbon emissions across the supply chain to give contractors a better understanding of their environmental impact and how to reduce it. Link

North America: Colorado-based zero-carbon research company Prometheus Materials is using algae to create a greener binding agent. The mixture was developed under a Department of Defense grant by a team of scientists and engineers at the University of Colorado Boulder and will be used to construct a data centre. Prometheus Materials championed the technology after announcing the close of an $8 million Series A funding round led by Sofinnova Partners, a life sciences venture capital firm; additional participants included the Microsoft Climate Innovation Fund and architecture and design firm Skidmore, Owings & Merrill. Link

construction sector players

Europe: British company ISG recorded £1.6Bn order book, latest results for the year to December 31 2021 show pre-tax profits more than doubled at £19m from £8.9m and revenue up 10% to £2.2bn. The firm is now looking forward to further recovery this year on the back of a record £1.6bn forward order book, after maintaining its zero-debt status and improving its net cash position by 18% to £120m. Link

Europe: HyperTunnel, a British tunnelling start-up, has received an unspecified amount of investment from French construction group Vinci. HyperTunnel will use Vinci's money to help pay for trialling its 'swarm bot' technology. The idea is to build tunnels using a combination of horizontal directional drilling, artificial intelligence and 3D printing. The proposed method involves injecting the lining of a tunnel into the ground and then removing the waste using a swarm of small autonomous robotic vehicles. Link

North America: The Boring Co. inched past another milestone, when the Las Vegas City Council unanimously approved an agreement with the Elon Musk-owned company. The deal permits Boring to build, own and operate underground tunnels beneath the Strip. The company will fund the project completely with its own money, though private stakeholders — such as hotels — will pay for the stops on their property. Link

Europe: Mace, UK-based construction company, has launched an annual "ambition fund", set up to back innovations from within the business and from third-party suppliers. The fund will see Mace invest about £1m each year in innovations designed to make the construction industry greener and more productive. Establishing the ambition fund is part of Mace's 2026 Business Strategy, which sets out its ambition to invest more than 2.5 per cent of its annual revenue each year in new products, technology and processes. Link
Europe: Modulaire Group - the Europe and Asia Pacific based modular space specialist - has confirmed a strong performance for the first quarter of 2022, largely driven by acquisitions. For the three months to 31 March 2022, the Group delivered total revenues of €370m, up 16% versus the prior year including acquisitions. Prior to acquisitions, total revenue grew by 9% driven by growth in both modular space leasing and sales. Link

North America: Nexii Building Solutions, Canadian modular construction start-up, has raised additional CAD$155 million to become 'rising star' in modular construction. Founded in late 2018, Nexii became the fastest company in Canadian history to reach a valuation of more than CAD$1 billion, doing so in 31 months. Nexii's patented building system involves the mass production of prefabricated panels for use in walls, floors, and roofs in an off-site factory, followed by on-site assembly. Besides software, the company relies on augmented reality to review project assemblies prior to physical construction. Link

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