

Construction Industry Trends to Watch (2022-2025)



BY DAVID REKERDRES

According to McKinsey, construction is the largest industry in the world.

And it makes up about 13% of global GDP.

But it is also one of the slowest growing.

However, new construction technologies are looking to speed up the rate of change.

This guide aims to bring you up to speed so you can stay ahead of the curve.

We outline 11 trends we expect for 2022 to 2025



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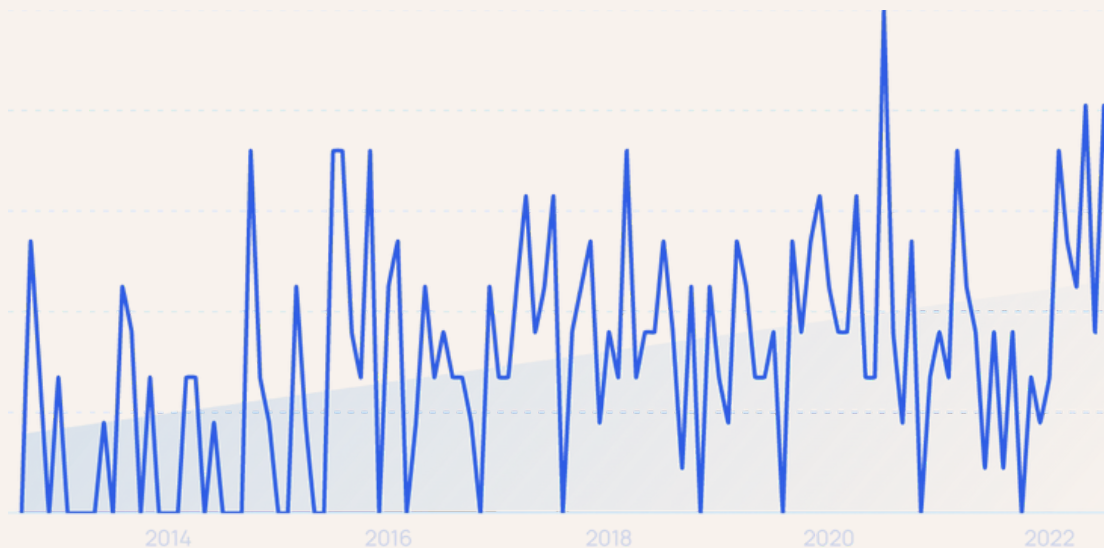
The Virtual Construction Market Sees Rapid Growth

The construction industry is increasingly adopting a variety of new technologies.

Many of these technologies involve virtual design and visualization.

And they range from Building Information Modeling (BIM) to Construction Management Software.

Virtual design and construction (VDC) describe the growing use of virtual environments to engineer and visualize the construction of structures before they're actually built in the physical world.



Searches over the last decade are up for “virtual design and construction”.

These virtual environments can be accessed via desktop, mobile devices, along with augmented and virtual reality hardware.

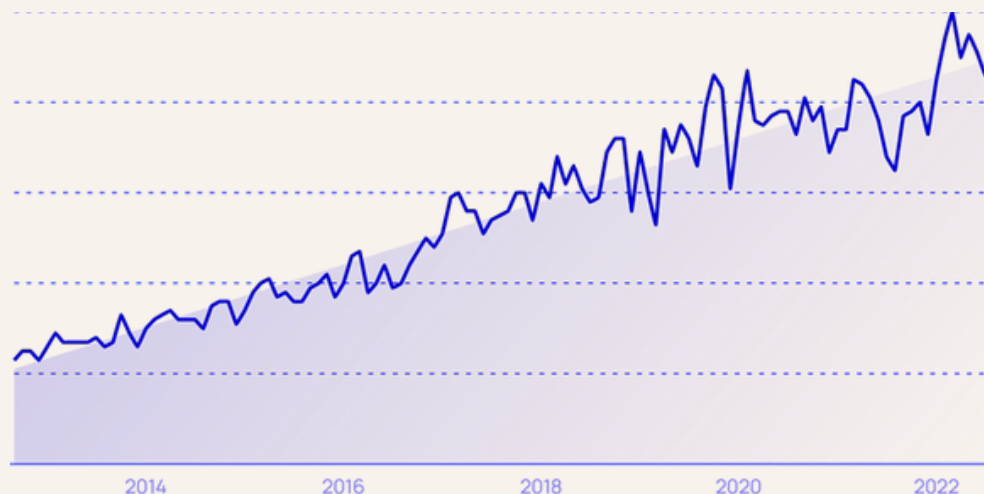
And there's no wonder why this is catching on.

It's estimated that reworks of faulty or incorrect builds account for nearly 30% of construction industry costs.

Virtual design helps cut down on this by allowing builders to first build structures in a virtual environment.

Building Information Modeling (BIM) is probably the most popular VDC tool.

It allows architects, engineers, or anyone else to generate a virtual model of a physical building or structure

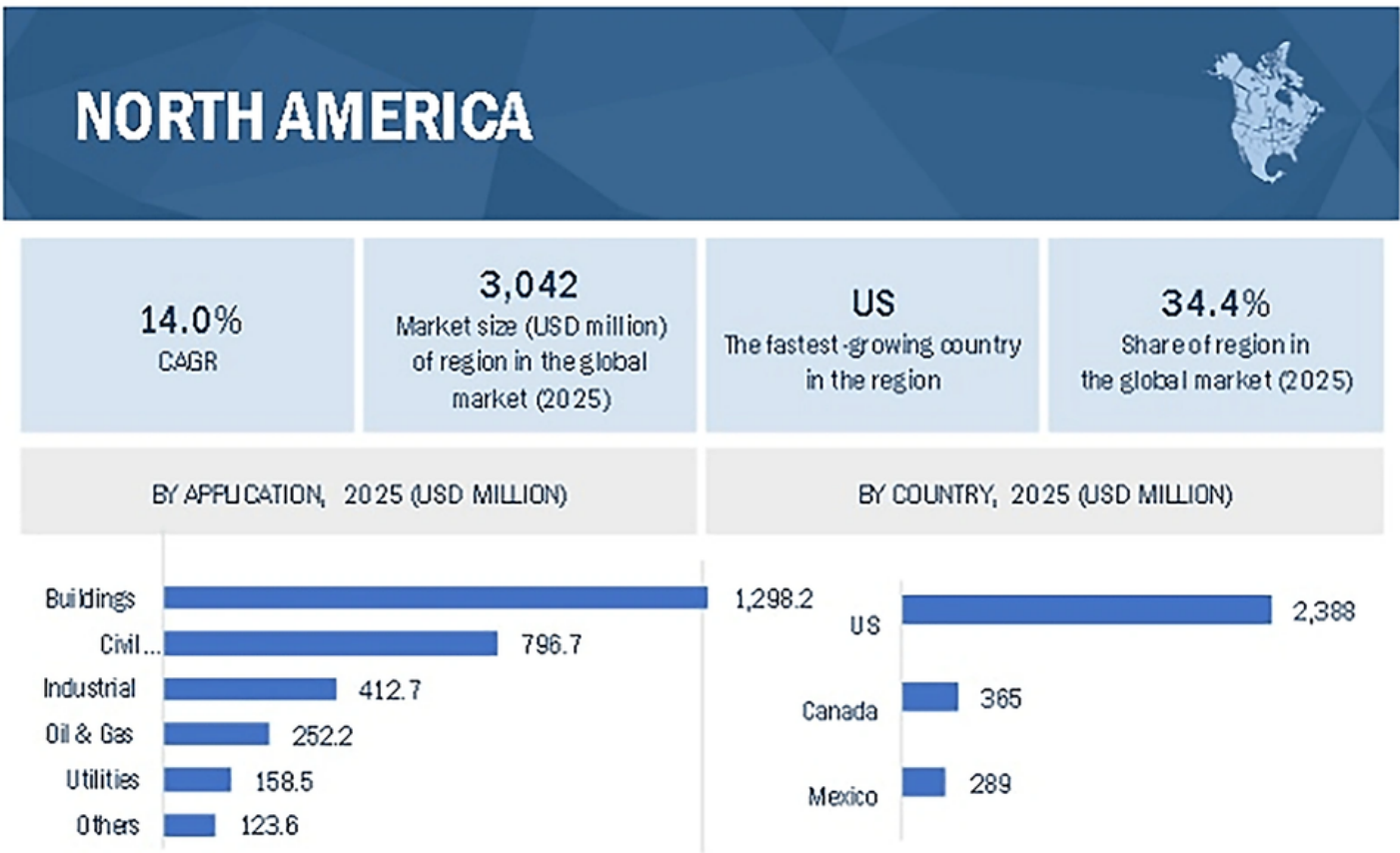


Searches for “Building Information Modelling” have grown by 250% over the last 10 years.

As of 2020, the BIM market was worth somewhere from \$4.5 billion to \$5.2 billion.

The construction industry took somewhat of a hit during the pandemic. But it is expected to rebound, with the BIM market growing at a CAGR of 14.5% over the next five years.

North America is expected to be the market leader over this time period, capturing over 30% of the market.



Expected growth and market share of the North American BIM market over the next four years.

McKinsey found that BIM technology has now achieved an adoption rate of about 60-70%.

However, this adoption has been relatively slow, taking about 35 years.
The last decade, though, offers some hope.

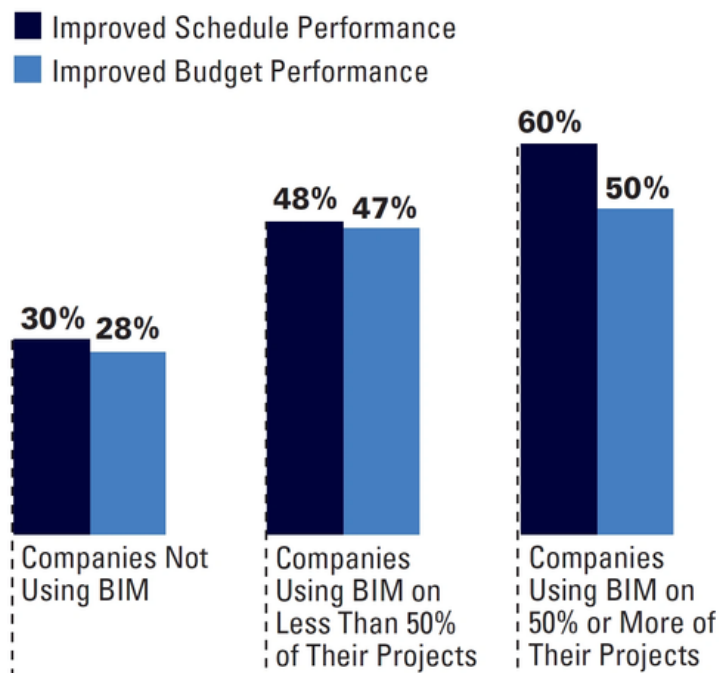
NBS's 2020 BIM Report found that 73% of its respondents were using BIM as of 2020.

Compare this to 2011, where almost half of all NBS respondents had never heard of BIM.

Combined with modular construction and prefabrication, BIM is consistently helping construction firms maintain budgets and keep tight construction schedules.

Impact of BIM on Schedule and Budget Performance When Using Prefabrication or Modular Construction (Percentage of Companies by BIM Usage Reporting Improved Performance)

Dodge Data & Analytics, 2020



Construction Management Software (CMS) is also now an important tool for many major construction companies.

A construction project is a very fragmented procedure. There are typically a variety of parties involved. And there are a lot of tasks happening at once.

CMS helps construction managers by allowing them to store and access data, blueprints, and documents all in one place.

The global construction management software industry is currently estimated to be worth \$1.4 billion.

It is expected to grow to \$3.2 billion by 2027 (a CAGR of 12.5%).

Autodesk is the largest player in the architecture and construction software market.

The company brought in over \$3.2 billion in 2020 revenue.

Its AutoCAD, BIM 360, and REVIT technology are basically the standard in virtual modeling.

Its traditional AutoCAD software is used by 85% of the market. And it's estimated that the company captures about 31% of the overall market.

Autodesk's software consistently ranks at the top of industry best lists.

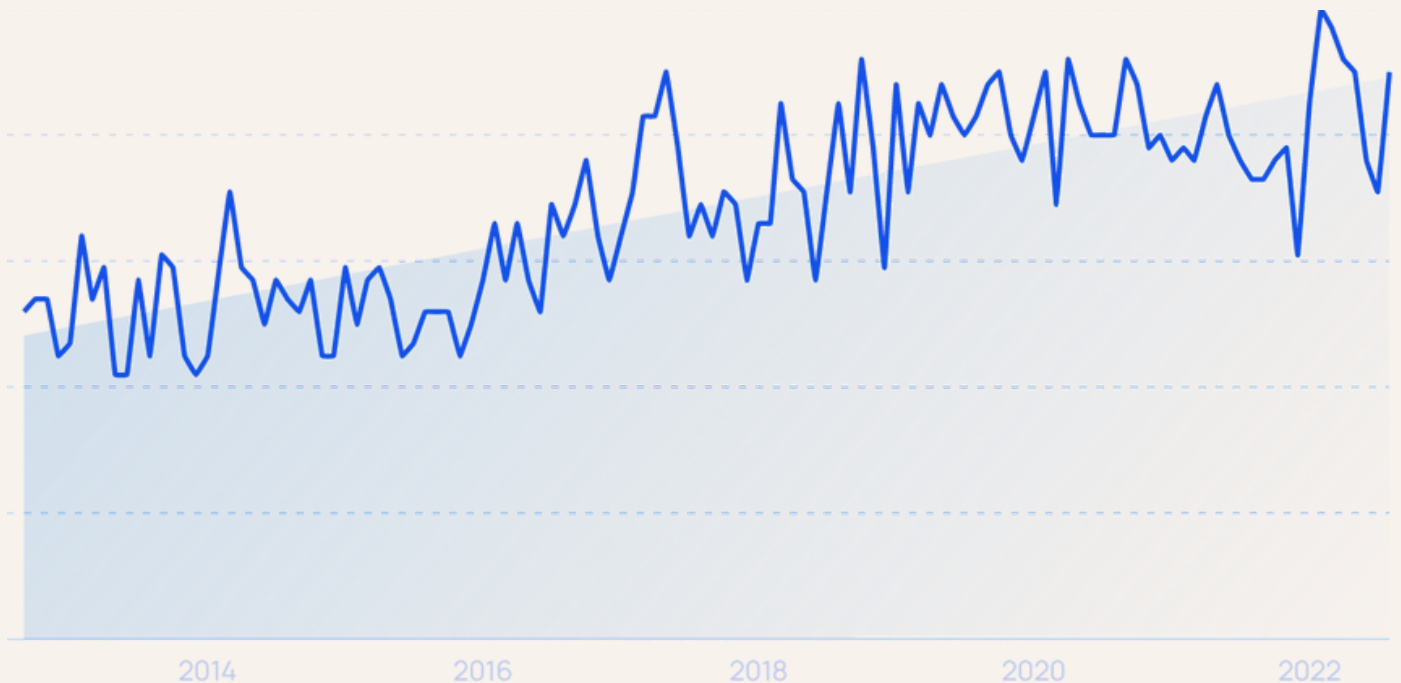


Google search growth for "construction management software" is up 120% in 5 years.

02

Prefabrication And Modular Construction Change How Structures Are Built

Modular construction typically involves constructing at least 60-90% of a building or other structure before bringing it to the construction site.



Search interest in “Modular Construction”.

Prefabrication, while technically part of modular construction, occurs when certain components of a structure are assembled or manufactured off-site.

The prefabricated parts are then easily affixed to the building.

The global modular construction market was worth about \$82.3 billion as of 2020. And it is expected to grow to \$108.8 billion by 2025.



Modular housing development in Oakland, California.

And while it has been relatively small compared to the entire construction market, the modular construction industry has experienced rapid growth in the past few years.

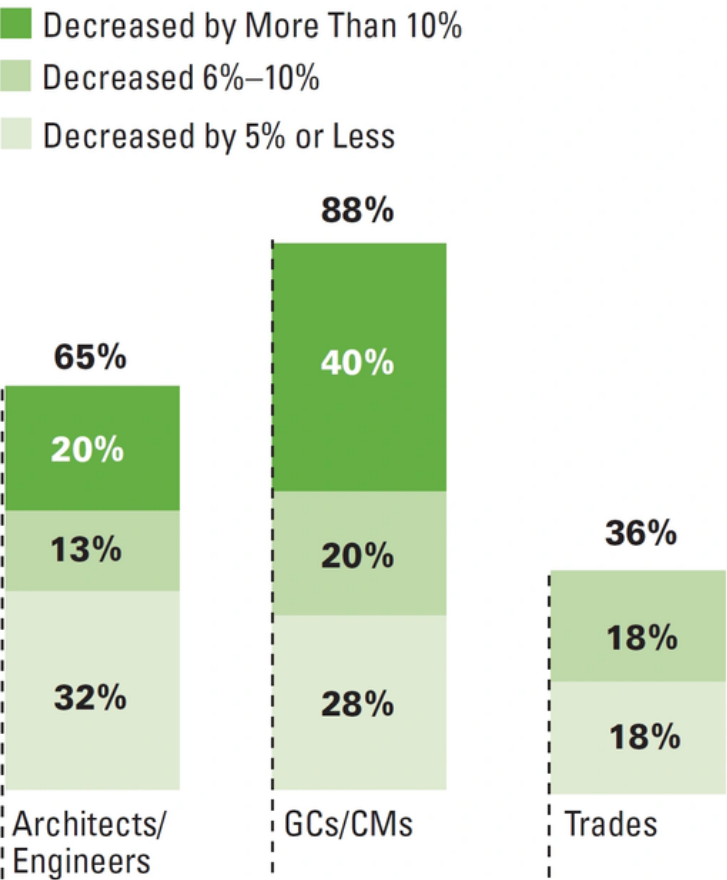
McKinsey estimates that the North American permanent modular construction industry's share of new construction projects rose by 51% between 2015 and 2018.

Over the same period, the industry's total revenue more than doubled.

Increasingly, general contractors (GC's), architects, and developers are finding that prefabrication and modular construction helps keep costs low, shortens the construction timeline, and reduces waste.

Impact of Modular Construction on Project Schedule Performance (Percentages Reporting Each of Three Levels of Improvement)

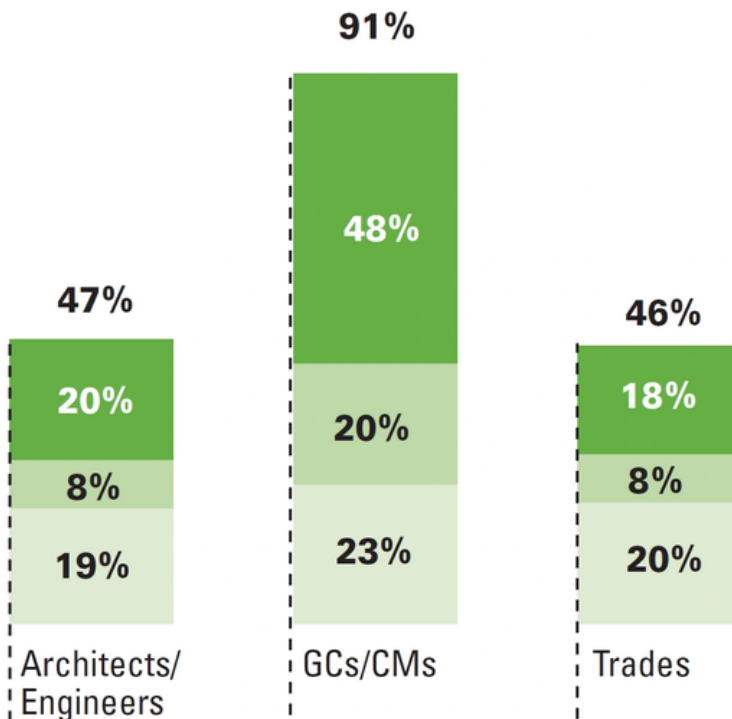
Dodge Data & Analytics, 2020



Impact of Modular Construction on Project Budget Performance (Percentages Reporting Each of Three Levels of Improvement)

Dodge Data & Analytics, 2020

- Decreased by More Than 10%
- Decreased 6%–10%
- Decreased by 5% or Less



Because of this, roughly 90% of respondents to Dodge's 2020 Prefabrication and Modular Construction Report said that prefabrication and modular construction methods were more beneficial than traditional construction.

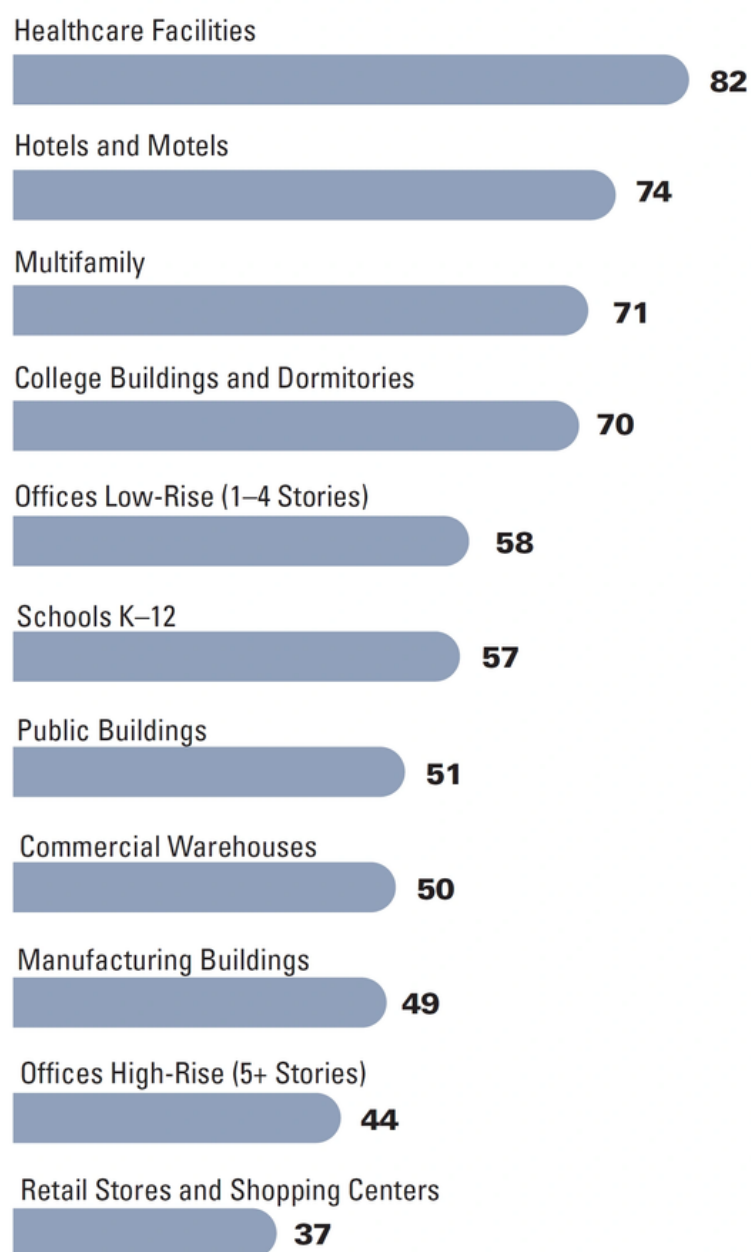
Certain kinds of buildings do, however, lend themselves better to this kind of construction.

Dodge found that, overall, healthcare facilities are expected to benefit the most from modular construction and prefabrication over the next three years.

Hotels and motels, as well as multifamily residential structures, didn't trail far behind though.

Most Likely Building Types for High Frequency of Prefabrication and/or Modular Construction (Index Based on Respondent Forecasts for the Next 3 Years)

Dodge Data & Analytics, 2020



Between 2018 and 2020, hotels and motels have led the pack as major beneficiaries of modular construction.

According to Dodge, roughly 43% of architects and engineers and 29% of general contractors and construction managers said that hotels and motels were the fastest growing industry for modular construction (2018-2020).

The two groups differ, however, on how they think 2021 to 2023 will go.

Over half of architects and engineers believe that multifamily residential buildings will be the fastest growing modular construction sector.

But the other group disagrees. 41% of GC's and CM's believe that healthcare will make the most use of modular construction between 2021 and 2023.

If you ask trade contractors (or subcontractors), they agree with the GC's and CM's.



56% of trade contractors think healthcare facilities will be the fastest growing market for modular construction.

And as the modular construction market grows, it is attracting new entrants. One of the most promising new startups is Katerra.

It is focused on completely modularizing the construction process.

The company manufactures certain parts of a building (like a wall) in its facilities, allowing developers to assemble buildings on job sites.

For now, Katerra is focused mainly on the residential real estate market. Katerra has raised \$1.6 billion in funding, including \$865 million from Softbank in 2018.

And although Katerra has had its recent problems, the company still generated about \$2 billion in revenue in 2020.



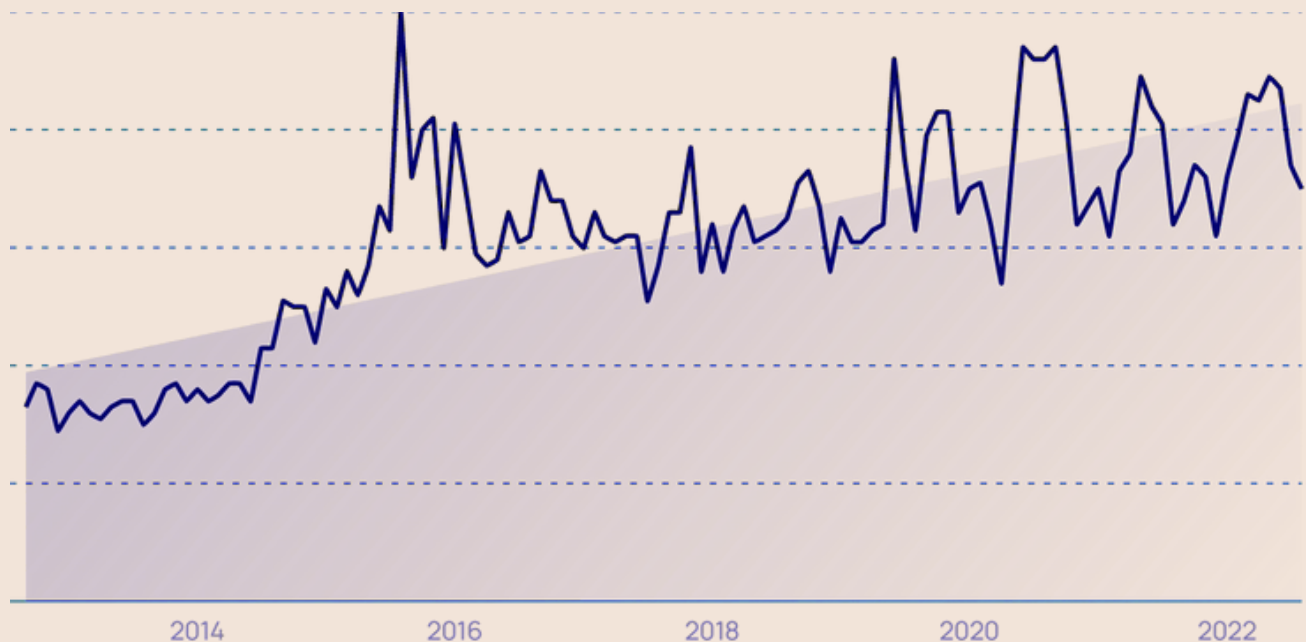
03

Smart Cities Change The Way Construction Companies Operate

One of the biggest trends affecting the construction industry is the rise of smart cities.

A smart city is a city that is basically fully integrated with the internet of things (IoT).

The infrastructure and buildings all assist in collecting data to help everything run more efficiently.



Searches for “smart city” have grown by 131% over the last 10 years.

It's estimated that the global smart city spend totaled \$124 billion in 2020. That's an increase of almost 20% over 2019.

IDC predicts that investments in smart cities will grow to \$203 billion by 2024.

Some estimates also indicate that the market will double again to over \$676 billion by 2028.

As this concept matures, it will likely change the way most of the construction industry operates.

More and more construction industry participants will have to start using tech advancements like IoT in their building materials.

A recent study shows that about 60% of U.S. building managers are familiar with IoT technology.



A digital representation of Toyota's “Woven City.”



And 43% expect IoT technologies to impact their business in the next few years.

The construction industry will have to adjust soon, as large corporations and cities are making agreements to construct smart cities within the next year.

Toyota has announced a 2,000-person smart city outside of Tokyo.

The company plans to test autonomous vehicles and “smart buildings” in an environment with actual citizens. Construction began in February of 2021.

04

Green Building Helps Tackle Environmental Issues

Green building involves building environmentally sustainable buildings using an environmentally sustainable construction and design process.

As governments and regulatory bodies around the world focus on environmental factors in every industry, more construction and design firms are implementing green building methods.

According to Dodge's World Green Building Report, almost half of all construction and design respondents said they expected the majority of their projects to be green by the end of this year.

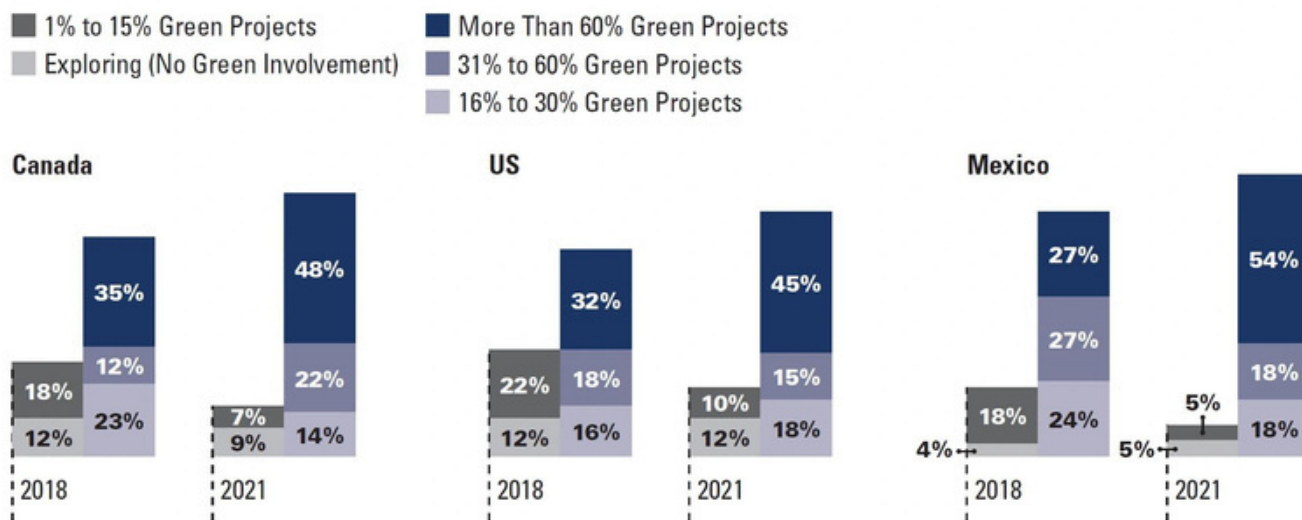


And a McKinsey study found that 90% of construction industry respondents believe that a shift towards environmental sustainability is imminent.

As of 2018, Canada had the largest percentage of builders engaged in green building in North America. And the U.S. was a close second.

Levels of Green Building Activity for Respondents in North America (2018 and 2021 Expected)

Dodge Data & Analytics, 2018



Mexico is expected to be the leader in North America.

Over half of their builders expect the majority of their buildings to be green.

The green building revolution is doing particularly well in the residential building market.

Over one-third of single-family and multi-family builders build at least half of their projects using green building techniques.

Energy efficiency is widely regarded as the top practice of home builders in improving green home performance. In fact, 96% of green home builders build their homes to be energy efficient.

This makes sense, considering building operations themselves account for the vast majority of greenhouse gas emissions in the construction and real estate sectors.

Because of this, over 90% of single-family residential builders said they used some kind of energy efficiency practices in the construction of at least some of their buildings. 69% claim they use it in most of their buildings.



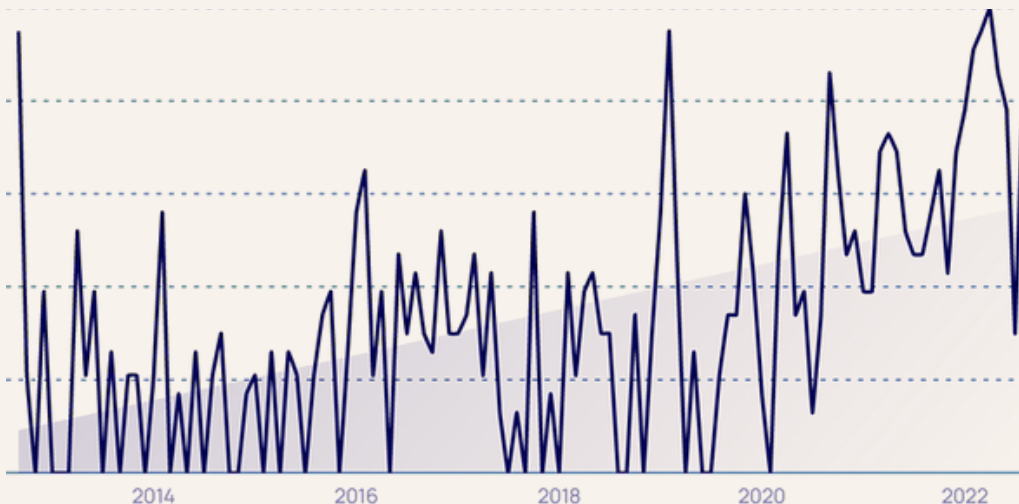
05

Living Building Materials Go Mainstream

One of the most radical new trends in the construction industry is the use of living building material.

This part of the industry is still very young, but there are signs of increased adoption.

When looked at from an environmental standpoint, the decision to switch to this kind of material is clear.



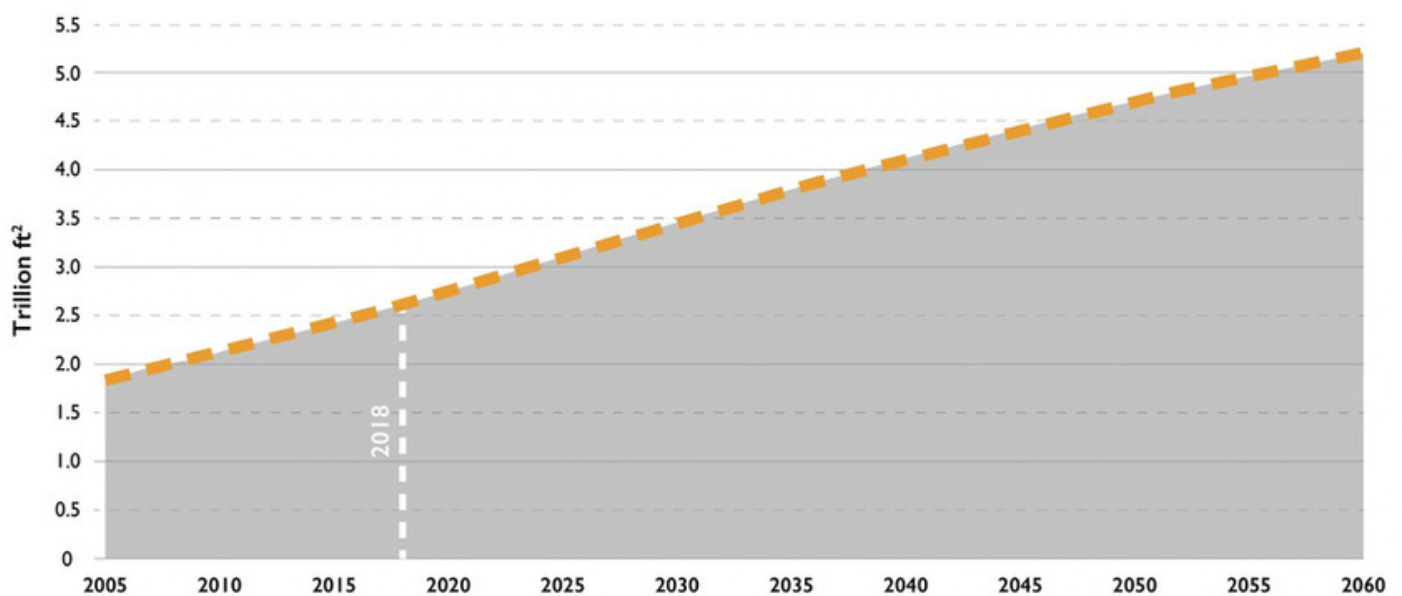
Searches for “living building material” have increased by 4,500% over the last decade.

The entire construction supply chain accounts for 11% of global greenhouse gas emissions.

And embodied carbon (carbon released in the construction process) accounts for close to 30% of greenhouse gas emissions in the construction and real estate sectors.

The number of new buildings being built also isn't expected to slow anytime soon.

To accommodate growing populations, the global building stock is expected to double by 2060.



Global Floor Area Growth

© 2018 2030, Inc. / Architecture 2030, All Rights Reserved.
Source: UN Environment Global Status Report 2017
Data Source: IEA (2017), World Energy Statistics and Balances

Cement is one of the main areas targeted by the living material sector.

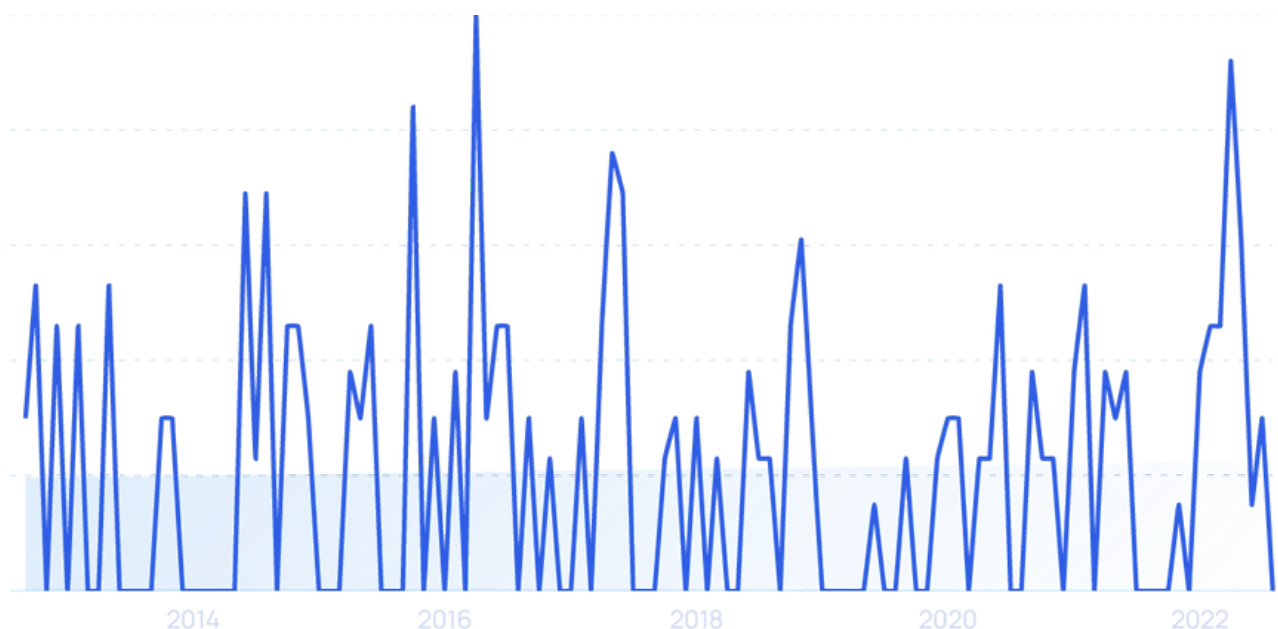
Cement production alone accounts for 8% of global CO₂ emissions.

And emissions will need to fall by 16% before 2030 for the sector to come in line with the Paris Agreement on climate change.

According to the BBC, if the cement sector were a country, it would be the third-largest carbon emitter, behind China and the U.S.

That's why new products like self-replicating concrete and self-mending biocement are being developed.

Biocement is grown using biological materials instead of created from non-renewable materials. And the process actually absorbs CO₂ instead of emitting it.



Search interest in “biocement” has grown by 600% over the last decade.

Innovations like this can allow “manufacturers” to grow building materials that self-replicate, making it much easier and efficient to scale.

BioMason Inc. is one of the most interesting companies in this area.

The company was founded in 2012, and it uses biological processes to grow biocement blocks.



A Biocement block grown by bioMason.

According to Crunchbase, bioMason has raised \$94.8 million in venture funding so far.

And it increased its headcount by 50% in 2020.

06

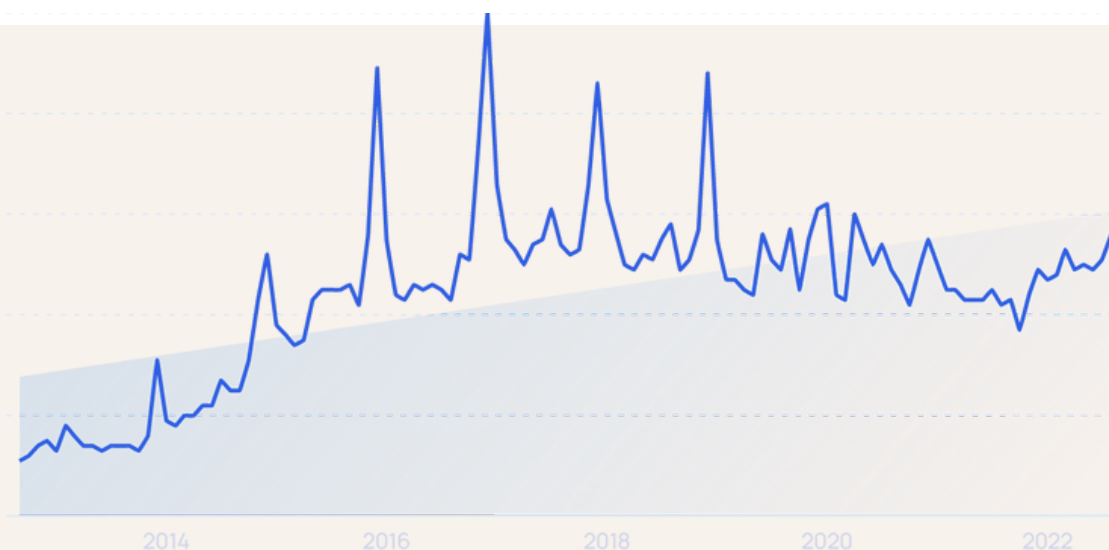
The Construction Industry Benefits Heavily From Drone Technology

Another way that the construction industry is becoming more efficient is through the use of drone technology.

Once thought of as novelty items, drones are now responsible for huge cost savings on major construction projects.

It's estimated that drone usage has significantly cut down on the annual \$160 billion in waste that occurs on construction sites.

In fact, using drones to measure stockpiles of building materials in real-time has resulted in a 61% increase in measurement accuracy.



Searches for "drone" grew by 261% over the last decade.

Many are hoping drones will significantly reduce construction worker injuries and deaths.

In the U.S., 20% of workplace deaths occur in the construction industry – an industry that only makes up 6% of the U.S. labor force.

By using drones, construction companies are able to survey and inspect various locations without putting any actual humans in harm's way.

As a result of drone technology, the construction industry has seen a 55% increase in safety standards.

In 2018, DroneDeploy – a drone cloud computing company – completed a study that found that the construction industry was adopting drone technology faster than anyone else.



Source: DroneDeploy

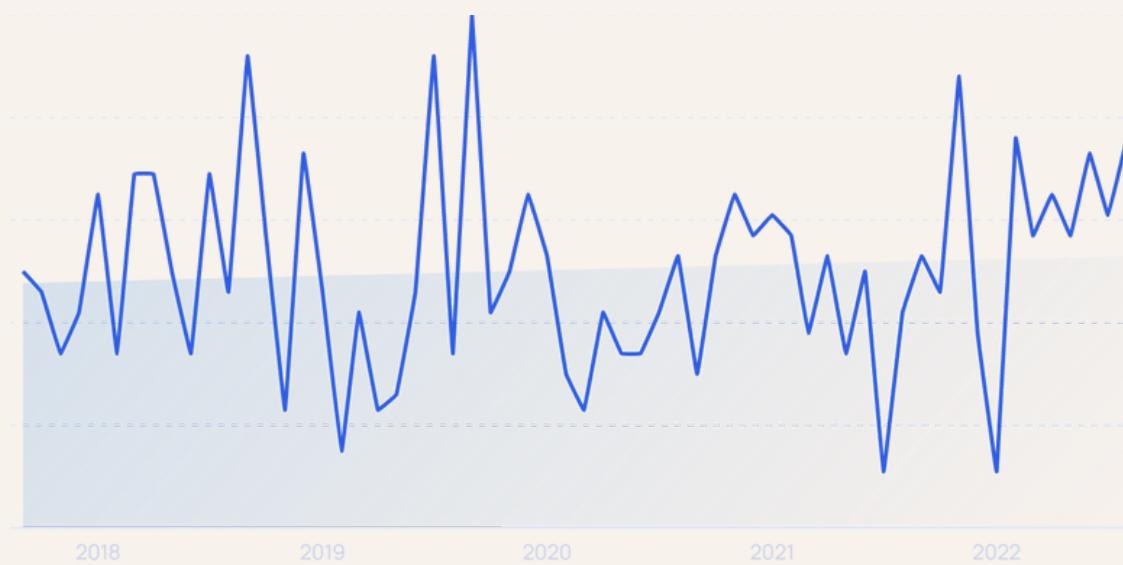
Tech Solutions Improve Safety

Concerns about construction site safety are on the rise.

From 2011 to 2019, injuries from falls increased 41% and the number of nonfatal injuries rose 8%.

Sadly, more than 365 people in the construction industry died from falls, slips, or trips in 2020.

Statistics like this are leading to a call for improved safety equipment using tech.



Search volume for "construction safety helmet" is growing, up 169% over the past five years.

Hard hats have been one of the most prevalent pieces of safety equipment at construction sites for the past several decades.

However, there's now a "helmet revolution" taking place in the industry.

Safety helmets, like the ones you see people wearing while rock climbing, are becoming popular for a number of reasons. For example, because they have a chin strap, they stay on even if the worker falls.

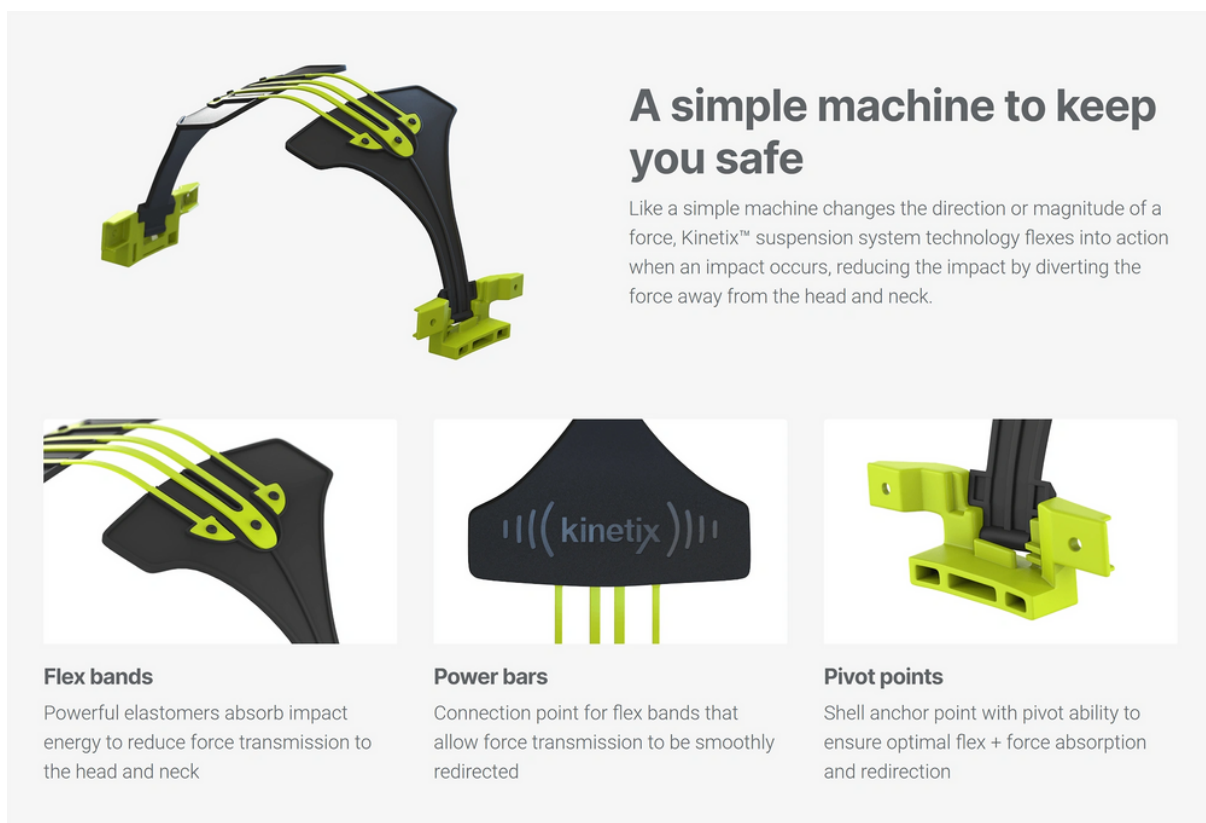
They also provide a greater field of vision and a more compact, ergonomic fit for the user.



Many of the latest developments in safety helmets focus on reducing impact in order to prevent injuries to the head and neck.

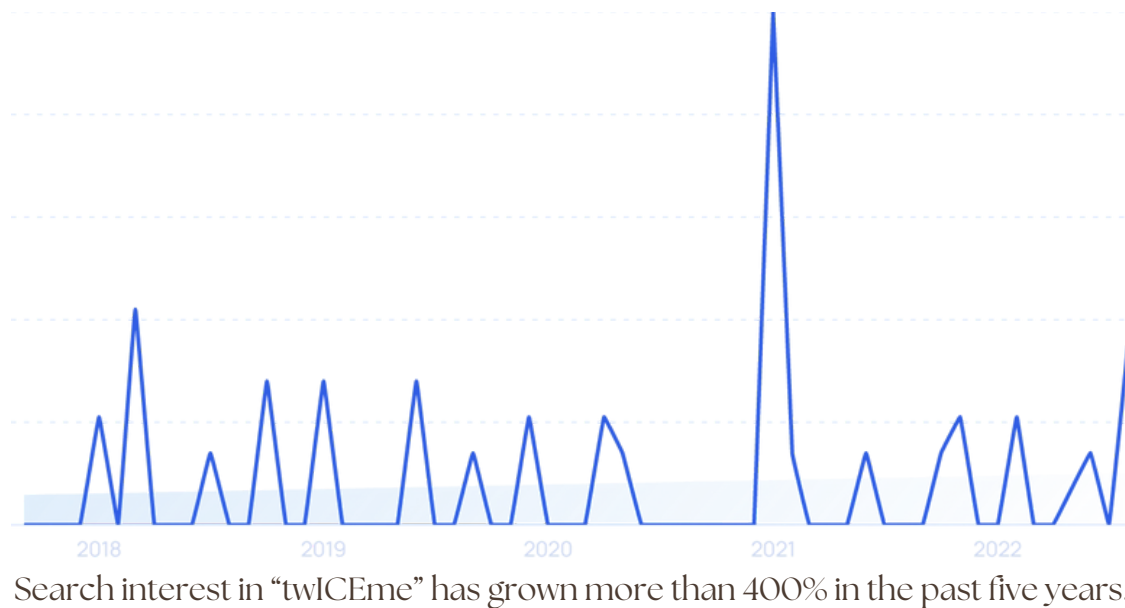
One helmet from HexArmor features a Kinetix suspension system that's able to absorb and direct impact out and away from the neck and spinal cord.

When compared to other helmets, this system reduces 40% more of the impact force.



The Kinetix suspension system is a high-tech way to protect construction workers from impact in the case of a fall.

There are even some safety helmets, like those offered by twICEme technology, that integrate the user's medical information, emergency contact information, and coordinates directly into the helmet.



Since twICEme technology works via NFC technology, no GSM, wi-fi or 3G/4G/5G is needed for communicating.

Wearables are another example of tech-enabled safety equipment that's becoming popular on construction sites.

Kenzen, a tech company focused on predicting and preventing industrial workforce injuries, has developed a continuous health monitoring program for construction workforces.

Workers wear a small device on their upper arm to monitor core body temperature, heart rate, sweat rate, and activity level.

The data feeds into an app that's visible to the worker and to the manager.

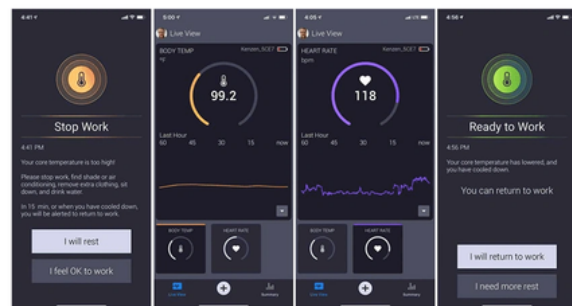
SMART PPE DEVICE

This compact, waterproof device records biometric data from a flat surface in a highly effective, unobtrusive way.



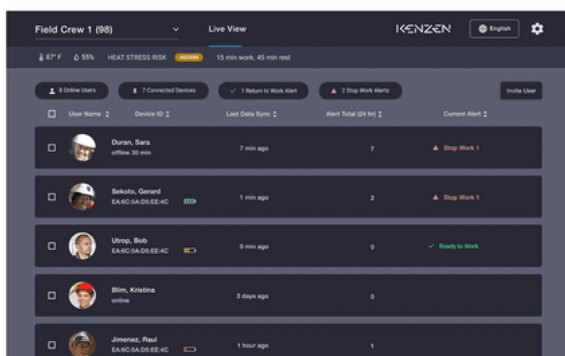
MOBILE APP

This personalized application empowers the individual worker to self-monitor key physiological indicators, resulting in increased worker awareness and adoption.



TEAM VIEW MOBILE DASHBOARD

This team-focused application alerts managers to deviations from baselines, allowing them to intervene, privately and quickly, with individual workers.



CLOUD-BASED ENTERPRISE SOLUTION

This risk management and productivity tool advises EHS directors and risk managers about broad safety trends, giving them the power to aggregate, anonymize, and analyze enterprise data.

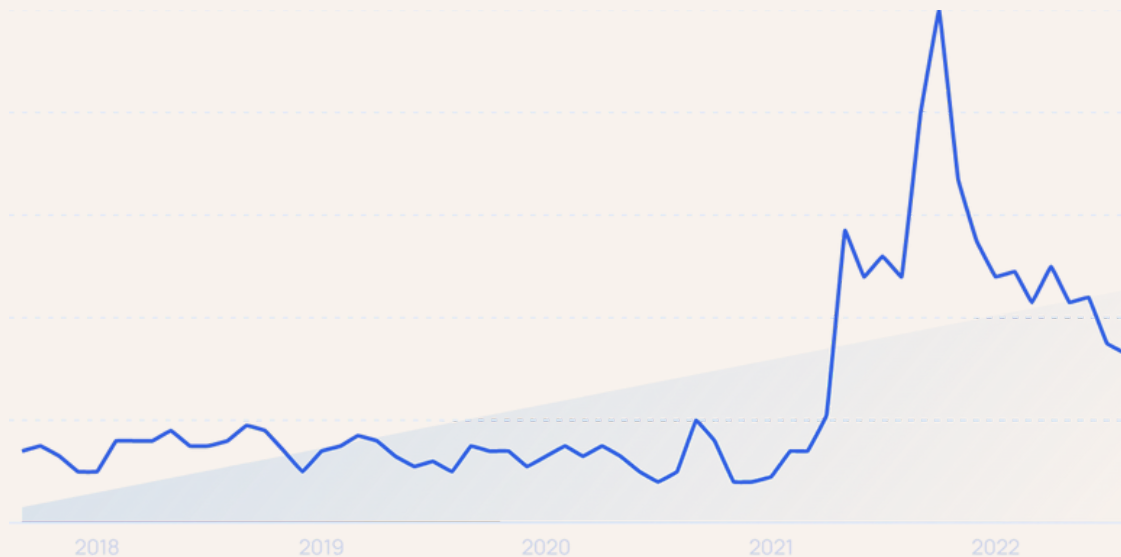


Kenzen's health monitoring system can transmit millions of precise data points to help managers provide real-time safety support to workers.

Construction Firms Face Major Labor Shortage

The construction industry has been facing a labor shortage for the past several years.

But in 2022, it has reached “crisis level.” That’s according to the CEO of the Home Builders Institute.



Search volume for “labor shortage” shot up in 2021.

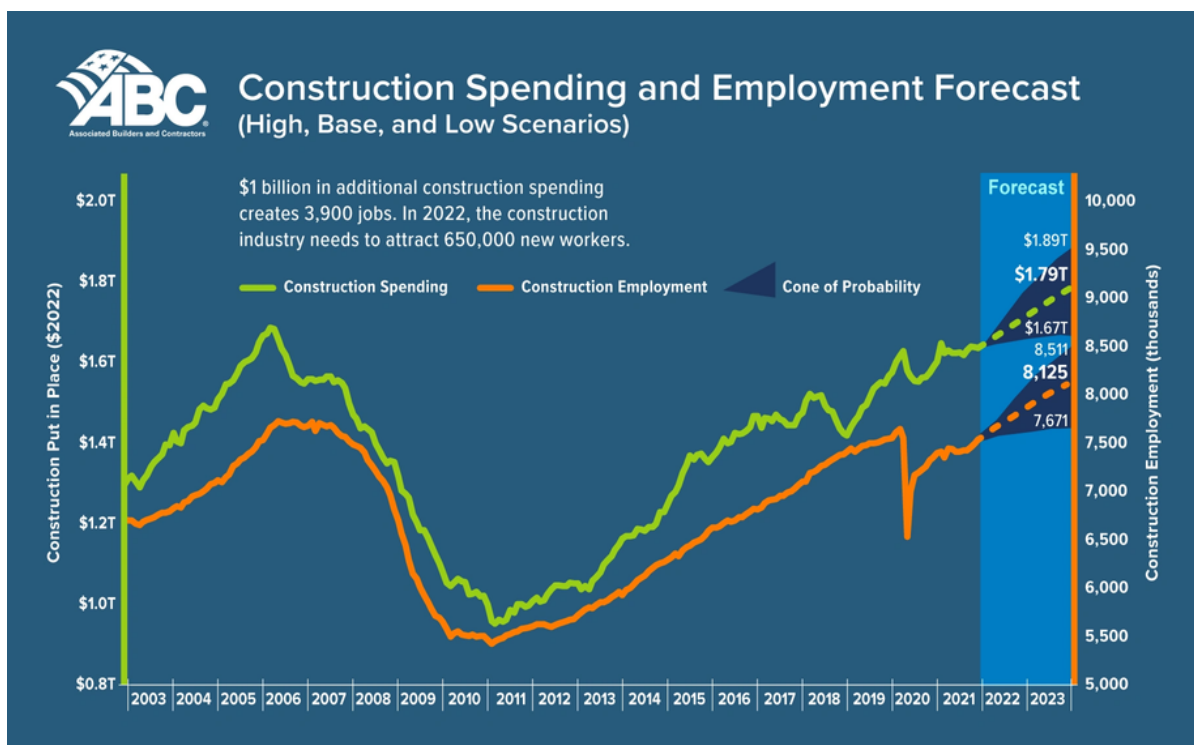
In April 2022, there were 494k jobs open in the construction industry.

That’s a 40% increase over April 2021 and the largest total openings since they began tracking the data in 2000.

In May 2022, there were fewer jobs open, only 466k. However, that still represented a 39% year-over-year jump and was the largest total ever for May.

This crisis is expected to get even worse with a portion of the \$1.2 trillion from the recent Infrastructure Investment and Jobs Act starting to flow into the industry.

The Association of Builders and Contractors estimates the industry will need to hire 650k additional workers on top of the normal hiring pace in 2022 in order to keep up with demand.



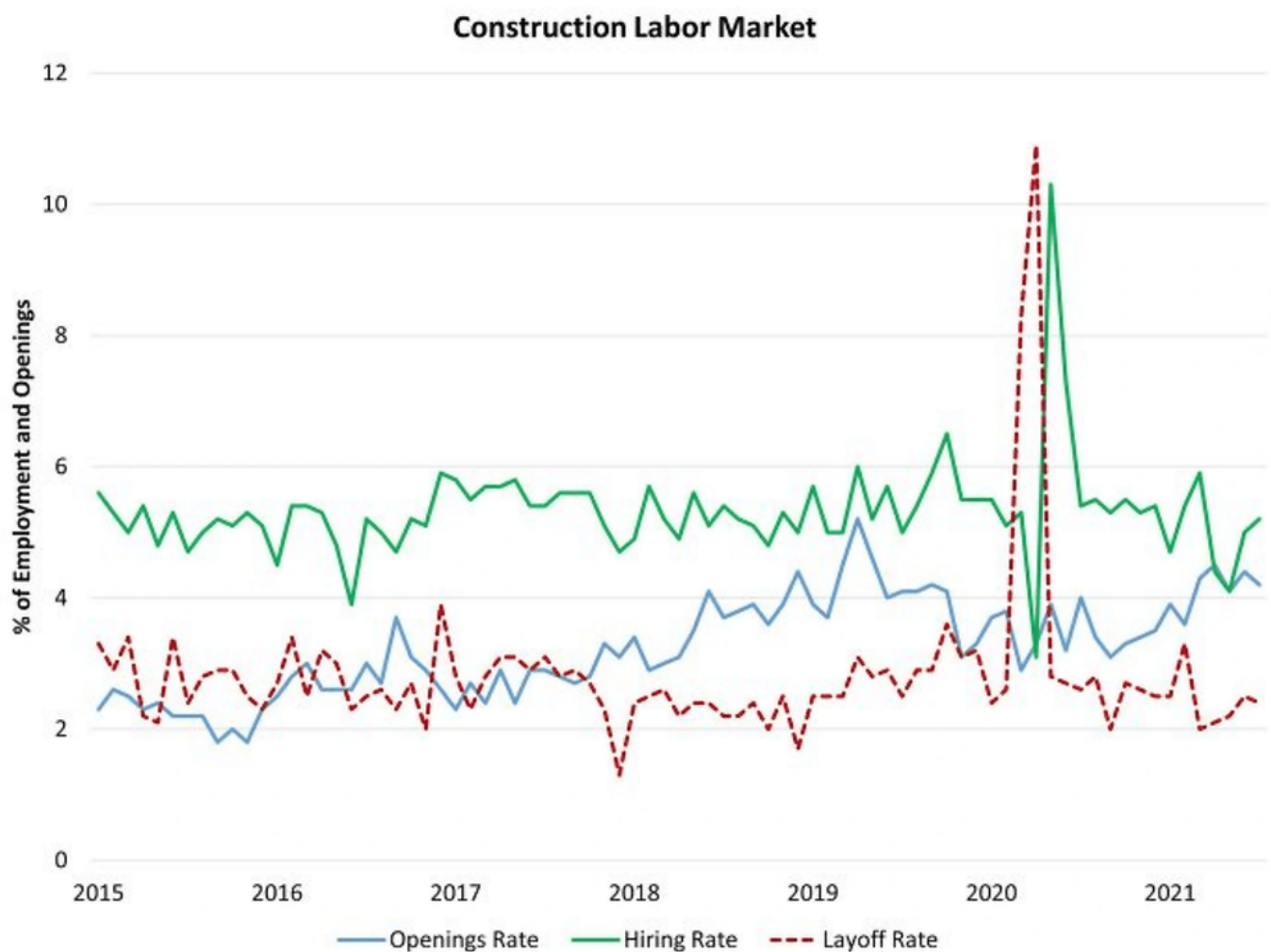
Predictions from ABC show that \$1 billion in construction spending equates to 3,900 new jobs.

They go on to say that these numbers won't be much lower in 2023. During that year, the industry will need 590k new workers on top of the normal hiring rate.

The shortage of workers is impacting project timelines and completion rates.

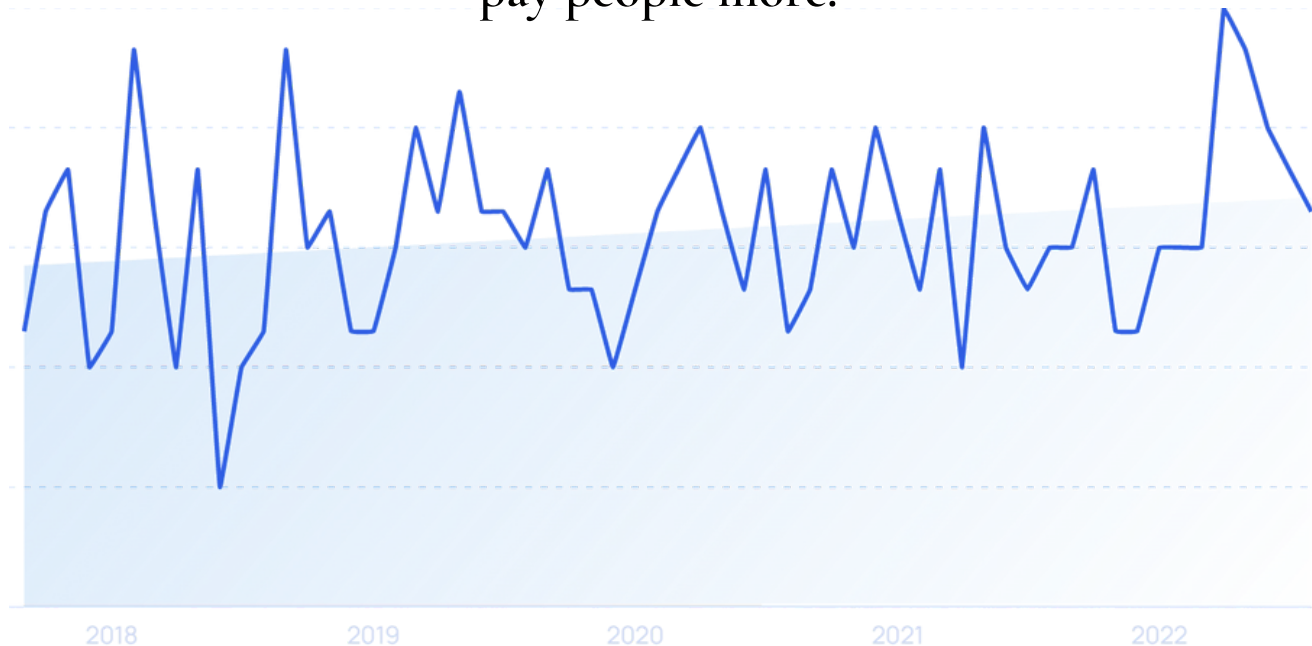
In a recent survey, 89% of construction firms reported having difficulty in filling positions and 61% said they are experiencing project delays due to the labor shortage.

The Home Builders Institute says the lack of construction workers is a main factor in the shortage of housing inventory and affordability. Their data shows that nearly 42% of the construction labor force works in residential construction.



From 2020 to 2021, the industry's job openings rate climbed while the hiring rate decreased.

One industry analyst says there are 25% more unfilled positions than hired. He expects that “jobs that were predicted to cost \$500M end up costing \$600M, because you’re going to need to pay people more.”



Search volume for “construction worker pay” over the past five years shows a steep increase in recent months.

In addition to higher salaries, the industry is trying a variety of strategies in order to recruit and retain workers.

Some are launching programs to reach kids as early as grade school and get them interested in construction jobs.

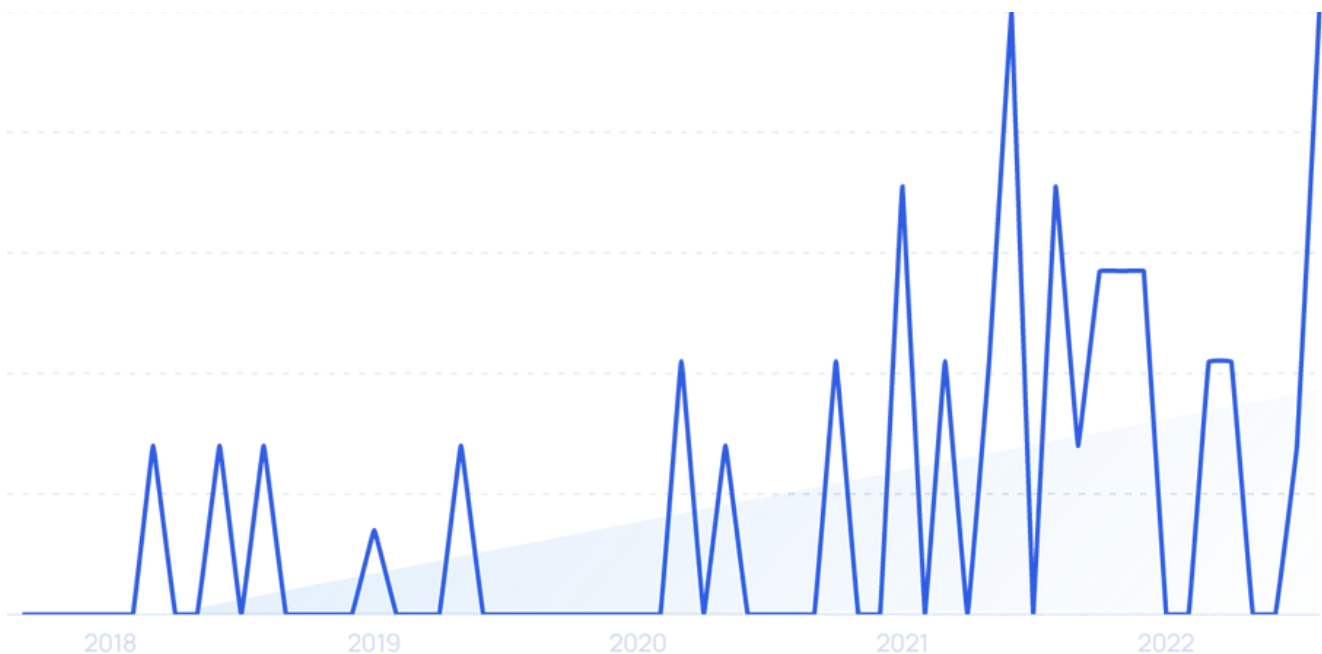
Other firms are focused on diversity in hiring, attracting interest through social media, and offering retention bonuses.

One bright spot is enrollment in construction industry trades courses at community colleges. Enrollment in these courses was up 5% between 2019 and 2021.

09

Material Costs Soar As Shortages Remain

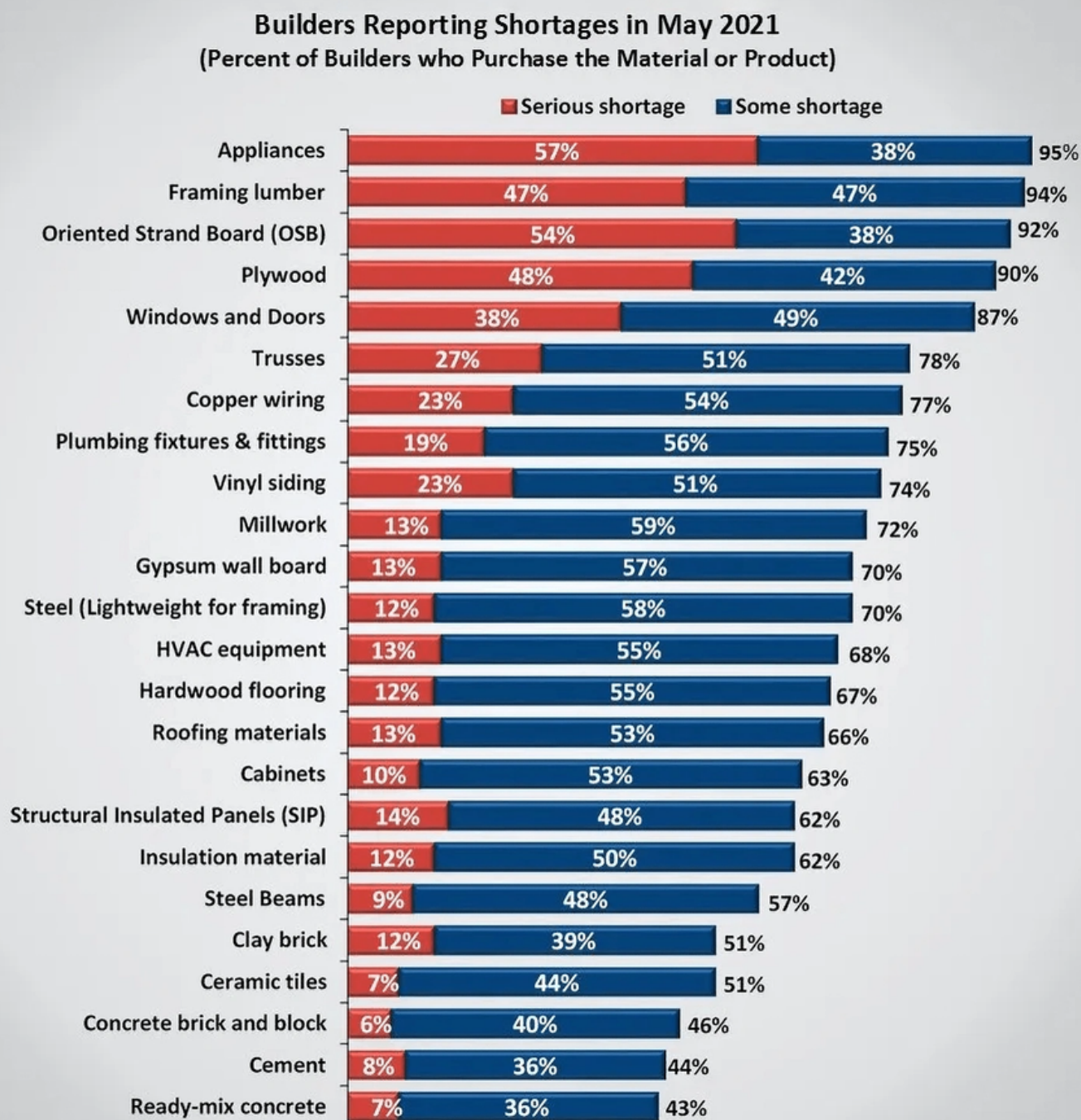
For many construction firms, certain materials are hard to come by. And, even if they can source the materials, the cost is soaring.



Search volume for “construction material shortage” is up 600% in the past five years.

More than 90% of builders say they're facing material shortages.

In that survey, builders were presented a list of 24 materials and asked to specify which shortages they were experiencing. More than 70% of builders marked half of the items.



The survey showed builders seeing the worst shortages with appliances, OSB, and plywood.

In June 2022, the Associated General Contractors of America released data that showed prices for construction materials used in nonresidential projects were up nearly 17% since June 2021.

Construction inputs with the highest price increases were diesel fuel (doubled since June 2021), asphalt roofing products (up 22% YOY), and plastic construction products (up 27% YOY).

The demand and cost for aluminum are up considerably, too.

In 2021, demand for the material jumped 7.7%.

In the first quarter of 2022, demand was up another 5.3%.

Aluminum prices are the highest they've ever been. Industry experts are predicting an average price-per-ton of \$3,450 in 2022.

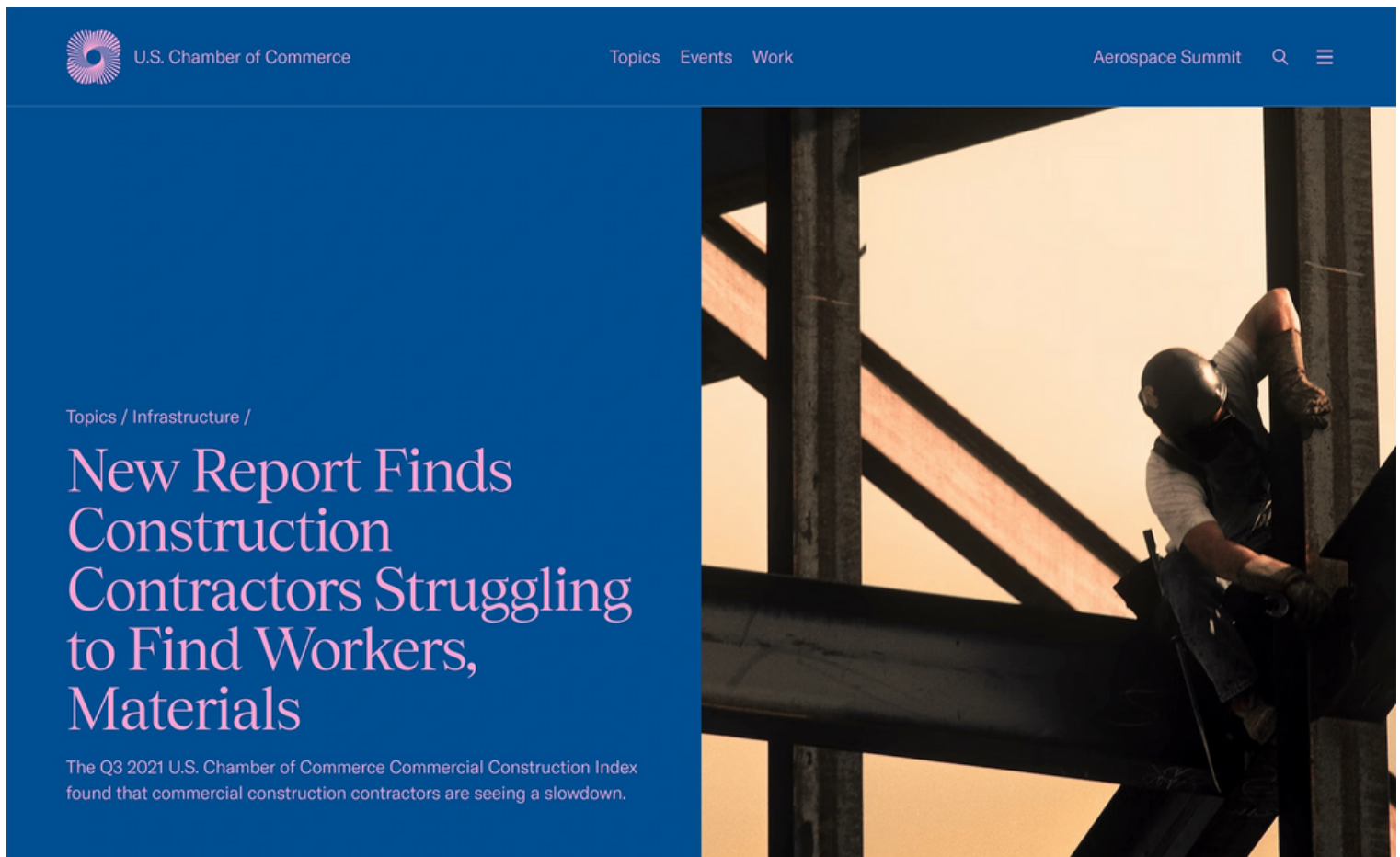


Steel is another material that's scarce and expensive.

The Bureau of Labor Statistics' Producer Price Index showed the price of steel mill products increased 123% year-over-year in August 2021.

During the last decade, the average price for hot-rolled coil steel was about \$400 per metric ton. An executive from Tata Steel says that steel will cost \$600 per metric ton in the coming years.

More than one-third of contractors are seeing a steel shortage.



The screenshot shows the top of a U.S. Chamber of Commerce website. The header is dark blue with the U.S. Chamber of Commerce logo on the left, navigation links for 'Topics', 'Events', and 'Work' in the center, and 'Aerospace Summit' with search and menu icons on the right. The main content area has a blue background on the left with white text and a photograph of a construction worker on the right. The text on the left reads: 'Topics / Infrastructure / New Report Finds Construction Contractors Struggling to Find Workers, Materials'. Below this, in smaller text, it says: 'The Q3 2021 U.S. Chamber of Commerce Commercial Construction Index found that commercial construction contractors are seeing a slowdown.' The photograph on the right shows a construction worker in a hard hat and safety vest working on a steel structure against a bright, hazy sky.

U.S. Chamber of Commerce

Topics Events Work

Aerospace Summit

Topics / Infrastructure /

New Report Finds Construction Contractors Struggling to Find Workers, Materials

The Q3 2021 U.S. Chamber of Commerce Commercial Construction Index found that commercial construction contractors are seeing a slowdown.

Material shortages are putting pressure on construction firms and driving up their costs.

These shortages and price hikes mean that many construction firms are worried about their bottom line.

Input costs have increased much more quickly than the average prices construction firms are bidding on projects. In December 2021, the average input cost was up nearly 20% while the average bid price had only increased 12.5%.

In a recent Deloitte survey, 20% of E&C (engineering and construction) respondents reported that their operating profitability and industry margins are likely to get worse in 2022.



3D Printing Use Increases

The construction 3D printing market is growing at an incredible rate. Reports show a CAGR of 99% through 2030.

This type of 3D printing can use a variety of materials: concrete, geopolymers, fiber, sand, and others.

Some innovators have even used biodegradable materials, like mud, soil, and straw in 3D-printed houses.

In most instances, only the frame and walls of a building can be manufactured with 3D printing.

However, the technology is advancing so fast that plumbing and electrical fixtures can also be integrated into the building via 3D printing.



Search volume for “construction 3D printing” is up 153% in the past five years.

The construction industry stands to reap several benefits from 3D printing.

The first benefit is time-savings. Technology works faster than we do and California-based Mighty Buildings has the proof.

The company built its Mighty Duo B, a 700-square-foot 3D prefabricated home, in just eight weeks. And, it only cost \$314 per square foot.



Mighty Buildings has several home layouts including this small dwelling, a 1,100 square-foot option, and a 2,000-square-foot home.

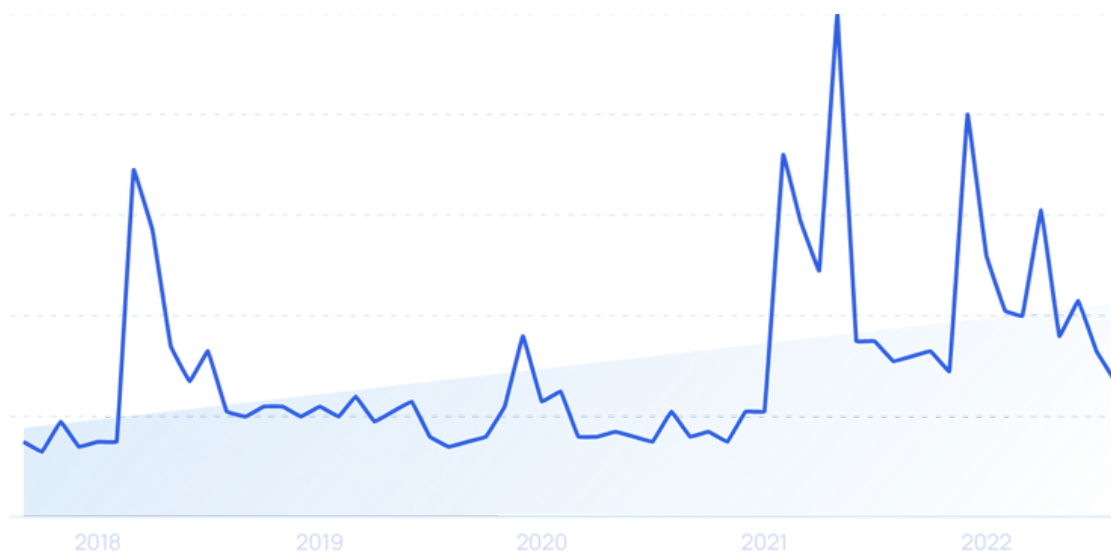
The company reports that its projects reduce construction timelines by up to 75%.

The lower price is another notable feature of 3D printing in construction.

Far less manpower and time is needed to build these structures, resulting in less wages paid.

One commercial building was built in Dubai using 50% less labor than a typical building.

Black Buffalo 3D, the provider of a large-scale 3D construction printer, says that using its machine to build a 1,000 square-foot-space costs 40% less than traditional wooden frames that are built on-site.



Search volume for "3D printed house" has increased more than 80% since 2018.

ICON, a company that constructs homes using 3D printing, built a 650-square-foot home in 24 hours at a cost of \$10,000.

They say they'll be able to get the price down to just \$4,000 in the future.

Because of the cost-savings of 3D printing construction, Habitat for Humanity has been watching the trend closely.

The organization built its first 3D-printed house in Virginia in late 2021.



In addition to the walls, the cabinet fixtures and light switch covers were also printed with 3D technology.

They have a second 3D-printed home in Arizona.

The organization says nearly 80% of the 2,400-square-foot-home is made with 3D technology.

Conclusion

That's about it for our list of important construction industry trends for the next few years.

Overall, environmental sustainability and software adoption seems to be the overriding themes that tie many of these trends together.

Interestingly, these themes also tend to result on cost savings. Which should help speed up the rate of adoption.

