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# 2021 Autodesk Construction Outlook: Risks & Opportunities



Produced in partnership between the BuildingConnected analytics team and Edward R. Zarenski, [Construction Analytics](#)



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# Introduction

It's safe to say that 2020 was a year no one expected.

The construction industry is navigating a new world and more than ever, we want to arm our customers with the insights and analysis they need to make the best possible business decisions.

To help achieve this goal, our BuildingConnected analytics team worked with Edward R. Zarenski from Construction Analytics to develop the **2021 Autodesk Construction Outlook**. This report combines external economic data with Autodesk's own aggregated, anonymized BuildingConnected product data to uncover the evolving state of the industry. For instance, what does the bidding activity from Autodesk's Builders Network of over 1 million construction professionals say about subcontractor backlog? How does the volume of RFIs and change orders on a project affect its success?

We hope that the insights contained in this report will help you stay resilient in 2021. Even more, we hope they will help you uncover new areas of opportunity for your business. Construction is known for developing creative solutions to difficult problems, and we believe the challenges we are currently up against are no different. You can continue to turn to Autodesk as you tackle those challenges head-on.

Will 2021 look like years past? Certainly not. The construction industry has been forever changed, and many of those changes will help us become more nimble, more efficient, and more connected than before. Together – armed with the right tools and insights – we can imagine a new possible.

Best,  
Jim Lynch  
Senior Vice President & General Manager,  
Autodesk Construction Solutions

# Executive Summary

Economic data shows that construction firms will continue to experience the long-term impacts of the COVID-19 pandemic over the next two to three years. However, bidding activity from Autodesk's Builders Network shows that we may be climbing out of the initial trough faster than expected, providing a much-needed jumpstart for the industry. As projects begin to come back online, our data has reaffirmed the importance of coordination and design reviews to reduce RFIs and change orders, helping firms meet increasingly tight deadlines. We believe that preconstruction planning – including tightening up bidding and subcontractor qualification processes – will be key for builders to successfully navigate the road to recovery.

We expect the bidding landscape in 2021 will be more competitive than in years past. Over the past twelve months:

- Compared to a three-month pre-pandemic average, total bidding activity was up 15 percent in November and 36 percent in January, with January volume representing an all-time high on the BuildingConnected platform.
- Comparing the volume of projects added to BuildingConnected and the volume of bid invitations, the surge in bidding activity may be due to restarts of delayed or rescheduled projects.

Construction starts dropped significantly in 2020, causing 2021 spending to decrease. 2021 should see construction starts beginning to rebound:

- New starts in 2021 are forecast to increase six percent, with a four percent increase in nonresidential projects and an 10 percent increase in non-building infrastructure projects.
- 2022 total starting backlog is projected to decrease five percent, while growth is expected in commercial, healthcare, and transportation sector starting backlogs.
- By October 2021, nonresidential buildings spending is projected to decrease 15 percent from February 2020, with projected drops of two to three percent each quarter. In total, nonresidential spend is forecast to hit \$410 billion in 2021.

With bidding productivity unaffected by the 40% increase in bidding activity and the possibility to reduce 70% percent of RFIs through design reviews, preconstruction teams will shoulder the burden of protecting profitability in 2021.



# About the Report

The **2021 Autodesk Construction Outlook** was created from our own internal, aggregated, anonymized, BuildingConnected product data as well as data pulled from external sources such as [Dodge Data & Analytics](#). The analysis was conducted by construction economist Ed Zarenski.

Ed Zarenski retired in 2014 from a 42-year career in construction, during which he spent 30 years as a building project cost estimator and construction economics analyst. He now spends his time as a construction economics analyst, author, educator, and presenter. Upon retirement, he focused on two goals: teaching – which he was fortunate to do at Worcester Polytechnic Institute – and supplying unique construction economics reporting. He created the blog [Construction Analytics](#) as a place where his readers can find in-depth, behind-the-headlines commentary related to the economics of building construction.

## **Data Analyzed**

- Forecast includes U.S. Census December 2020 year-to-date spending as of February 1, 2021
- Forecast includes Dodge Outlook 2021 and December construction starts as of January 19, 2021

## *Purpose and Method of Analysis*

This report presents the results of analysis using currently available actual and predicted national construction data to determine the impact of recent construction market activity and cost inflation and to forecast future construction activity, jobs, and inflation. The analysis uses a unique model to factor construction starts and cash flow data to predict construction market activity. Forecast market activity is viewed in relation to job growth and availability to predict market inflationary response.

[Learn more here.](#)

This analysis uses [Dodge Data & Analytics](#) construction starts data to generate spending cash flows to then determine how spending may affect future construction activity. This analysis is based upon U.S. national-level data.

All adjusted starts, backlog, cash flow and spending reported in the tables in this report are directly forecast from the construction starts data provided by Dodge Data & Analytics. The input data is new and forecast construction starts.

Survey market share factors and cash flow curves applied are developed by Construction Analytics from historical actual data. Actual spending data is reported by the U.S. Census. Inflation indices are developed by Construction Analytics and inputs are from various named sources.

Residential inflation indices are primarily single-family homes but would also be relevant for low-rise two to three story building types. High-rise residential work is more closely related to nonresidential building cost indices.

A nonresidential buildings index would be representative of commercial construction or high-rise residential construction, since high-rise residential is quite similar to commercial construction, and in fact substantial portions of the building are constructed by firms classified as commercial contractors.

# Part 1: Growth

## Winning Business in 2021



### The Big Picture

Perhaps the best word to summarize 2020 – and the forecast for 2021 – is idiosyncratic. The economic conditions seen today disrupt all the models traditionally used to predict the future of the construction industry. New project starts on record were displaced as thousands of projects were delayed and rescheduled. However, looking at economic data alongside anonymized, aggregated data from BuildingConnected tells us there is still plenty of work to be won.

In 2020, nonresidential buildings starts fell 24%, but during the six months from April – September specifically, starts fell 33%. Nonresidential buildings spending began to decline in August, is now down 10% from February high, and is forecast to drop steadily over the next 20 months. New starts are forecast to grow from 2020, with healthcare, commercial and office leading the way.



Over the final 5 months of 2020, new residential construction starts posted 4 of the 5 highest monthly totals since 2004-2006. Residential new starts finished 2020 at a 15-year high, with almost 50% of new activity for the year posting in the final 5 months, which will put a lot of that spending into 2021.

The industry seems to be seeing early signs of recovery as the pandemic officially reaches the one year mark.

### New Starts

By far the greatest impact of the pandemic on construction was the decrease in new nonresidential construction starts in 2020, reducing construction spending for at least the next two years. Total construction starts for 2020 ended down -8%, but nonresidential buildings starts finished down -24% and non-building infrastructure starts were down -14%.

The current 2021 forecast shows residential starts up 4.9% from 2020, nonresidential building starts up 3.6%, and non-building infrastructure starts up 10.1%. Most nonresidential buildings markets and residential new starts are forecast to increase 5% in 2021.

**Firms able to pivot with the market should focus their bidding efforts on sectors of growth to secure future revenue. Firms unable to diversify must find new ways to appeal to potential clients, like displaying their ability to outperform the competition through technology.**

**Healthcare (9.6%), office buildings (7.4%), and commercial construction (6.6%) are the nonresidential sectors that are projected to see the largest growth in new starts during 2021. Transportation (37%) and power infrastructure (13.7%) pull total nonbuilding infrastructure starts up with all other categories, projecting one to three percent growth.**

Starts lead to spending, but that spending is spread out over time. The average spending curve for nonresidential buildings is 20:50:30 over three years. Only about 20% of new starts get spent in the year they started. 50% gets spent in the next year and 30% in the third year. The effect of new starts does not show up all at once.

Many nonresidential buildings have project durations that last 24 to 36 months, with peak spending occurring 12 to 18 months from now. With the 24% drop in new starts

in 2020, that peak spending 12 to 18 months from now will be affected. Some non-building markets have project durations that go out 5 or 6 years, so the impact of a decline in 2020 starts may be felt at least until 2025.

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Over the final 5 months of 2020, new residential construction starts posted 4 of the 5 highest monthly totals since 2004-2006.

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## Forecast Starting Adjusted

Delays, Cancels, Starts | Adjusted for SHARE | \$ in millions 000,000s

	2018	CHANGE	2019	CHANGE	2020	CHANGE	2021	CHANGE	2022	CHANGE
<b>Total all markets</b>	<b>1,357,444</b>	<b>1.7%</b>	<b>1,338,966</b>	<b>-1.4%</b>	<b>1,228,260</b>	<b>-8.3%</b>	<b>1,299,905</b>	<b>5.8%</b>	<b>1,351,056</b>	<b>3.9%</b>
<b>Residential bldgs</b>	<b>560,282</b>	<b>1.6%</b>	<b>570,694</b>	<b>1.9%</b>	<b>608,779</b>	<b>6.7%</b>	<b>638,765</b>	<b>4.9%</b>	<b>664,572</b>	<b>4.0%</b>
Manufacturing bldgs	72,775	-1.4%	65,806	-9.6%	28,376	-56.9%	28,989	2.2%	30,456	5.1%
Office bldgs	81,610	5.1%	79,586	-2.5%	63,140	-20.7%	67,818	7.4%	69,866	3.0%
Commercial bldgs	82,452	-3.7%	69,005	-16.3%	58,039	-15.9%	61,848	6.6%	63,715	3.0%
Educational bldgs	104,364	2.6%	103,527	-0.8%	92,344	-10.8%	91,323	-1.1%	95,012	4.0%
Lodging bldgs	31,790	2.9%	27,537	-13.4%	15,204	-44.8%	14,508	-4.6%	15,094	4.0%
Healthcare bldgs	45,671	3.7%	46,562	2.0%	43,248	-7.1%	47,406	9.6%	49,805	5.1%
Amusement/Recreation bldgs	27,769	1.2%	24,833	-10.6%	13,728	-44.7%	12,792	-6.8%	12,984	1.5%
<b>Total nonres bldgs</b>	<b>458,368</b>	<b>1.0%</b>	<b>426,780</b>	<b>-6.9%</b>	<b>324,268</b>	<b>-24.0%</b>	<b>336,081</b>	<b>3.6%</b>	<b>348,615</b>	<b>3.7%</b>
Power infra	109,477	1.4%	104,173	-4.8%	65,656	-37.0%	74,653	13.7%	76,907	3.0%
Highway/street/bridge infra	98,127	2.9%	100,838	2.8%	109,774	8.9%	112,163	2.2%	116,683	4.0%
Transportation infra	57,229	6.3%	60,326	5.4%	46,962	-22.2%	64,428	37.2%	67,031	4.0%
Environmental public works infra	51,029	5.7%	53,712	5.3%	52,201	-2.8%	52,948	1.4%	56,173	6.1%
Communication infra	22,931	-3.5%	22,442	-2.1%	20,621	-8.1%	20,868	1.2%	21,076	1.0%
<b>Total nonbldg infra</b>	<b>338,794</b>	<b>2.9%</b>	<b>341,491</b>	<b>0.8%</b>	<b>295,213</b>	<b>-13.6%</b>	<b>325,059</b>	<b>10.1%</b>	<b>337,870</b>	<b>3.9%</b>

Source: [2021 Construction Economic Forecast](#), [Construction Analytics](#)



## Backlog

Starting backlog is the estimate to complete (in this analysis taken on January 1, 2021) for all projects currently under contract. Backlog leading into 2020 was at all-time high, up 30% in the last 4 years. Backlog leading into 2020 was at all-time high, up 30% in the last 4 years. Prior to the pandemic, 2020 starting backlog was forecast up +5.5%. Due to delays and cancellations, that has been reduced to +1.8%, still an all-time high. Starting backlog, from 2011-2019, increased at an average rate of 7% per year.

### Impact of the Pandemic on Backlog

Some of the projects that were delayed or canceled due to the impact of COVID-19 started before January 2020. When one of these projects was delayed, the part of the project that was delayed shifted to future backlog. When one of those projects was canceled, the part of the project not yet put-in-place was removed from 2020 and future backlog. Not only does that reduce future backlog, but it also retroactively reduces the backlog that was on record at the start of 2020.

Therefore, 2020 backlog is reduced by cancellations while future backlog is increased by delays, but also reduced by cancellations and a loss of new construction starts.

### Backlog Forecast

If new construction starts are greater than construction spending in the year, then starting backlog increases for the following year. It's when new starts don't replenish the amount of spending in the year that backlog declines. That is the case this year.

Total starting backlog is down -10% for 2021 and -5% for 2022. 2021 starting backlog is back to the level it was in 2018.

We expect total starting backlog to show signs of recovery by the start of 2022, down only five percent, compared to the -10% decline in 2021. Due to new starts declining by -24% in 2020, nonresidential buildings backlog dropped -19% for 2021 and is projected to slow to -8.7% for 2022.

For non-building infrastructure, a drop of -13% in 2020 starts resulted in a drop of -8.5% in 2021 starting backlog, also slowing to -4.6% by 2022. The biggest changes to 2021 starting backlog were lodging (-42%), amusement/recreation (-40%), manufacturing (-26%), and power (-20%).

**Based on the projected growth in new starts for 2021, starting backlog for 2022 should improve marginally. Office buildings, lodging, and amusement/recreation – some of the hardest hit areas – still see declines in backlog in 2022 but on a smaller scale. Commercial, healthcare, and transportation are expected to see growth in starting backlog by 2022.**

80% of all nonresidential buildings spending in any given year comes from backlog and could be supported by projects that started last year or even 3 to 4 years ago. Residential spending is far more dependent on new starts than backlog. About 30% of residential spending comes from backlog and 70% from new starts.

## Forecast Starting Backlog

Delays, Cancels, Starts | Adjusted for SHARE | \$ in millions 000,000s

	2018	CHANGE	2019	CHANGE	2020	CHANGE	2021	CHANGE	2022	CHANGE
<b>Total all markets</b>	<b>1,187,026</b>	<b>8.2%</b>	<b>1,247,607</b>	<b>5.1%</b>	<b>1,270,527</b>	<b>1.8%</b>	<b>1,148,333</b>	<b>-9.6%</b>	<b>1,086,151</b>	<b>-5.4%</b>
<b>Residential bldgs</b>	<b>180,346</b>	<b>4.6%</b>	<b>180,801</b>	<b>0.3%</b>	<b>194,878</b>	<b>7.8%</b>	<b>218,605</b>	<b>12.2%</b>	<b>217,174</b>	<b>-0.7%</b>
Manufacturing bldgs	113,710	4.3%	114,803	1.0%	110,717	-3.6%	74,499	-32.7%	49,616	-33.4%
Office bldgs	96,181	21.4%	112,995	17.5%	119,187	5.5%	98,864	-17.1%	88,687	-10.3%
Commercial bldgs	83,141	-2.0%	77,127	-7.2%	64,859	-15.9%	54,989	-15.2%	59,622	8.4%
Educational bldgs	110,881	6.9%	114,278	3.1%	117,642	2.9%	108,332	-7.9%	104,151	-3.9%
Lodging bldgs	26,495	20.5%	26,803	1.2%	24,485	-8.6%	13,930	-43.1%	11,771	-15.5%
Healthcare bldgs	45,592	5.7%	49,422	8.4%	54,064	9.4%	50,839	-6.0%	53,475	5.2%
Amusement/Recreation bldgs	31,774	16.2%	34,810	9.6%	30,978	-11.0%	17,743	-42.7%	13,306	-25.0%
<b>Total nonres bldgs</b>	<b>519,777</b>	<b>8.1%</b>	<b>541,443</b>	<b>4.2%</b>	<b>528,671</b>	<b>-2.4%</b>	<b>429,205</b>	<b>-18.8%</b>	<b>391,723</b>	<b>-8.7%</b>
Power infra	206,205	9.6%	213,781	3.7%	206,831	-3.3%	162,154	-21.6%	141,255	-12.9%
Highway/street/bridge infra	141,736	4.0%	150,100	5.9%	159,159	6.0%	167,520	5.3%	167,078	-0.3%
Transportation infra	65,120	24.8%	81,586	25.3%	97,373	19.4%	91,450	-6.1%	92,672	1.3%
Environmental public works infra	51,321	11.8%	57,789	12.6%	61,969	7.2%	58,908	-4.9%	56,148	-4.7%
Communication infra	22,521	4.6%	22,106	-1.8%	21,647	-2.1%	20,492	-5.3%	20,102	-1.9%
<b>Total nonbldg infra</b>	<b>486,903</b>	<b>9.6%</b>	<b>525,362</b>	<b>7.9%</b>	<b>546,979</b>	<b>4.1%</b>	<b>500,524</b>	<b>-8.5%</b>	<b>477,254</b>	<b>-4.6%</b>

Source: [2021 Construction Economic Forecast](#), [Construction Analytics](#)



## Spending

For 2020, the biggest declines were lodging (-14%), manufacturing (-10%), and amusement/recreation (-7%). Commercial/retail finished up 4.2%, but this is entirely due to warehouse – 60% of the total commercial/retail market. Office and educational finished down -4% and -1%. Nonresidential buildings will take the brunt of declines in both 2020 and 2021.

In 2021, every nonresidential building market forecast is down from 2020, with some markets down as much as -20%. Educational, healthcare, and office are all down -3% to -6%. Non-building infrastructure power market is down -15%, but transportation spending is up 10% due to strength in backlog from several multi-billion dollar starts over the past few years.

The table to the right shows actual spending for 2020 and the spending forecast for this year and next.

## U.S. Total Construction Spending

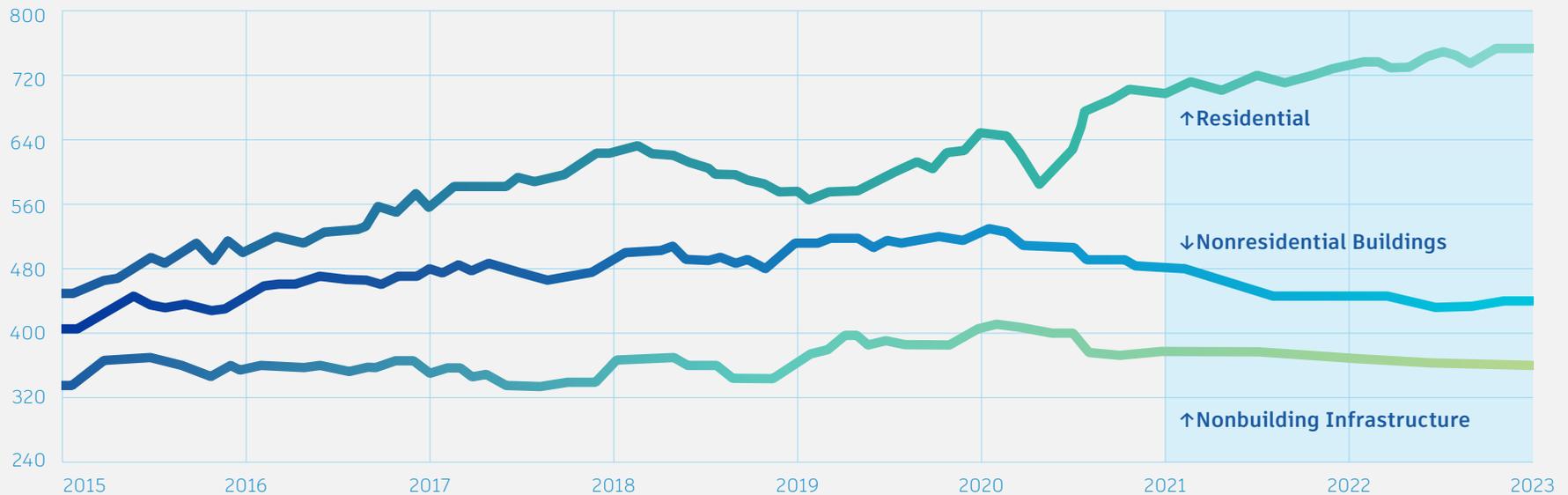
\$ in billions; % growth vs prior yr

	2021	CHANGE	2022	CHANGE
<b>Total Construction</b>	<b>1449</b>	<b>1.4%</b>	<b>1423</b>	<b>-1.8%</b>
<b>Residential</b>	<b>696</b>	<b>12.9%</b>	<b>710</b>	<b>2.0%</b>
<b>Nonresidential Buildings</b>	<b>411</b>	<b>-11.2%</b>	<b>384</b>	<b>-6.4%</b>
<b>Nonbuilding Infrastructure</b>	<b>343</b>	<b>-2.4%</b>	<b>329</b>	<b>-3.9%</b>
Educational	100.5	-4.0%	97.1	-3%
Healthcare	45.3	-5.0%	46.7	3%
Amusement I Recreation	20.0	-26.0%	14.1	-29%
Commercial I Retail	75.4	-10.0%	80.1	6%
Lodging	17.8	-37.0%	15.4	-14%
Office	75.9	-7.0%	68.0	-10%
Manufacturing	57.9	-19.0%	45.7	-21%
Other Nonres Bldgs	17.8	-2.0%	17.2	-3%
Power	101.4	-15.0%	87.0	-14%
Highway I Bridge I Street	100.7	2.0%	100.5	0%
Transportation I Air I Rail	62.5	10.0%	64.0	2%
Sewer I Water I Conservation	55.7	4.0%	55.9	0%
Communication	22.3	-2.0%	21.7	-3%

Source: [2021 Construction Economic Forecast](#), [Construction Analytics](#)

## Construction Spending by Sector

Spending Annual Rate (\$bill)



Source: [2021 Construction Economic Forecast, Construction Analytics](#)

### Spending Forecast

Almost every market has a weaker spending outlook in 2021 than in 2020 because of the lower starts in 2020. Starts lead to spending, but on a curve, a good average for nonresidential buildings is 20:50:30 over three years. 20% of the total of all starts in 2020 gets spent in 2020 (YR 1), and that represents about 20% of all spending. 50% of the total value of 2020 starts gets spent in the following year. So, 50% of spending in 2021 is generated from 2020 starts.

If starts are down 20%, and 50% of spending comes from those starts, spending will be down 20% x 50% of the work.

While 2021 residential spending will climb about 13%, nonresidential building spending is forecast to drop -11% and non-building spending drops -2%. Looking at construction spending alone can be slightly misleading, as it does not factor inflation.

For the four years between 2012 and 2015, construction spending grew by 35% – but after inflation volume grew by only 21%. Inflation accounted for 14% of spending growth. With 3% to 4% inflation, after inflation residential volume is up only 9%, nonresidential building is down 14% and non-building is down 6%.



# How Helm Mechanical Appeals to Sophisticated Clients

Helm Mechanical is a specialty contractor that focuses on the pharmaceutical, automotive, and healthcare industries. As a turn-key contractor, the Helm team exceeds client expectations by bringing a value-based approach to project delivery.

Jeff Knoup, VP of Operations at Helm Mechanical, says their team likes to go after highly technical, industrial projects that many firms can't handle. The buyers at these companies are sophisticated, and they expect similar sophistication from their partners.

That's what led to their adoption of Autodesk Construction Cloud. Helm Mechanical uses Autodesk Construction Cloud as a common data environment to unify and simplify data across the project lifecycle and improve collaboration across teams.

**“Owners want full visibility into the project to see what’s getting done in a given day: how many linear feet of pipe were put up, how many pounds of ductwork, etc. Unless you have a technology solution to help you track and produce that information, the owners will pass you by,” says Knoup.**

**“We get into some of these bid meetings, and we show off,” he says. “We not only traditionally showcase our work, but we share our designs via Augmented Reality/Virtual Reality (AR/VR) headsets while we’re talking about data sharing. It appeals to those sophisticated owners.”**

By developing their technology stack to specialize in these large-scale industrial projects, Helm Mechanical has been able to win more work. Furthermore, they're able to prove the value their team brings to the table, leading to more repeat business in key verticals. [Read their full story.](#)

# Part 2: Health & Safety

## Building in a Pandemic



AQI 200



### The Big Picture

We would be remiss to not mention the COVID-19 pandemic when discussing the current state of health and safety in construction. The pandemic has not only changed forecasts for the construction industry, but it's also brought health and safety into the spotlight on construction sites. Not only have state and local governments implemented new requirements for job site safety, but firms often take extra steps to ensure team safety and avoid outbreaks that would require construction to shut down.

Project delays and shutdowns were unavoidable at the beginning of the pandemic. Initial stay-at-home orders brought projects to a halt before essential business exceptions were rolled out and guidelines were published. In an Autodesk survey to over 1000 preconstruction professionals in June 2020, 58% of respondents said at least 10% of their projects were stopped. 23.7% said over 50% of projects were halted.



With 2020 barely in the rearview, research is still in its infancy to quantify the impact of the pandemic on the construction industry. In this section, we'll look at initial findings of the economic impact of the pandemic, BuildingConnected aggregated, anonymized product usage to understand productivity impacts, and outside research to quantify the risk to construction laborers in the year ahead.

### Measuring COVID-19 Risk

As discussed in this section and throughout this report, the pandemic has affected many aspects of construction, changing the way builders look at risk. But what is the potential risk to construction laborers? How does it differ from the labor force in other professions?

A recent [data bulletin from the CPWR](#) (The Center for Construction Research and Training) supplies some valuable answers.

**The bulletin concluded that nearly 60 percent of construction workers are at higher risk of severe illness from COVID-19 due to age, medical conditions, and other risk factors. Construction workers fared slightly better when compared to the 62 percent of workers across all industries that fell into the same category.**

The research centered around the understanding that COVID-19 disproportionately affects certain groups. "Currently available information and clinical expertise indicate that older workers and workers of any age who have certain underlying medical conditions (e.g., heart or lung disease, diabetes) and other factors (e.g., smoking, obesity) might be at higher risk for severe illness from COVID-19," it says. The CPWR then looked at national studies to understand what percent of construction workers fall into these high-risk categories.

The research reaffirms what we've known for many months now: proper personal protective equipment (PPE), training, and education can protect those groups disproportionately affected by the pandemic. The organization recommended, "construction employers should be aware of the unique needs of potentially vulnerable groups of workers in the industry."

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...nearly 60 percent of construction workers are at higher risk of severe illness from COVID-19 due to age, medical conditions, and other risk factors.

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## Measuring Compliance

According to [Smartvid.io](https://www.smartvid.io), an enterprise-class SaaS platform for managing, collaborating, and analyzing industrial videos and photos, it took several months for the construction industry to adapt to new PPE requirements.

Midway through 2020, Smartvid.io released new COVID-19 safety capabilities that enable their AI (nicknamed “Vinnie”) to detect whether workers on a jobsite are social distancing, wearing masks, and other important health and safety KPIs.

Their technology can identify whether workers are standing at least six feet apart and if they’re working in groups of 10 or more. Smartvid.io compiled anonymized data from users, then broke it out regionally to show how well construction workers in various parts of the country are following health and safety regulations.

At the time this report was compiled, the company had five months of benchmarking data. Back in June 2020, when the project started, all four regions had about two-thirds of workers following social distancing rules, with the South trailing the pack at 57%. Mask compliance was better, with most regions posting numbers in the 80th percentile, but, again, the South was an outlier at 72%.

Over the summer, however, all regions made gains, and those gains have remained stable. The South has shown the greatest improvement, increasing social distancing by 43% since June to 83% compliance in October 2020. The South also increased the rate of mask wearing by 22% to 88% compliance over the same period. Results are drawn from a sample of over 40,000 workers.

## Industry Resources

There are a variety of resources available to help firms keep workers safe by taking necessary precautions on the jobsite. We recommend the following:

[CPWR COVID-19 Resources](#)

[OSHA COVID-19 Control and Prevention](#)

[AGC Coronavirus Resources](#)

[CDC COVID-19 Construction Recommendations](#)



# How Chandos Construction Harnesses Data for Increased Safety

Specializing in complex projects from nuclear research facilities to geothermal energy systems, Chandos delivers value to its clients through collaborative project delivery models, Lean methodologies, and BIM (building information modeling). The 100% employee-owned firm continuously innovates by implementing technology to promote better project outcomes - often with an eye toward improving safety and quality on site.

To do this, Chandos took an integrated approach to managing, tracking, and analyzing project data. In their old workflow, the team relied on paper-based reporting, which led to data loss and inefficiencies. With the lack of a centralized platform, it was challenging to maintain detailed issue tracking.

**Using a common data environment for reporting safety incidents, site issues, and non-conformance reports, project stakeholders now have visibility into project status as data is tracked in real-time. Teams can use their smartphone or tablet to take pictures, tag, report, and publish an issue. With an easier way to track and input issues, nothing gets overlooked, and teams are reporting more issues seen onsite. The new way of working has also reduced reporting time by 30%.**

“We worked closely with our superintendent and safety team to generate checklists and track site and safety issues on a standardized template,” says Alex Bahan, Senior VDC Specialist / Manager at Chandos Construction.

Now that they have a standardized checklist in place, Chandos can understand the root cause of an issue with greater certainty. They can more easily see what the most repetitive root causes are and create a plan to change behavior – increasing profitability and reducing risk in the process. With the artificial intelligence and machine learning algorithm within their project management solution, Chandos can start a risk analysis of projects through data and apply learnings and findings to future projects, keeping their sites safer for everyone.

[Read their full story.](#)

# Part 3: Labor

## Measuring Subcontractor Risk



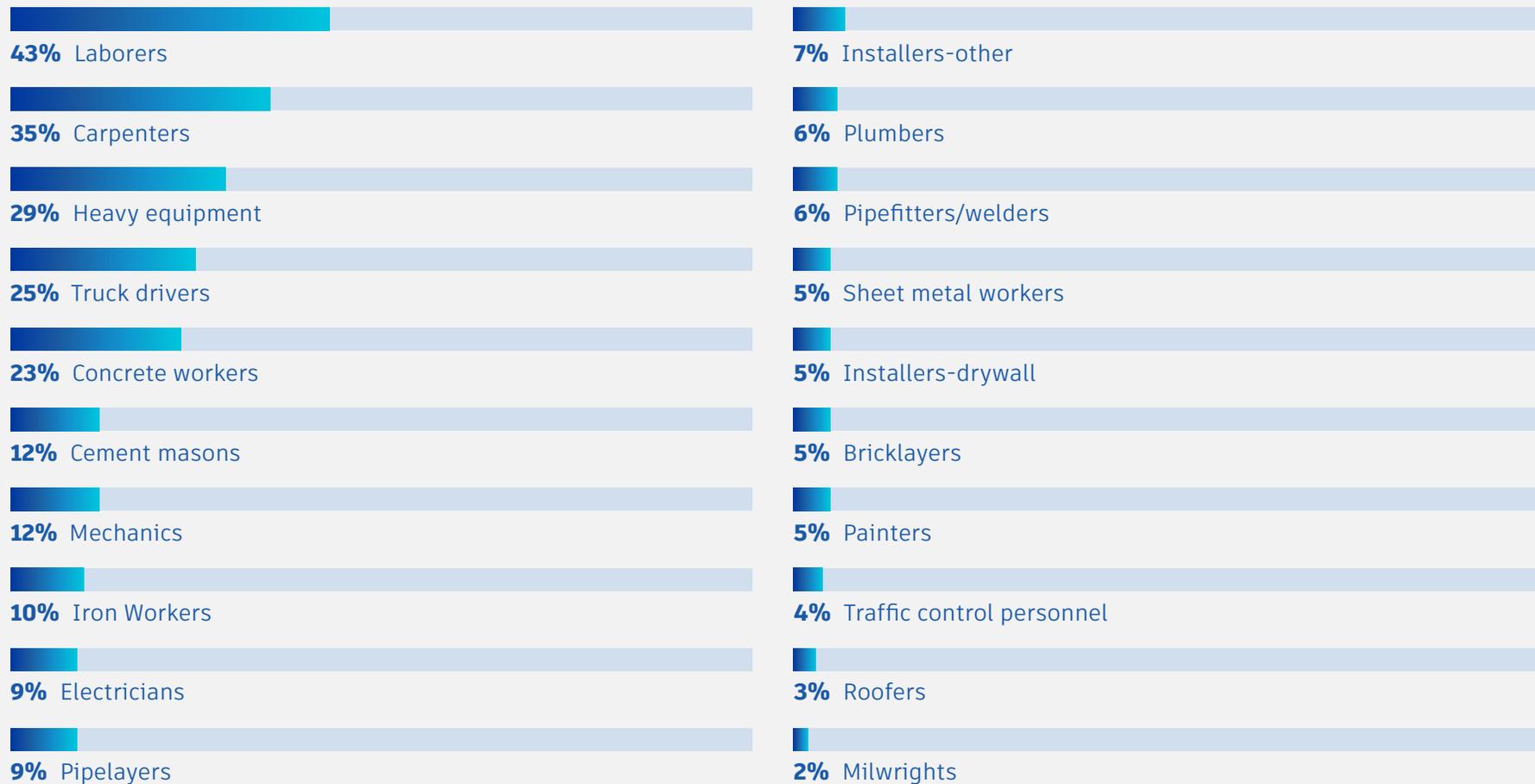
### The Big Picture

In 2021, we expect to see builders navigate an increasingly difficult labor situation. According to the results of a workforce survey conducted by the Associated General Contractors of America and Autodesk, the pandemic has had little impact on labor demand in recent months. Despite obvious interruptions caused by the pandemic, firms still have a tough time filling craft and salaried positions.



## What hourly craft positions are you having trouble filling?

From the Associated General Contractors & Autodesk [workforce survey](#)

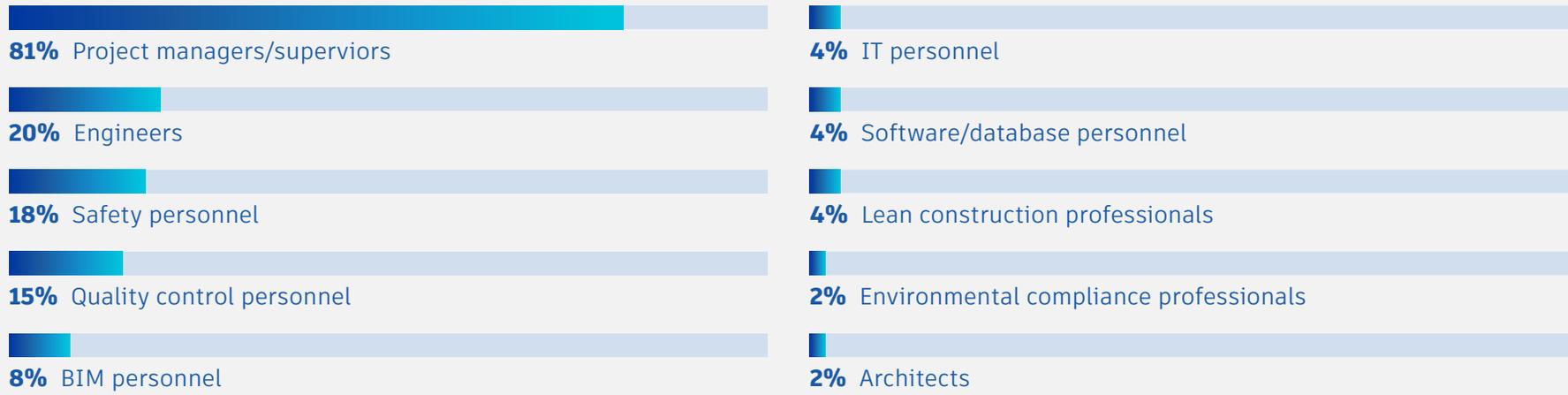


When looking at subcontractor relationships, we expect the risk of subcontractor default to rise in 2021. Bidding activity as evidenced by the Autodesk Builders Network is on the rise. Compared to a pre-pandemic average, bidding activity in January of 2021 is up 36%. The uptick in bidding activity signals delayed or rescheduled projects may be coming back online in bulk.

Project restarts will help spending and will deliver much-needed cash to trade partners. This bidding activity also means increased competition – good news for general contractors and construction managers. But as we say in construction, “subcontractors do not die of starvation, but rather overeating.” Monitoring subcontractor health in 2021 will be vital to protect profitability.

## What roles are you having trouble filling?

From the Associated General Contractors & Autodesk [workforce survey](#)



### Labor Demand

One half of all firms surveyed in the workforce survey reported no change in headcount because of the COVID-19 crisis, and in fact, nearly a quarter (23%) of firms have added employees during the pandemic.

What's more, 32% of firms reported no change in headcount year over year, and 27% said that headcount had increased in the same period. Still, 41% of firms reported a decrease in headcount since 2019.

Other survey findings show that demand for labor in the industry is still strong. When it comes to employee furloughs, two-thirds (68%) of construction firms said they didn't have to take such measures, and 38% reported increasing base pay rates.

Regarding openings for salaried employees, 56% of firms said they have no openings for these roles, and 28% reported having difficulty filling these positions. Specifically, 81% of respondents said that they are having trouble hiring project managers and supervisors.

Most firms (52%) reported encountering difficulties in hiring hourly craft workers. However, similar to salaried positions, 28% of firms said they have no open positions for hourly craft positions, up nearly 300% from last year, when only 9% of firms reported having no openings for hourly craft positions. If we remove those that said they have no openings to fill, almost 70% say they are having difficulties hiring craft workers.

This year, firms reported the top positions they're having a tough time filling included laborers (43%), carpenters (35%), and crane/heavy equipment operators (29%). Despite these difficulties, 38% of firms expect to add new employees in the next 12 months, a strong sign that labor demand will increase, and a recovery is in sight for the construction industry. Results seemed uniform across the United States, with a few exceptions.



## Bidding Activity

Reviewing aggregated, anonymized real-time bidding activity presents a unique opportunity when looking to understand the construction industry's outlook. It allows us to identify potential future swings in new starts data, competition levels, and in a pandemic, it may allow us to infer when projects will return.

Over one million construction professionals use BuildingConnected, Autodesk's bid management solution, to receive bid invitations or award work. Owners, general contractors, construction managers, and subcontractors alike can use the platform to answer or request bids. **Over five million bid invites are sent out every month.**

In early 2020, bidding activity was on the rise. With plenty of work up for grabs, the volume of bid invitations continued to grow. Immediately after the nation's first stay-at-home order was enacted (March 19<sup>th</sup> – California), we saw a drop in bidding activity. While preconstruction teams remained active in the network, **bid invitations stalled, dropping 34% over the next 60 days.** Autodesk's workforce survey, conducted during the same period, saw projects shutting down at a similar rate. 30% of participants in June said at least one of their projects had been canceled.

Bidding activity remained below the pre-pandemic average between March and October, but in increasingly smaller amounts. By November, bidding activity climbed 15% above the pre-pandemic average, and **by January, that number was up to 36%.**

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Over five million bid invites are sent out every month

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## Bidding Productivity

Bid invitation due dates

Bids Due	Within 7 days	8-14 days	15 days or more
2020	71%	23%	6%
2021	79%	19%	2%

### Projects vs. Bid Invitations

To understand whether the increase in bidding activity will lead to new starts growth, Autodesk compared growth in bid invitations to growth in new projects. Project levels within BuildingConnected are returning to, but not exceeding, pre-pandemic levels. We believe the increased bidding activity may be a re-bidding effort on existing projects. These are likely projects that were delayed or rescheduled in 2020 and are now coming back online.

### Bidding Due Dates

The spike in bidding activity and increased competition will put pressure on preconstruction teams, but technology may help alleviate the added pressure. We can see teams are handling bids almost exactly as they did before the pandemic, despite the 40% spike in activity. We would expect to see much larger dips in the number of bids due over a week out if teams were overwhelmed and unable to handle the volume of work.

### Competition

The final measurement analyzed was competition. Based on the number of individuals joining Autodesk's Builders Network and the number of bidders per project, we forecast that 2021 will see increased competition, leading to more competitive prices.



# How John Moriarty & Associates' Focus on Managing Subcontractor Risk Leads to 85% Repeat Business

JMAV is a construction management firm with work stretching along the Eastern seaboard. JMAV's projects run the gamut from high-rise office construction in urban settings to complicated laboratories and healthcare facilities to residential projects.

JMAV turned to BuildingConnected and TradeTapp within Autodesk Construction Cloud to manage and mitigate risk throughout the project lifecycle. Using these two solutions, JMAV effortlessly integrates risk management with the bidding process.

Their risk team works based on a ranking system they've developed internally. First, they review and rank each project according to a category of no risk, moderate risk, or elevated risk. Because this information is integrated into BuildingConnected from TradeTapp, JMAV's project managers can then review qualified subcontractors without added, time-consuming communication with the risk team.

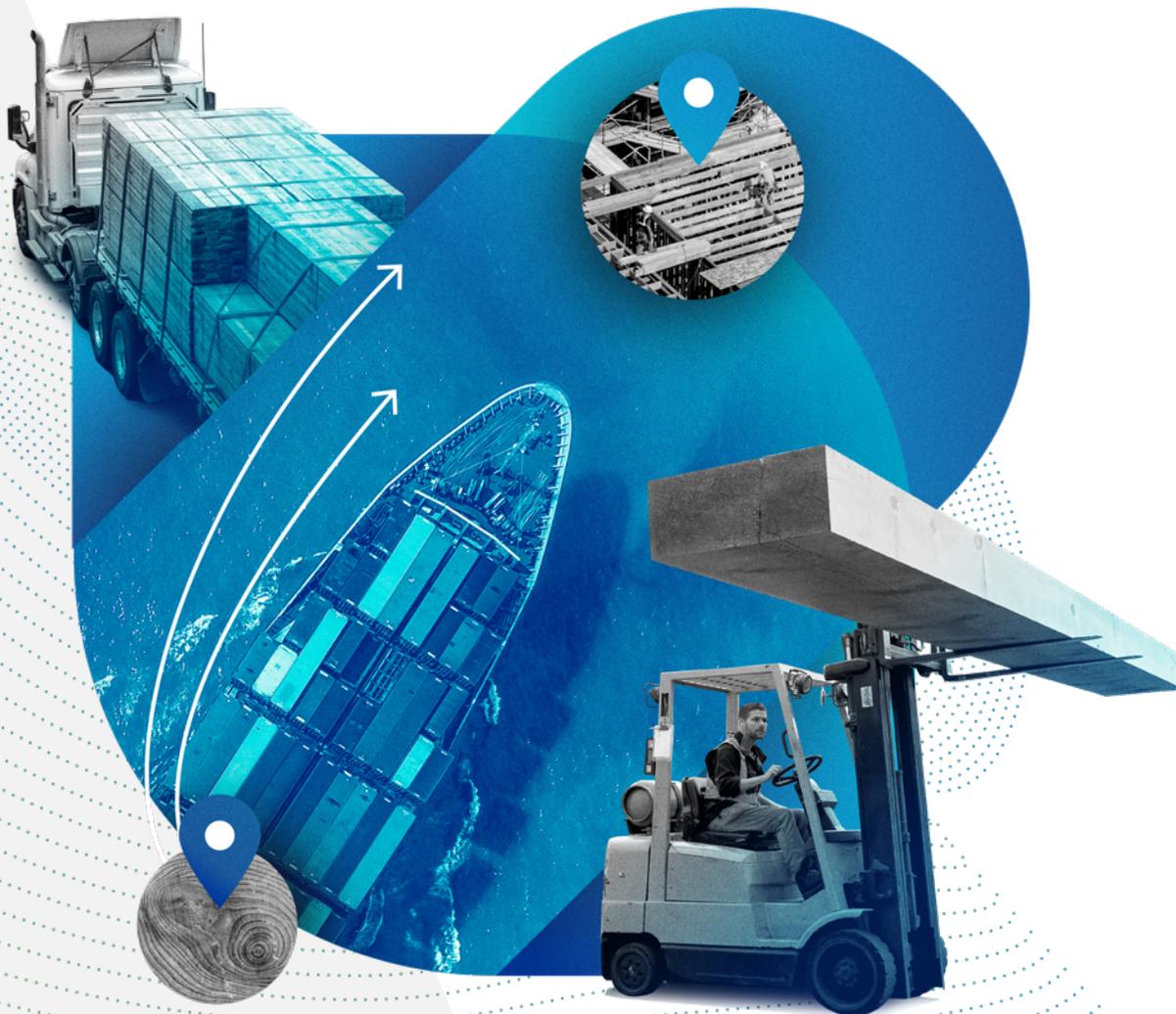
"You need to make sure that the subcontractor has the experience and means to perform that particular job, as well as the finances – from liquidity and debt ratios to turnover," said Kyle Nicholson, JMAV's Director of Preconstruction. "If the company is not doing well, efficiency and adequate staffing will be concerns."

Using BuildingConnected and TradeTapp enables JMAV to analyze financials and backlogs when evaluating a subcontractor prior to awarding a contract, so that they can identify potential problems.

"If a subcontractor is stretched too thin, this negatively impacts their work," says Sanchez de Esposito. "These insights enable us to know if a subcontractor is positioned to meet the demands of what they've committed to over a period of time. This also affects their working capital and cash flow for materials and other upfront costs."

Withinsight into a subcontractor's financial health, JMAV can flag risk earlier in the bid management process and ensure they choose the right trade partners for every job. This has helped the team work more efficiently and develop better long-term relationships with quality subcontractors. [Read their full story.](#)

# Part 4: Supply Chain Navigating Supplier Disruptions



## The Big Picture

The effects of COVID-19 have been both a wakeup call and a reminder of just how interconnected the world of materials really is. As efficient and positive as this connectedness is, it also comes with built-in vulnerabilities. Because the entire world is dealing with the impacts of COVID-19, there is virtually no supply stream that has remained unaltered.



TradeTapp insurance partner AXA XL has seen – and continues to see – widespread supply chain impacts due to COVID-19. AXA XL wanted to get a handle on the concerns that keep their insureds up at night, so they conducted a COVID-19 impact survey that included questions related to supply chain impacts. According to that research, **over 75% of their insureds are more concerned or much more concerned about supply chain and material delivery impacts** and their effects on their subcontractors’ ability to perform on their projects. The survey also revealed a similar spike in concern about enterprise approaches to supply chain risk overall.

Data from other sources supports this growing concern among builders. In [AGC’s October Survey](#), which covered more than 1,000 contractors that perform all types of nonresidential and multifamily construction, 75% of respondents reported that a scheduled project had been postponed or canceled and 42% of firms are experiencing disruptions due to a shortage of construction materials, equipment, or parts.

The [Institute for Supply Management \(ISM\)](#) conducted a survey looking into supply chain disruptions, as well. 95% of respondents reported disruptions to supply chains, but most expected impacts to dissipate by Q4 2020. Firms “are experiencing global disruptions to supply availability, manufacturing capacity, lead times, and transport of goods.” ISM expects impacts to last 18 months to two years. ISM conducted two follow-up surveys throughout 2020 and found the percent of organizations who said they will be or have already been affected by coronavirus supply chain disruptions increased to 97%.

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Over 75% of their insureds are more concerned or much more concerned about supply chain and material delivery impacts

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## Construction Costs

Typically, when work volume decreases, the bidding environment gets more competitive, and prices go down. However, if materials shortages develop, that may cause prices to increase. There are reports that many imported products are not available or in short supply. The [American Iron and Steel Institute](#) (AISI) reports domestic U.S. steel mill shipments year-to-date through October are down 16.5% from 2019. Imports are down 22%. Firms that manufacture goods used in construction were closed temporarily, so their production was disrupted. Many projects have been halted, and many more have experienced disruption. Delays may add several weeks to perhaps a month or two to the overall schedule, causing management costs to go up. In this case, the materials availability issues and schedule delays could outweigh any decline in work available for bid.

Residential Building Material Inputs costs were up +8% YTD through October 2020. Increases for lumber and ready-mix concrete are noted. Over the last five months, the PPI (Producer Price Index) for softwood lumber is up +90%, adding more than \$17,000 to the price of an average new single-family home since mid-April.

Nonresidential buildings construction Inputs were up YTD +2.0% through October. PPI Index YTD for some materials:

- Ready mix concrete +3%
- Fabricated structural metal -0.9%
- Flat glass +1.2%
- Lumber and plywood +45%
- Concrete brick and block +3.1%

Expect nonresidential buildings inflation near 4% for 2020 and 2021, perhaps 5% to 6% for residential work.



## Construction Analytics Index

BASE YR SET TO 2019=100

	2015	2016	2017	2018	2019	2020	2021	2022	2023
<b>CA NONRESIDENTIAL BLDGS</b>	<b>83.6</b>	<b>87.0</b>	<b>90.6</b>	<b>95.4</b>	<b>100.0</b>	<b>102.5</b>	<b>106.4</b>	<b>110.4</b>	<b>114.5</b>
Turner Index actual cost	81.6	85.5	89.8	94.9	100.0	102.2	106.3	110.5	114.9
Rider Levett Bucknall Index Actual Cost	82.2	86.7	90.6	94.8	100.0	103.5	107.7	112.0	116.5
Morenson avg 6 cities nonres bldg	85.1	88.1	91.1	97.8	100.0	101.8	105.8	110.1	114.5
PPI Industrial Bldg actual cost	87.5	88.0	90.4	94.6	100.0	102.0	106.6	109.3	112.0
PPI Warehouse Bldg actual cost	88.0	89.4	92.0	95.2	100.0	99.9	102.9	105.5	108.1
PPI School Bldg actual cost	88.0	88.8	90.6	94.5	100.0	101.3	104.3	106.9	109.6
PPI Office Bldg actual cost	88.5	89.9	91.9	95.7	100.0	101.2	104.2	106.8	109.5
PPI Health Care Bldg actual cost	90.3	90.8	92.1	96.0	100.0	101.4	104.4	106.5	108.7
PPI Concrete Contractor actual cost	83.2	86.7	89.8	94.0	100.0	100.5	103.0	105.6	108.2
PPI Roofing Contractor actual cost	93.1	94.4	96.6	97.5	100.0	103.1	106.2	108.8	111.6
PPI Electrical Contractor actual cost	88.3	90.2	91.5	95.6	100.0	102.1	104.7	107.3	110.0
PPI Plumb/HVAC Contractor actual cost	90.7	89.6	91.3	95.2	100.0	100.0	102.0	104.0	106.1
RS Means Index Inputs	88.8	89.3	92.0	96.0	100.0	103.8	106.9	109.6	112.9
ENR BCI Index Inputs	89.9	92.0	95.0	98.1	100.0	102.5	105.1	107.7	110.4
PPI Inputs to NONRES BLDGS	87.9	86.4	89.8	96.0	100.0	103.7	107.3	111.1	115.0
<b>CA INFRASTRUCTURE</b>	<b>90.1</b>	<b>88.7</b>	<b>90.6</b>	<b>95.4</b>	<b>100.0</b>	<b>103.4</b>	<b>107.0</b>	<b>110.7</b>	<b>114.5</b>
FHWA Hiway Index NHCCI	87.7	85.7	86.5	92.6	100.0	103.5	107.1	110.9	114.8
H S UCCI Pipeline, LNG	98.8	89.3	91.4	96.2	100.0	104.0	108.2	112.5	117.0
1 H S DCCI Refine, Petrochemical	93.2	88.8	90.2	96.2	100.0	104.0	108.2	112.5	117.0
H S NAPCCI coal, gas, wind, xNuc	94.6	94.1	96.0	96.2	100.0	104.0	108.2	112.5	117.0
BurRec Dams & Pumping Plants	90.2	91.3	93.5	96.5	100.0	103.0	106.1	109.3	112.6
BurRec Distribution Pipelines	91.0	92.7	94.5	96.5	100.0	103.0	106.1	109.3	112.6
<b>CA RESIDENTIAL</b>	<b>83.2</b>	<b>87.5</b>	<b>92.6</b>	<b>96.5</b>	<b>100.0</b>	<b>105.1</b>	<b>109.0</b>	<b>113.1</b>	<b>117.3</b>
US Cen Bur NEW Homes Lasperyes	84.8	89.1	93.7	96.9	100.0	104.9	108.6	112.4	116.3
S&P/Case Shiller HomePrice NATIONAL	81.7	85.9	91.5	96.1	100.0	105.2	109.4	113.8	118.4
PPI Residential Inputs	88.7	87.6	90.6	97.7	100.0	106.2	109.4	112.7	116.0

### How to use an index:

Indexes are used to adjust costs over time for the affects of inflation. To move cost from some point in time to some other point in time, divide Index for year you want to move to by Index for year you want to move cost from. Example : What is cost in mid 2019 for a nonresidential building whose midpoint of construction was 2013? Divide Index for 2019 by index for 2013 =  $109.6/86.0 = 1.27$ . Cost of building in 2013 times 1.27 = cost of same building in 2019. Costs should be moved from/to midpoint of construction. Indices posted here are at middle of year and can be interpolated to get any other point in time.

All forward forecast values where-ever not available are estimated by Construction Analytics, generally 0.5% to 1.0% lower each for 2019 and 2020.

Source: [2021 Construction Economic Forecast, Construction Analytics](#)

## Managing supply chain in 2021

The construction industry has responded to the pandemic disruption by paying much closer attention to their supply base, with many Autodesk customers reporting that they've increased communication with existing suppliers while working to qualify alternate suppliers.

While there is not much builders can do to avoid disruptions, there are practical approaches they can take to mitigate the impacts.

### **Put someone in charge of the effort.**

This may be an individual or a committee. The supply chain is a complex subject, and someone needs to own it to achieve success. The primary function of the role should be to break down silos and talk about supply chain risk on an enterprise basis.

### **Create a clear and consistent way to communicate with your subcontractors about supply chain issues.**

Your subcontractors are closest to the risks and can give you the best possible intelligence; understanding their point of view is critical to getting your approach right. Autodesk worked with AXA XL and others to develop [a set of questions](#) you should be asking your trade partners.

### **Conduct a supply chain audit for all projects to develop your first focus.**

Dig in to understand which materials are truly single source or specialized and what alternates may exist, and which subcontractors or suppliers are particularly financially fragile or on your critical path.

### **Implement a material monitoring and management plan for all at-risk materials.**

Track these materials from their point of origin to your site with documentation along the way. Once on site, check them in against submittals to ensure you receive correct and sufficient materials.

**Document everything.** Baseline your project schedules and cost reports so that they accurately reflect the conditions on site at the time the impact arose. This documentation should be a clear snapshot in time of conditions before the impacts hit and will frame and form the basis of any request for time or cost. Be sure these are accurate and clear, and in agreement with other project documents. This will provide a measurement tool for the impacts you may experience. Incorporate material constraints/delays into your project schedule as they are known, so that it always accurately reflects the actual activities on site. Capture the cost impacts distinctly within your cost reports. Use separate cost codes so that the impacts are easy to pull out and identify clearly.

AXA XL shared these tips and more on the Autodesk blog – [dive into their full article here.](#)



# How EBC Reduces Project Risk with Streamlined Asset Tracking

Construction asset tracking is critical to reducing risk, minimizing loss, and managing timelines. Any disruption in asset shipments, failures of delivery, or theft can lead to significant delays and cost overruns. Traditionally, asset tracking has been handled in spreadsheets and based on trusting the goodwill of vendors and partners. This approach can create gaps between what's expected in the office and what happens in the field. Construction asset data is often lost, duplicated, or inaccurate, and disputes can arise when records don't match reality.

For the construction firm EBC, Inc., this scattershot approach is unacceptable. EBC is a Canadian-based general contractor that focuses on creating value on the building, mining, and infrastructure sectors. EBC uses Autodesk Construction Cloud™ for construction data management to create a collaborative virtual environment where every member of a project team can access the right information at the right time.

EBC has successfully deployed a centralized construction assets management process that reduces project risk and improves project outcomes by connecting asset tracking and management from end to end throughout the project lifecycle.

“Now, we can support the entire lifecycle,” says Philippe De Guise, Manager, BIM Corporate Services at EBC. “By continually tracking and managing assets and equipment in the platform, we can anticipate any issues that will arise during the project so we are successful in collaborating and supporting the information that will be transitioned or shared between the various stakeholders on a project.”

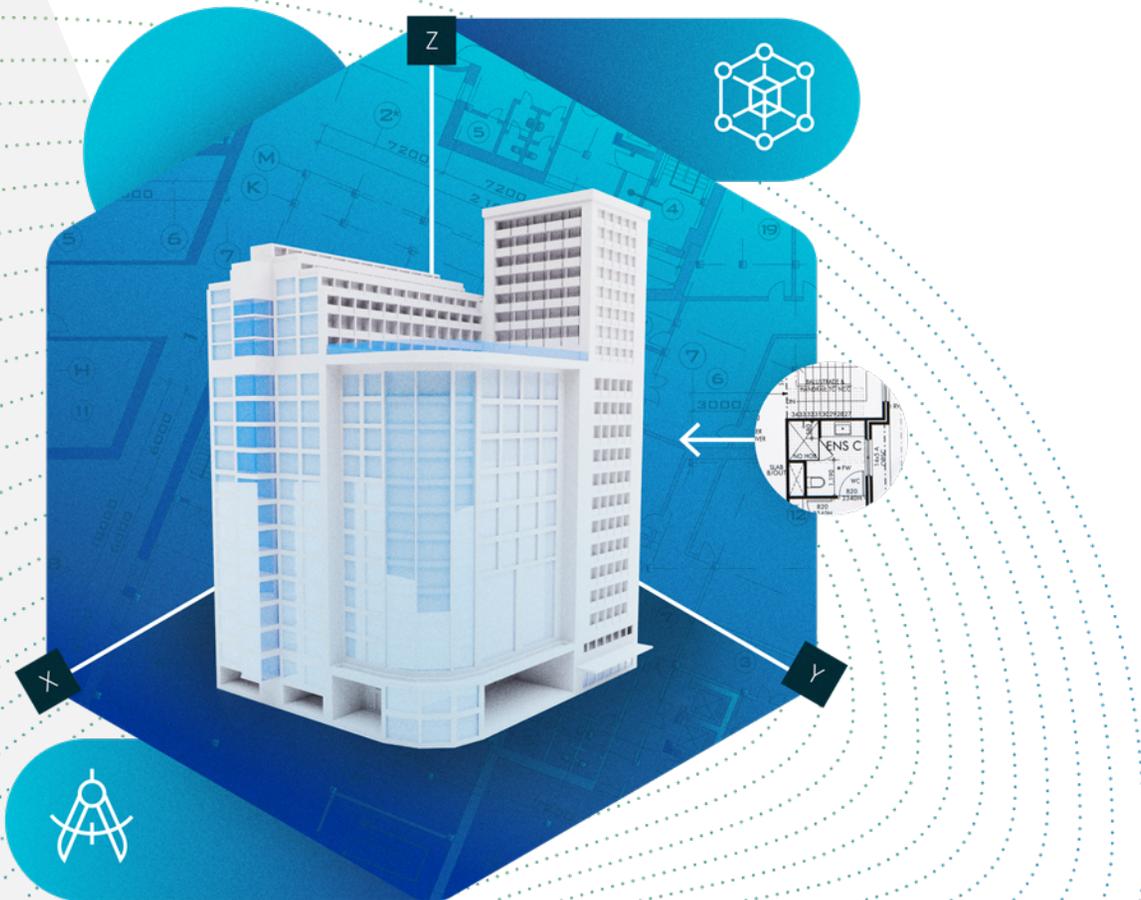
Disruption and delays are almost inevitable, especially on large, complex, and ambitious construction projects. BIM 360 Assets enables EBC to pivot quickly around delays caused by vendors, global disruptions, and partners.

The visibility and transparency provided by asset tracking means that all project stakeholders can be involved in real-time decision-making in response to delayed materials and shipments, leading to more trust, collaboration, and better outcomes.

[Read their full story here.](#)

# Part 5: Design

## Improving Profit Margins through Design



### The Big Picture

Our team of data scientists recently found that **projects with more than 6% of construction value in change orders showed margin erosion.** To be clear: change orders in construction are not necessarily a bad thing – they’re an expected part of a job. It’s when a project hits the tipping point of having *too much* of its construction value in change orders that this pattern of losses can emerge.

“I think the takeaway here is that you need to expect some change, but you also need to invest more time and resources into the earlier phases of project planning to keep that change in the right zone,” said Pat Keaney, Director of Product Management for Autodesk Construction Cloud Intelligence Products. “So, the next question we asked is: what led to those changes? We worked backwards to RFIs, which are sometimes early warnings of change.”



## RFI Prioritization Is Critical to Success

In analyzing the RFI behaviors of several teams across five different software systems, our data experts found that projects that prioritized closing more critical RFIs faster were more successful. The devil is in the details. The most successful teams were not closing out *all* RFIs faster, they were closing out *critical* RFIs faster.

“This made a lot of sense: the best managers intuitively know which RFIs are the most important, and they prioritized those,” Keaney said. “They knew which RFIs had dependencies or could cause schedule delays, and they got those resolved faster.”

The nuance this data reveals is that prioritization matters. Many firms collect data that can't necessarily predict project results. What's worse, measuring this data could drive the wrong behavior. But when it comes to prioritization, how do firms know which RFIs matter most? This brings us to the next insight our team revealed.

## Coordination Problems Are a Common Root Cause

When our data scientists examined the common root causes of a group of unsuccessful projects\*, we were not surprised to learn that these projects had **50% more RFIs with a root cause of coordination problems** than the successful projects studied.

“Autodesk has been providing leading coordination products for years, so we were not surprised to learn this,” Keaney commented. “But, like the industry, we didn't previously have this clear, data-driven insight to quantify the value and importance of coordination.”

Specifically, we now know poor coordination erodes project margins. If the industry can focus more on solutions to improve and standardize their coordination processes, it will lead to more project success in the future.

*\*In this case, unsuccessful projects are classified by profit margins.*

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Unsuccessful projects, have 50% more RFIs with a root cause of coordination problems than successful projects.

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## Design Review is Often the Answer

One of the most overwhelmingly strong insights our data scientists uncovered was that **more than 70% of RFIs could have been resolved in design review.**

“I’m sure both GCs and design professionals would agree with this,” said Manu Venugopal, who oversees Construction Data and Analytics for Autodesk Construction Cloud. “Our industry is on a mission to figure out how to minimize cost overruns. What we are realizing is that one way to head off unexpected changes is to have a robust design review process. Today, many GCs that I talk to have teams devoted to reviewing design documents and drawings and identifying potential problems and solutions in a more collaborative environment.”

To reach this insight, Venugopal’s team decided to measure the impact of the design review process with machine learning models that would automatically tag RFIs with root causes. The findings showed that roughly 70% of RFIs stem from design and documentation errors and omissions.

“A more robust design review gives you the opportunity to identify and mitigate a majority of these problems early and make sure they don’t reach the field,” Venugopal added. “I think the biggest theme we saw come out of all of this, which is something we hear all the time, is the earlier you catch the potential problem, the cheaper it is to fix.”

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More than 70% of  
RFIs could be resolved  
in design review.

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# How CRB Reduces Waste and Improves Constructability with Lean Construction

Global design, construction, and consulting services firm CRB embraces a Lean approach to project delivery. By co-authoring models with trade partners, CRB maximizes efficiency and connects workflows from start to finish.

“Once you’ve been through a Lean project, you learn how projects can be,” says Matt Edwards, director of VDC (Virtual Design and Construction). “In a traditional design-bid-build project, the design team’s authoring model gets thrown over the fence to contractors, who redesign and re-author that model to be able to work with their fabrication shops and ensure constructability. With a Lean approach, using VDC, you pull all that stuff that you’re doing twice into one effort during the design process, and the first time you do it, the light goes on.”

With this strategy, CRB has found many opportunities to save time, money, and rework by resolving clashes before they become issues during construction. The transformation has led to less finger-pointing and more collaboration between project teams as everyone has access to real-time project data on one centralized platform.

**“We use Autodesk Construction Cloud,” says Edwards. “We vet and onboard trade partners early in the preliminary design process and co-author models together. This method supplies shared ownership of design, which is a big key benefit. But then it also allows us to use all the other tools within the ecosystem, including BuildingConnected and Assemble.”**

**For CRB, [Autodesk Construction Cloud](#) forms the backbone of a common data environment for collaboration. The platform also integrates with the many other tools that CRB uses so that nobody must download or upload files from multiple tools.**

By bringing specialty contractors in earlier and having them author inside the fabrication suite, the mechanical design team can also offer up their parts, and everything becomes seamless. Their speed to market makes life-saving technologies and services available months earlier than would be possible using standard construction methodologies.

[Read their full story here.](#)

# Conclusion: Recommendations

While it's not a sign that the construction industry is completely out of the woods, the aggregated, anonymized bidding data we've seen from Autodesk's builders network points to the fact that projects delayed by the COVID-19 pandemic are beginning to come back online. The fact that bidding has not only returned to pre-pandemic levels – but in some cases surpassed those pre-pandemic levels – is a bright spot and suggests the industry is getting back to work.

That said, being able to predict recovery has become increasingly nuanced, especially while navigating this uncharted territory. More than ever, companies need to invest in thorough preconstruction planning to meet stringent deadlines, work effectively with trade partners who are seeing increased volumes of new and rescheduled projects, reduce costly rework, and generate critical data that can be carried through the entire project lifecycle.

These are our top four recommendations for builders to help mitigate risk and protect their profits in 2021:

- 1. Reduce overhead costs.** Increased efficiency aided by technology can help cure rising overhead costs. With the right solutions, preconstruction teams can work faster, improve accuracy, and make their processes more secure.
- 2. Monitor the burden of project restarts.** Defaults tend to rise when the construction industry moves from a period of reduced activity to a period of growth. Bidding activity more than doubled between March 2020 and January 2021, putting stress on all construction groups.
- 3. Qualify trade partners often.** The construction market is volatile right now, meaning an annual qualification schedule may no longer cut it. A trade partner's financial situation can change significantly between annual qualification renewals, so we recommend you requalify your trade partners at least twice a year moving forward.
- 4. Stay diligent about design risks.** Reducing change orders and RFIs may be a crucial step in meeting increasingly demanding deadlines. 70% of RFIs could have been addressed by proper design reviews during preconstruction, and projects that closed high priority RFIs faster had greater profit margins. Improving design collaboration and coordination workflows will help firms avoid schedule risk, rework, and cost overruns.

The construction industry is one of the most resilient industries in the world and is uniquely prepared to weather this storm. Together, we can look forward to increased opportunities and brighter days to come. In the meantime, we will continue to share the trends we're seeing through 2021 – along with strategies to address them – so be on the lookout for updates.



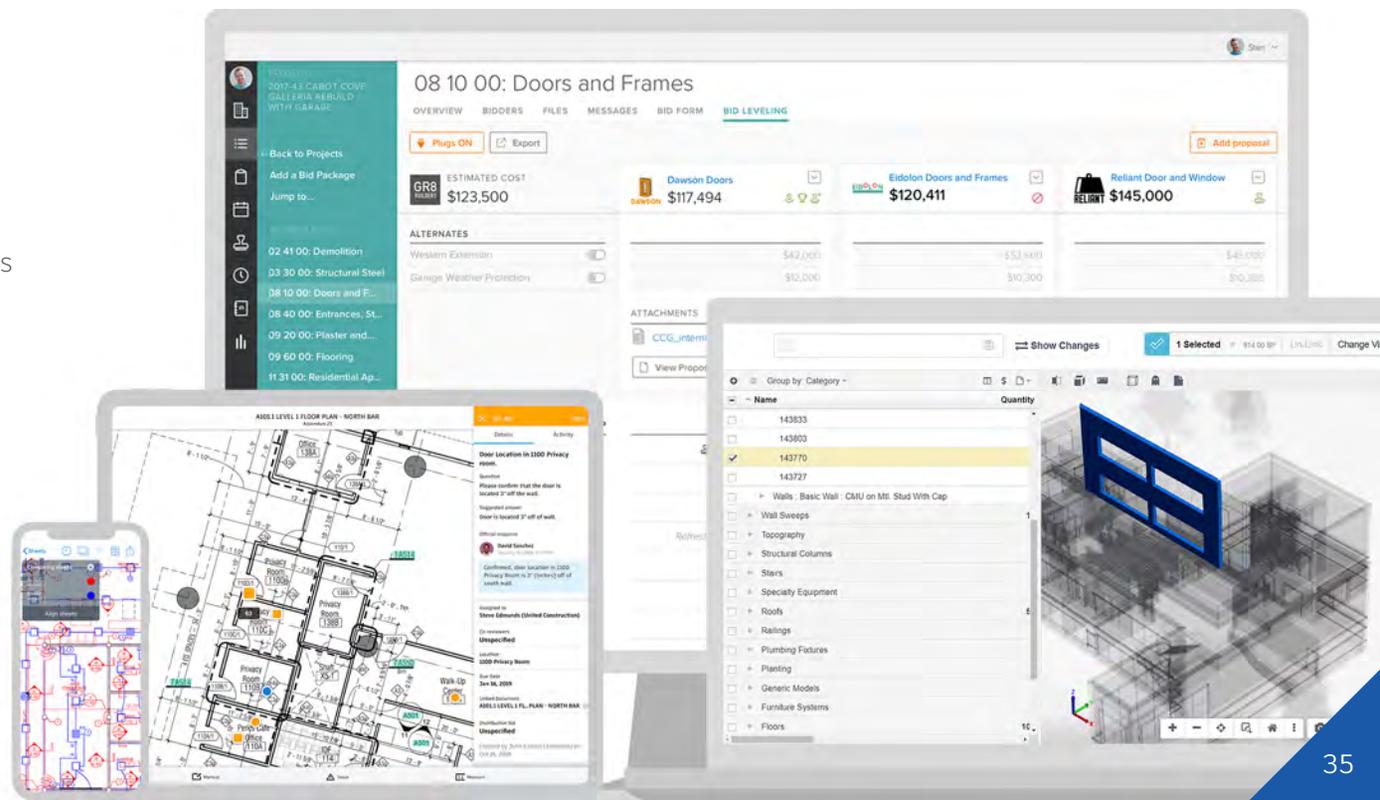
# See the Future of Connected Construction

[construction.autodesk.com](https://www.construction.autodesk.com)

Our industry requires solutions that connect their information, teams, and technology –breaking down data silos and disconnected processes that hinder true transformation. As we navigate the ever-present push to do more with less, we need to uncover new ways of working, enhance connected digital workflows, and incorporate advanced analytics. To support us on this journey of transformation, we must lean into tools that connect construction – from design to plan, build, handover, and operations.

Built on a unified platform and common data environment, Autodesk Construction Cloud is a powerful and complete portfolio of construction management products that empowers general contractors, specialty trades, designers and owners to drive better business outcomes. Autodesk Construction Cloud combines advanced technology, a unique builders network and predictive insights to connect teams, workflows and data across the entire building lifecycle.

While the industry experiences unprecedented transformation, our mission remains the same: to help construction teams meet the world's rapidly expanding building and infrastructure needs while making construction more predictable, safe, and sustainable. And we've remained steadfast in our promise to deliver the industry's most compelling solutions, connecting data, teams and workflows from the field. This is our commitment to connected construction.





With Autodesk software, you have the power to Make Anything. The future of making is here, bringing with it radical changes in the way things are designed, made, and used. It's disrupting every industry: architecture, engineering, and construction; manufacturing; and media and entertainment. With the right knowledge and tools, this disruption is your opportunity. Our software is used by everyone - from design professionals, engineers and architects to digital artists, students and hobbyists. We constantly explore new ways to integrate all dimensions of diversity across our employees, customers, partners, and communities. Our ultimate goal is to expand opportunities for anyone to imagine, design, and make a better world.

Connect with ACS



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