



CONSTRUCTION TECHNOLOGY REPORT

» 10th EDITION

IN PARTNERSHIP WITH



CONSTRUCTION SCIENCE
TEXAS A&M UNIVERSITY



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• ABOUT THE REPORT

ABOUT THE ANNUAL CONTECH REPORT

JBKnowledge is proud to bring you our tenth Annual Construction Technology Report!

For the past decade, we have worked hard to build our reputation as a respected and trusted resource for the construction industry. Our goal is to help construction companies compare technology adoption, forecast innovations, benchmark against competitors, explore trends, and learn more about the latest software and apps.

We're excited to bring you updates on IT, R&D, technology innovations, BIM/VDC, the construction industries' favorite software & apps, and more!

Before we dive into 2021's ConTech insights, we have a couple of reminders about the report:

- » Not all questions will add up to 100% because respondents were allowed to select more than one answer to certain questions.
- » Our volunteer survey respondents change slightly from year to year, this means our most popular software and apps can vary. Software or apps that appeared in last year's report are not guaranteed to appear this year.

Before we dive into the Construction Technology you came to enjoy, please review our statements about the origins of our data and information about sharing or distribution.

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- » **The data represented in The Annual Construction Technology Report® was provided voluntarily by the participants of The Annual Construction Technology Survey.** The data represented in the report was self-reported by participants. Participants were not compensated.
- » **You can still download prior years' reports.** As previously mentioned, this is the tenth edition of The ConTech Report! You can download prior years back to 2012 at contechreport.com.

Enjoy the Ride & Geek Out!

• DEMOGRAPHICS

55%

of 2021 Annual ConTech
Report's respondents were
between 42 to 61 years old.

THE DEMOGRAPHICS

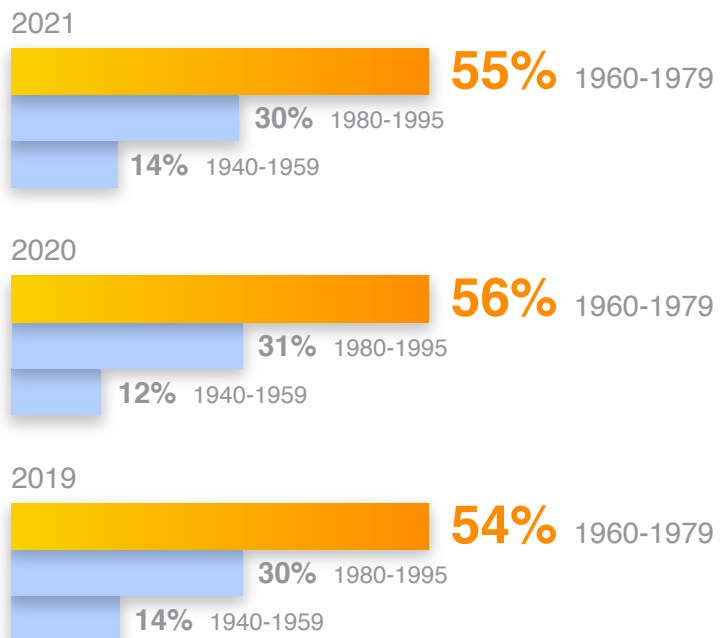
Who Responded to the 2021 ConTech Survey?

The main takeaway about this year's ConTech Report is 2021's participants are a mature group, with 54.6% of all respondents between the ages of 42 to 61 years old. The Millennials (those born between 1980 to 1995) experienced a 1% increase since 2020, while the first generation to be born after the invention of the internet, Generation Z (1996-2000) entered the construction industry 1.3% more in 2021.

The culprit behind 2021's very minimal changes from 2020 versus 2021 could be the product of the [construction hiring slowdowns in 2021](#) among other issues.

Changes in generational demographics were incremental across the board in 2021. The most notable change was 2% less participation from construction pros born between 1960 and 1979. Due to the number being so small, it is difficult to speculate whether it is a simple lack of survey responses from that group this year or an exodus from the industry

Generation of Respondents



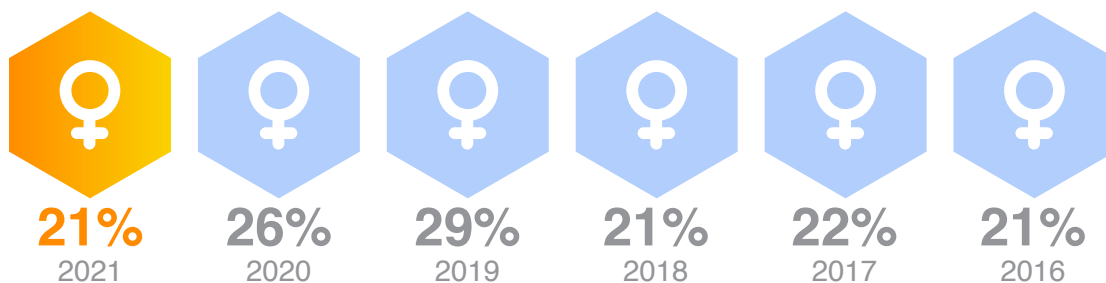
Are More Women Joining the Construction Industry?

Women Who Participated in The Report in 2021



It's no secret that construction is employing only a very small segment of the female workforce. Figures from [a report by NAWIC in 2018](#) indicated that only 1.5% of the construction workforce was comprised of women. A study by [OSHA published in 2020](#) reported the US's construction workforce employed as many as 9% women in 2010, which is cause to ponder whether women have existed in the industry over the last decade or if construction careers for women are under-represented in recent studies.

All-Time Participation from Women in The ConTech Report



The gender gap is an open issue within the construction industry with companies like construction powerhouse Balfour Beatty rolling out diversity-based hiring initiatives including goals of staffing 25% women. While employing 25% of women in the trades or executive positions is a tall order for several construction companies, until this year's decrease The ConTech Report had over one-quarter of participation from women in the construction industry. 2019 featured a record high 29% participation by women, 2020 saw a drop to 26%, before 2021 dropped to 2018's 21%.

While responses from women in construction to The ConTech Report may be proportionally yoyoing over the last few years, data from larger studies are clear—more personnel (male and female) are entering construction.

What 2021's ConTech Report readers should know is construction is working hard at the trade and executive levels to build a more inclusive workforce.



WHY DO WE ASK QUESTIONS ABOUT DEMOGRAPHICS?

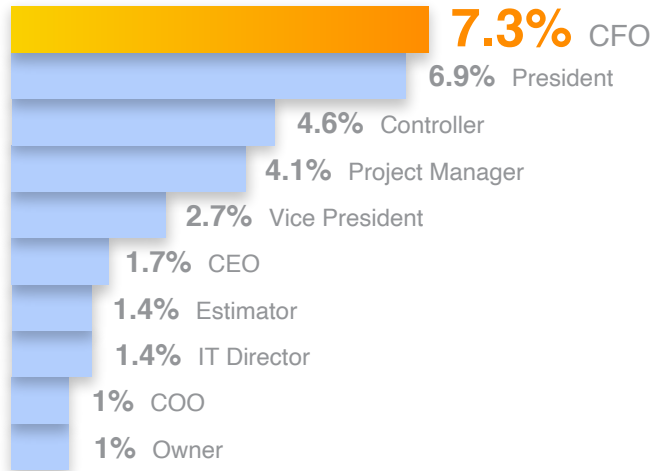
It may seem arbitrary (or even invasive) to ask questions about age, gender, and location, for some readers. The only reason we take the time to ask is to keep track of changes over time. If there is a sudden upswing in technology usage that correlates with the workforce, this could be a clue about what to expect for the future of the industry.

The reason The Annual ConTech Report includes survey questions about gender is because of the extremely sparse numbers of women in construction. Although this number may have increased in recent years, construction is still woefully outside typical male to female employment ratios.

Our survey respondents are foremost construction pros and innovators, regardless of gender, age, or location!

What Job Titles and Company Roles Are People Filling in 2021?

Most Popular Job Titles of 2021



*Accounting Manager, Foreman, VP, Office Manager, Operations Manager, VDC Manager, BIM Manager Director, IT Manager | < 1%

2020

28% Executive
26% Construction Technology/IT Systems Management
26% Finance/Accounting
24% Project Management
15% Owner/Principal

2018

29% Executive
26% Project Management
26% Finance/Accounting
24% Estimating
22% Construction Technology/IT Systems Management

2016

30% Executive
23% Estimating
20% Project Management
16% Owner/Principal

2019

16% Finance/Accounting
14% Executive
13% Construction Technology/IT Systems Management
10% Project Management
8% Estimating

2017

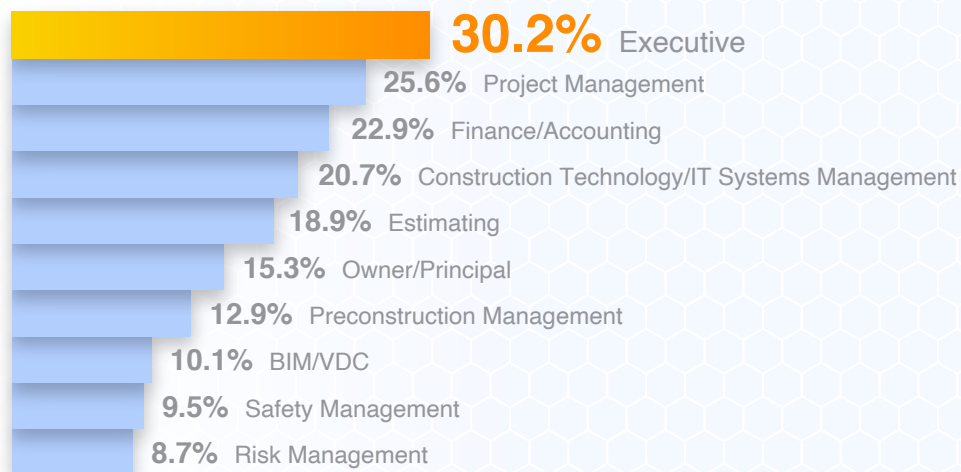
28% Estimating
25% Project Management
24% Finance/Accounting
24% Executive
21% Construction Technology/IT Systems Management

As in previous years, the report includes the experiences of people from all facets of the industry, with ‘Executives’ (namely CFOs, Presidents, and CEOs) leading the way among the most popular job titles among survey participants. While it is important to hear from job titles from the office to the field, it is helpful to tap into the job titles associated with creating the budgets and approving technology purchasing!

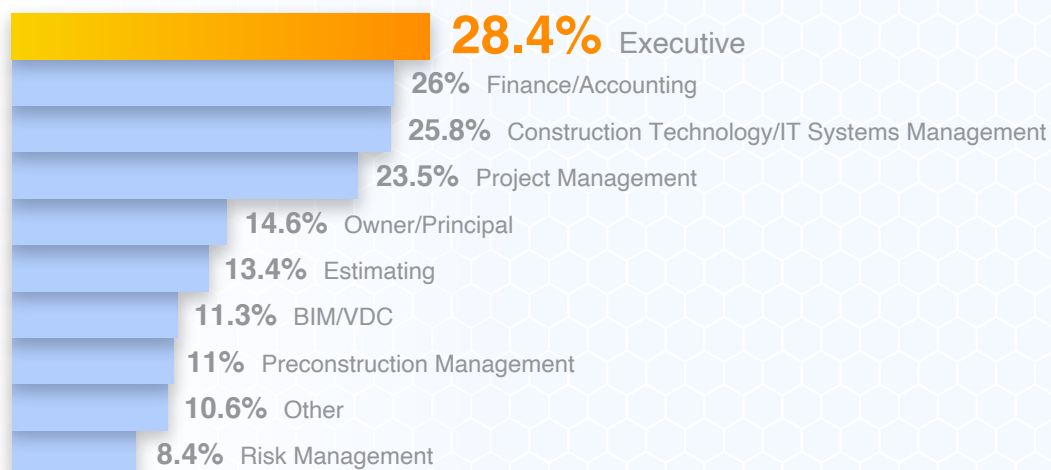
WHAT WILL BE CONSTRUCTION’S NEXT MOST POPULAR JOB TITLES?

Most Popular Job Titles Over Years

2021

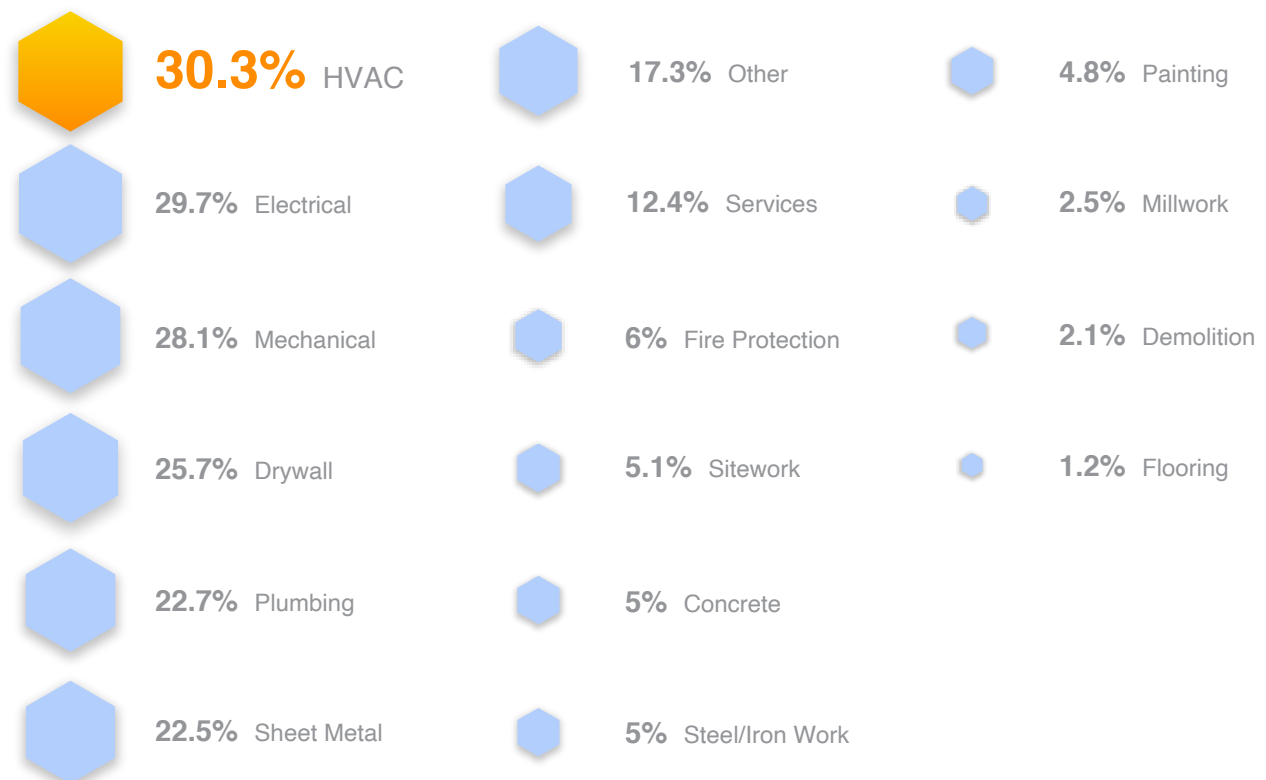


2020

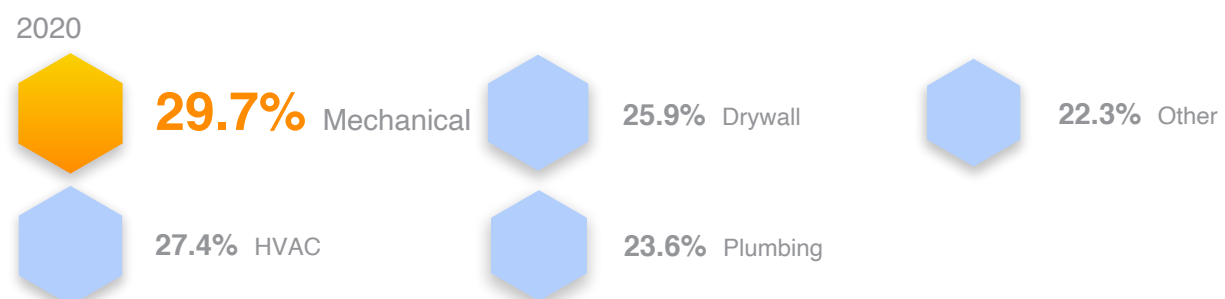


An interesting trend in the ConTech Survey is the steady popularity of certain job titles over the past five years. C-Level executives have retained a spot at the top job title since 2016. A past favorite job title was Estimating which waned in popularity when JBKnowledge sold the product SmartBid. Comebacks in popular job titles like Preconstruction Manager and Design leave us optimistic about which job titles will continue an upward trajectory over the next five years!

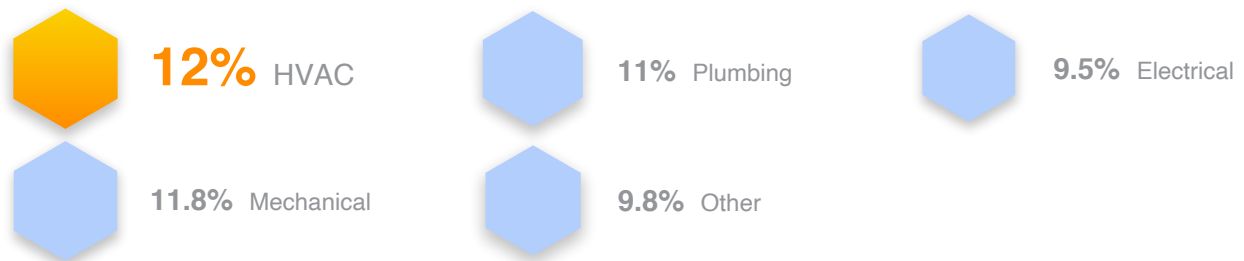
Most Popular Subcontractor Trades of 2021



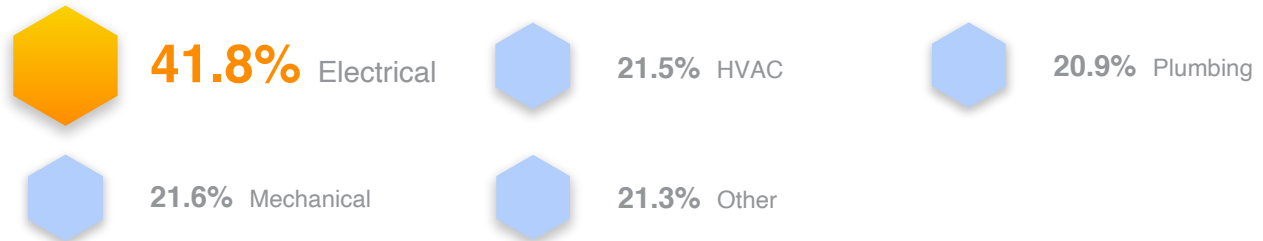
Most Popular Trades of Last 4 Years



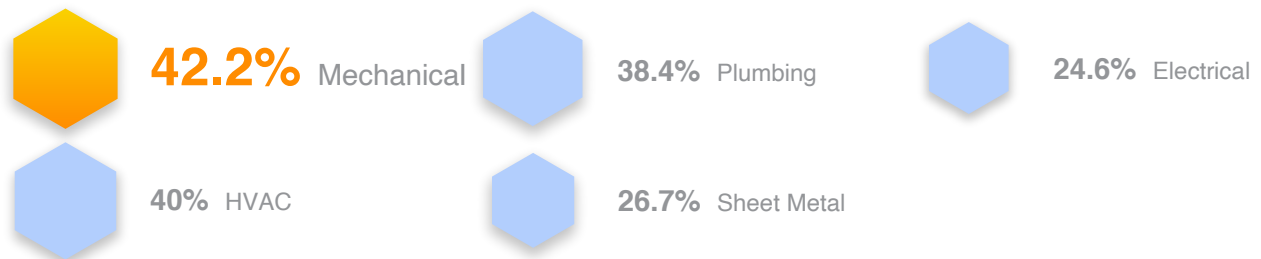
2019



2018



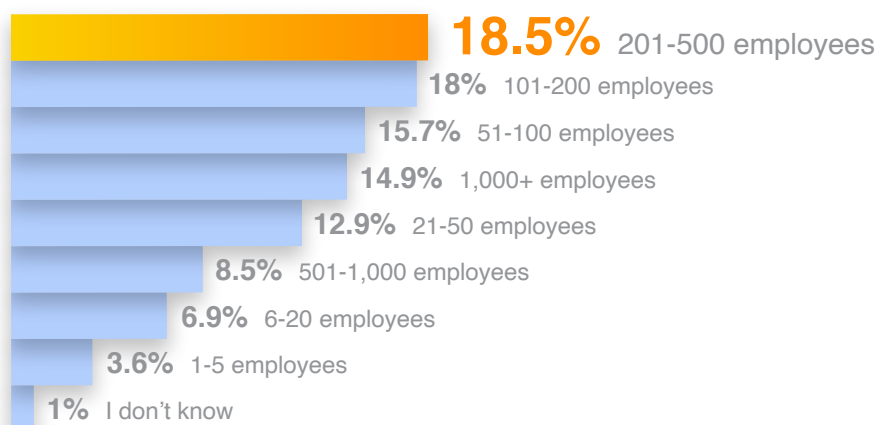
2017



When it comes to changes in responses from the Most Popular Subcontractor Trades of 2020 versus 2021, the only notable changes include the slight changes between the top two most reported trades: HVAC with a 2.9% increase in 2021, and Mechanical at a 0.2% increase. Respondents were allowed to select more than one answer because some firms perform more than one service.

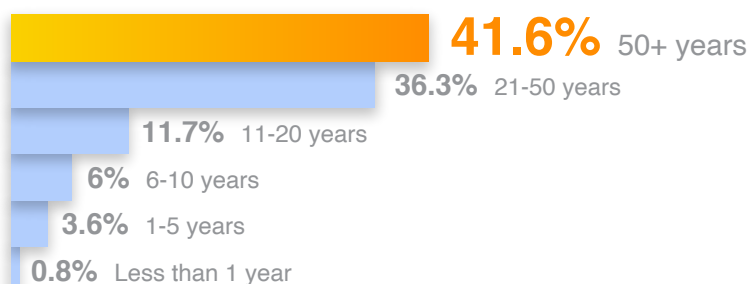
To remind readers, this representation is in step with The Annual Construction Technology Survey & Report sponsorship by trade organizations Mechanical Contractors Association of America, Sheet Metal and Air Conditioning Contractors' National Association, and National Electrical Contractors Association. (The survey is distributed to their members.)

Number of Employees Per Company

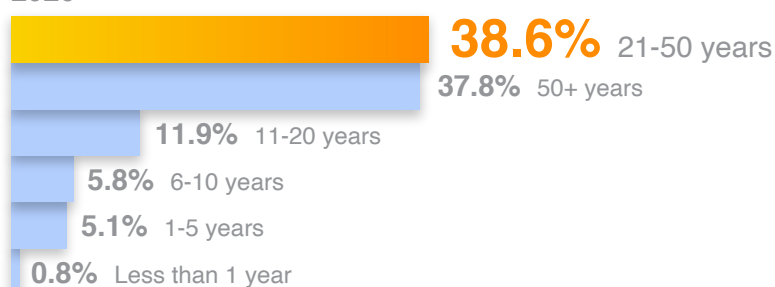


Age of The Company

2021



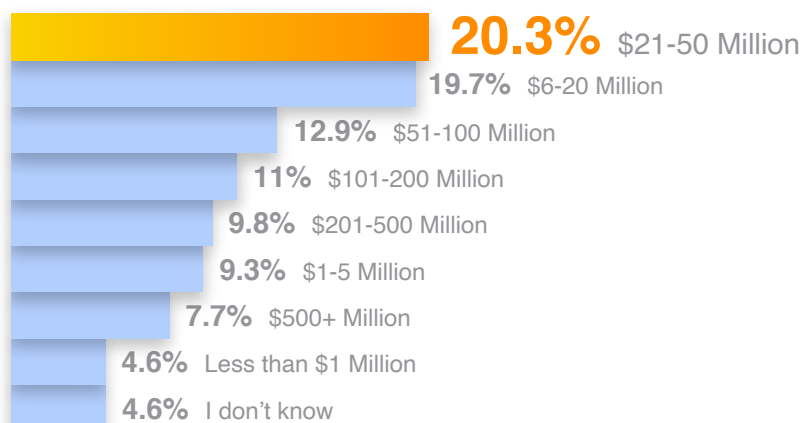
2020



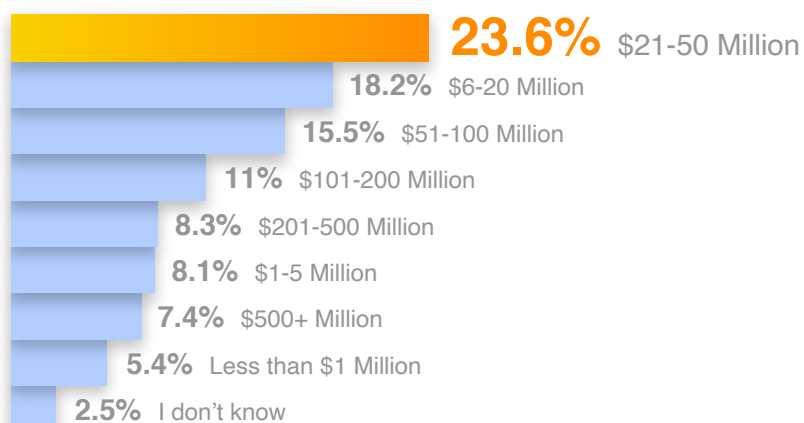
42% of 2021 ConTech Report respondents are from older (in business 50+ years) albeit smaller companies (51 to 500 employees). 57% of 2021 respondents reported that their firm has fewer than 200 people. 2021 had the highest number of responses from companies that have been in business for over 50 years with a 3.8% increase over past years, and over 76% responded their companies have been in business over 21 years.

Company's Average Annual Sales Volume

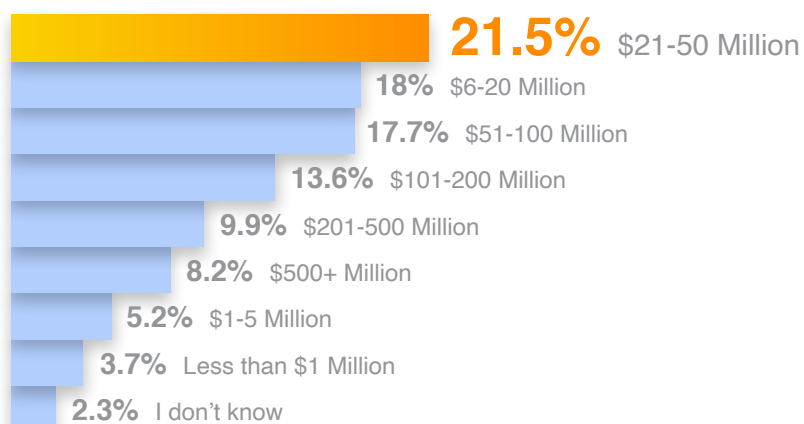
2021



2020



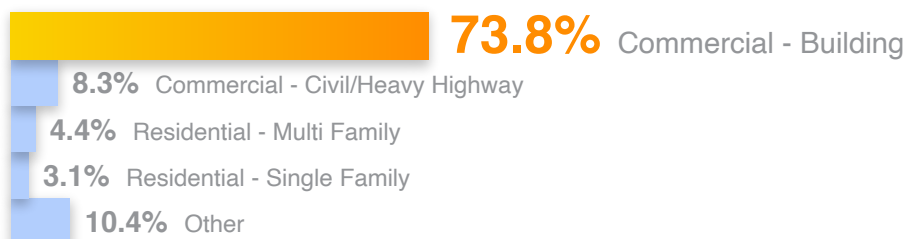
2019



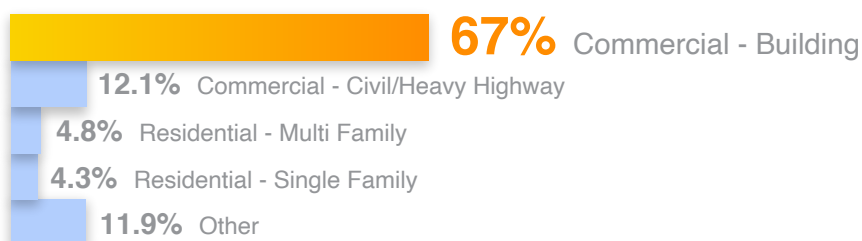
There is a 1.5%, 0.3% and 2.1% increase of companies with an Annual Sales Volume within \$101-200 M, \$201-500M and \$500M, respectively. The most reported Annual Sales Volume for 2021 is evenly distributed toward the 'moderate' range for construction companies.

Primary Industry

2021



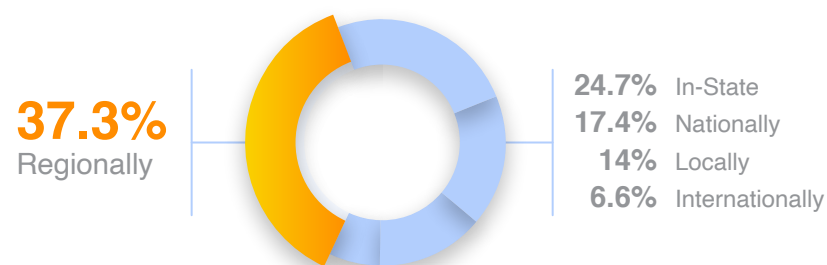
2020



The top three most reported primary industries in 2021 have not changed leadership over the past three years, although 2021 did experience some unexpected changes in certain sectors. More than half of all the responses were from Commercial Building, which experienced a 6.8% increase in responses in 2021. Commercial-Civil/Heavy Highway experienced a 3.8% decrease in responses since 2020.

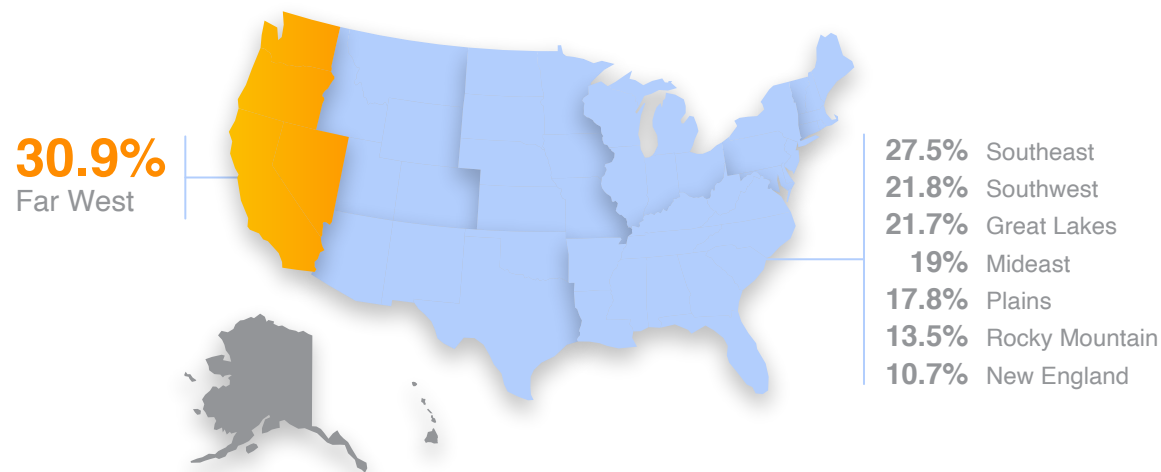
Range of Work

2021

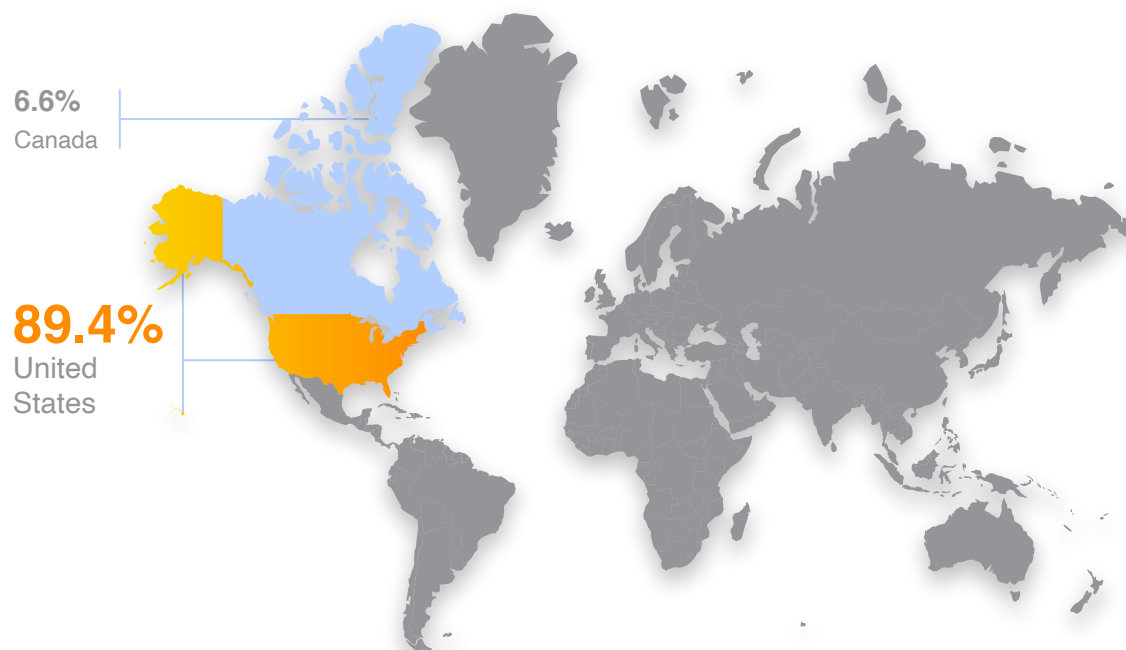


Survey respondents spent another year performing a majority of their work 'Regionally'. Construction pros who reported working 'Nationally' moved to second place, pushing those who reported working 'In-State' to third place after a 4.4% decrease. A simple reason for this may be limitation of the local business endeavors versus the earning capabilities of larger projects. A local market is limited by local projects whereas growing metro areas present an assortment of opportunities.

Regions of The US Where Companies Are Working



Countries Where Construction Companies Are Working



*Afghanistan, Albania, Angola, Argentina, Australia, Bolivia, Canada, Colombia, Costa Rica, Denmark, Dominican Republic, Egypt, Germany, India, Japan, Kazakhstan, Mexico, New Zealand, Philippines, Saudi Arabia, Singapore, Spain, Sweden, United Arab Emirates, United Kingdom & Uruguay | < 1%

The 2021 ConTech Survey received responses from 29 different countries. The bulk of responses were from North America at 96.3%. Responses from the United States increased 7.5% this year, and responses from Canada decreased 3.5%.

In terms of responses from the United States, the most popular regions had a slight lead change from last year, the Far West region surpassing the 2020's most popular region, the Southeast.

Construction professionals have branched out from local to regional work because of the influx of large-scale projects that exist in every region ranging from infrastructure to commercial projects.

• IT STRATEGY & BUDGET

42%

of Construction Companies are
NOT billing IT expenditures.

IT STRATEGY & BUDGET

• Are Construction Companies Strategizing for IT in 2021?

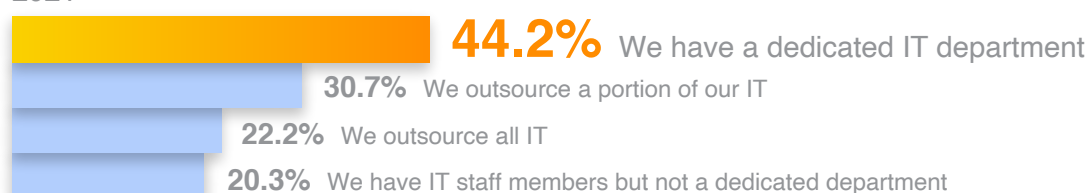
Construction is an old industry, but in 2021 technology is a way of life – our cars, telephones, and even refrigerators use technology that sounded like science fiction even twenty years ago. In a high-tech world where our life expectancies have been extended with the assistance of medical technology, it stands to reason innovations in construction technology are drastically impacting the built world.

A critical error many construction companies are making is not prioritizing IT. (To briefly clarify, we consider IT to be software hardware, IT personnel, technology, custom software spend, infrastructure, bandwidth connectivity.)

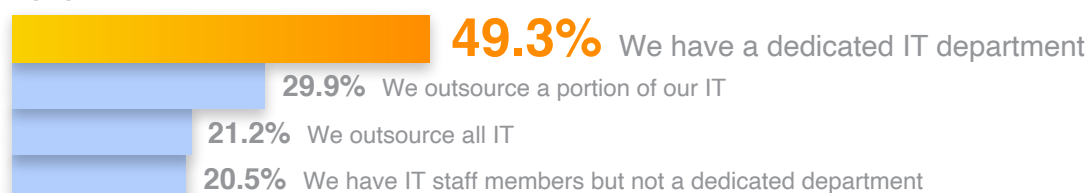
Many construction companies fail to realize that an investment in IT will help to realize greater profitability and increased ROI. Other low-margin industries are already reaping the rewards of investing in IT, it's no coincidence that construction companies are on measuring on the lower-end of productivity as compared to other industries.

IT Strategy

2021



2020



Dedicated IT Departments took a small dive in 2021 with a decrease of 5.1% since last year. Since 2019, construction companies appear to be reducing dedicated IT support and relying more on outsourcing a portion, if not all, of their IT functions. Small and medium outsource companies are more likely to outsource technology needs - an acceptable solution as long as IT needs are addressed!

IT is important to increase ROI quickly and efficiently. Investing in a dedicated IT team pays for itself by allowing employees to focus on their expertise, or “do less better.” IT will always pay for itself in the long term by improving productivity and reducing human error. Consider IT as an internal consulting team, IT is an investment not an expense.

Percentage of Annual Sales Volume Spent on IT

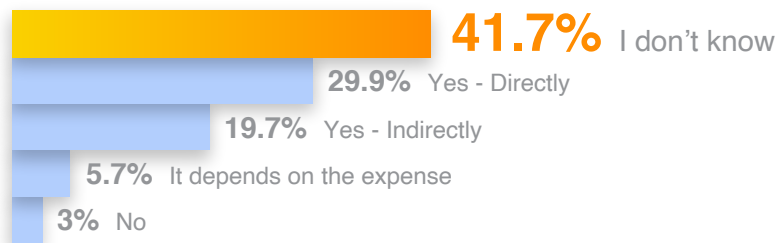


Across industries, IT budgets average around 3.5%. Construction spending on IT is behind the curve, spending only 1% of Annual Sales Volume on IT. Construction companies that prioritize IT spending can recoup expenses relatively quickly. Revenue dedicated to IT has remained consistent across the years. Spending is not lifting in a measurable way, unfortunately the construction remains at the bottom of all industries when it comes to investing in IT. (The cross-industry spend for IT averages 3.5%)

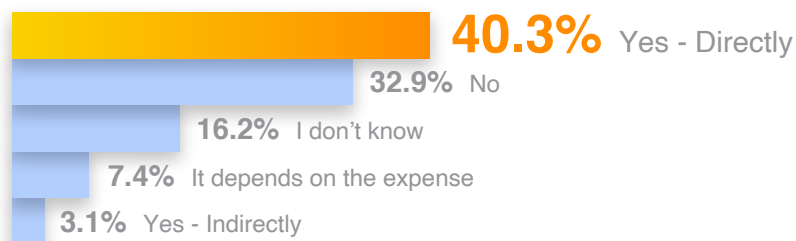
Some may argue that construction is low-margin industry so there isn't money to invest in IT. The truth of the matter is: It is a low-margin industry because of the lack of investing in innovations and IT. Many contractors see double-digits in profit increase because of their investment in technology.

How Companies Are Billing IT Expenditures

2021



2020



IT staff and tools are expensive; therefore, it is surprising not to see more firms jump at the opportunity to bill IT expenses to clients. Whether it is billing directly for the use of a sophisticated tool or increasing fees by a small percentage, billing for IT is important for construction companies. The number of respondents reporting they are not billing for IT have hovered at over 40% for 3 years. More companies could recover expenses by segmenting expenses by project. By segmenting expenses, companies can allocate expenses by project and recover the cost of technology immediately.

By billing for IT expenditures, companies can recover revenue, prevent mistakes, and reduce topline and bottomline expenses. Several contractors are reluctant to spend on technology because it feels like they absorb the costs the owners profit on, billing for IT prevents this.

A lack of respondents billing for IT is likely the result of respondents awareness of how to bill for IT services, or not using the IT services enough to necessitate billing to clients.



SHOULD MY COMPANY BE BILLING CLIENTS FOR IT?

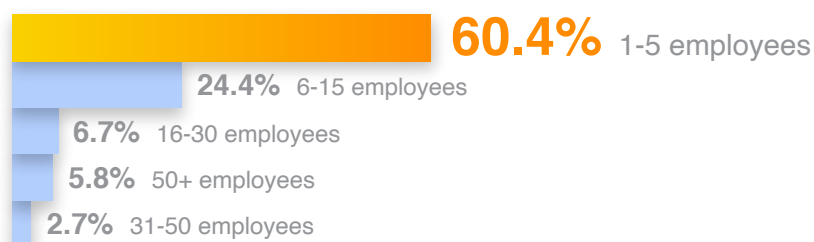
Many construction pros mistakenly think: “Billing for IT sounds like something only giant corporations do. I’m not sure that’s something my construction company could manage.” In reality, billing for IT expenditures is possible for companies of all sizes.

Here are some suggestions to help you get started:

- » **Rethink IT:** IT is no longer a “nice to have” item. IT is crucial to running a successful business. Be sure you are expanding your definition of IT to consist of software licenses, infrastructure, personnel, consultants, and more.
- » **Segment Expenses by Project:** Segmenting expenses by projects is an ideal way to drive efficiencies and directly reimburse technology costs.
- » **Assess the Value:** Assigning a percentage or mark-up to your work may be easier once the numbers are in front of you. Calculate the operational and material costs then formulate a strategy for billing your overhead costs
- » **Learn Billing Methods:** There are several ways to bill for IT. Acquaint yourself with the different options (direct and indirect billing) to see what works best for your company and clients.

Number of Employees Dedicated to IT

2021

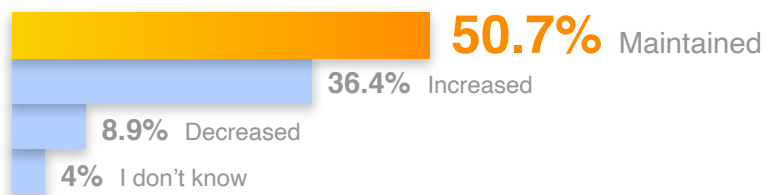


2020

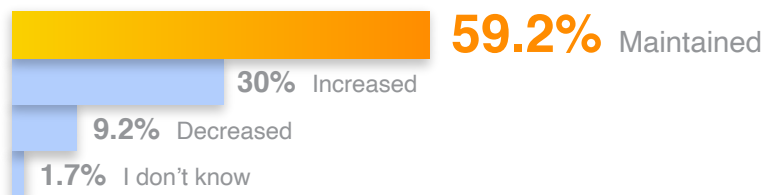


IT Staff Growth Over The Last Year

2021



2020

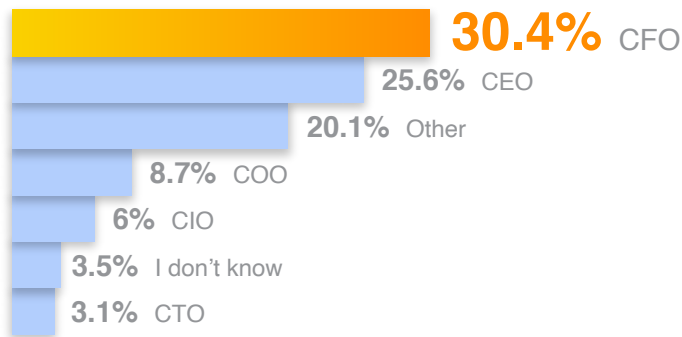


From 2016 to 2021, 60% of all respondents surveyed reported their company kept between one and five employees dedicated to IT on payroll. It is interesting to note that over half of the respondents continued to have one to five dedicated IT employees throughout the pandemic era of 2020 to 2021. (Some companies with narrowly focused sectors were impacted by economic downturn and had to decrease staffing although many construction companies were not impacted by quarantine periods.)

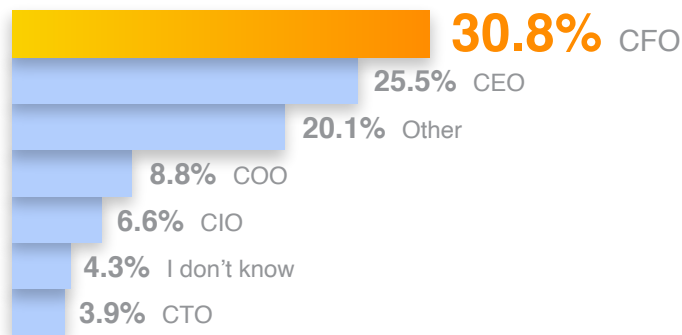
Companies without IT support fell behind when circumstance forced a transition remote work, risked data breaches, and suffered other consequences of underutilizing technology. Profit loss could have been avoided by expanding IT efforts prior to the pandemic.

Who leads the IT department

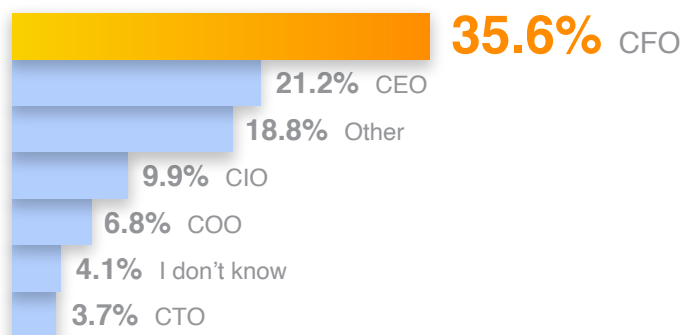
2021



2020



2019



IT teams continue to be led by C-level executives, with Chief Financial Officers leading the way as the most popular answer of 2021. Companies with Chief Information Officers or Chief Technology Officers are catching some traction in 2021, although these job titles are still far newer in the construction sector as compared to other industries.

Companies are getting ahead by growing their IT departments rather than expecting a single person to shoulder the responsibility of IT alone. By keeping IT at the C-level, technology is offered a seat at the table to better foster a culture of technology transformation from the top down.



QUOTES STRAIGHT FROM SURVEY RESPONDENTS

» “We use technology only when we have no other choice.”

» “Routine IT expense is built into our general conditions, so a portion is captured on each bid.”

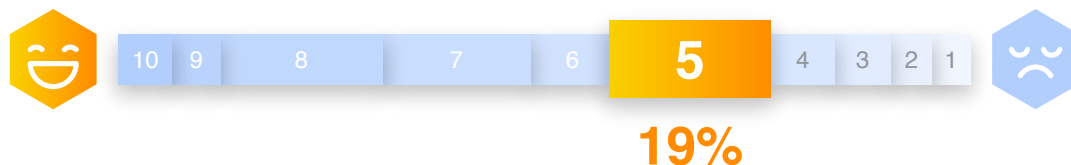
Are Construction Companies Training for IT?

How Would You Rate The Training Offered on New Technology At Your Company?

2021

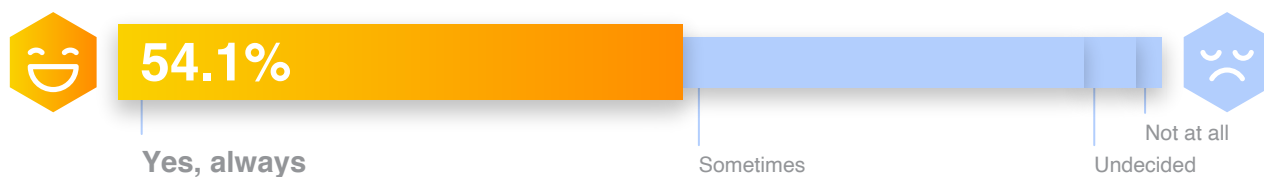


2020

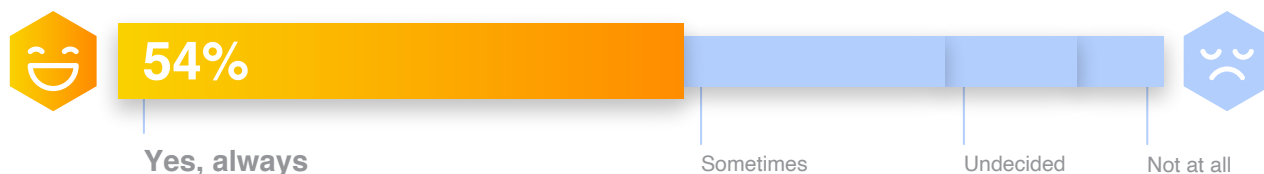


I Receive The Necessary IT Support Needed to Do My Job

2021



2020



I Feel I Have The Technology Budget I Need to Efficiently Do My Job

2021



2020



I Understand The Technology Budget Process At My Company

2021



2020



As with prior years, comments and results of survey questions contradict the respondent's positive ratings about attitudes on technology training and budgets. Smaller budgets combined with smaller IT teams leave report analysts contemplating whether respondents rate these questions higher because they feel satisfied or because they are unaware that simpler or more effective processes and relationships are possible.

25% of respondents reported they do not understand their company's budgeting process, this is a great opportunity for CFO's to explain the budgeting process.

Budgets should transparent and based on documented strategies for technology projects and deliverables.

Given the frustrations expressed in some of the comments from respondents regarding IT support and tech adoption, it is clear some respondents are aware that better solutions exist. (Even without IT or budget support, creative thinkers will start using the tools available to ‘hack’ solutions to their problems with spreadsheets or plug-ins.)

Plainly stated, self-perception of technology fluency is often not a reliable indicator.

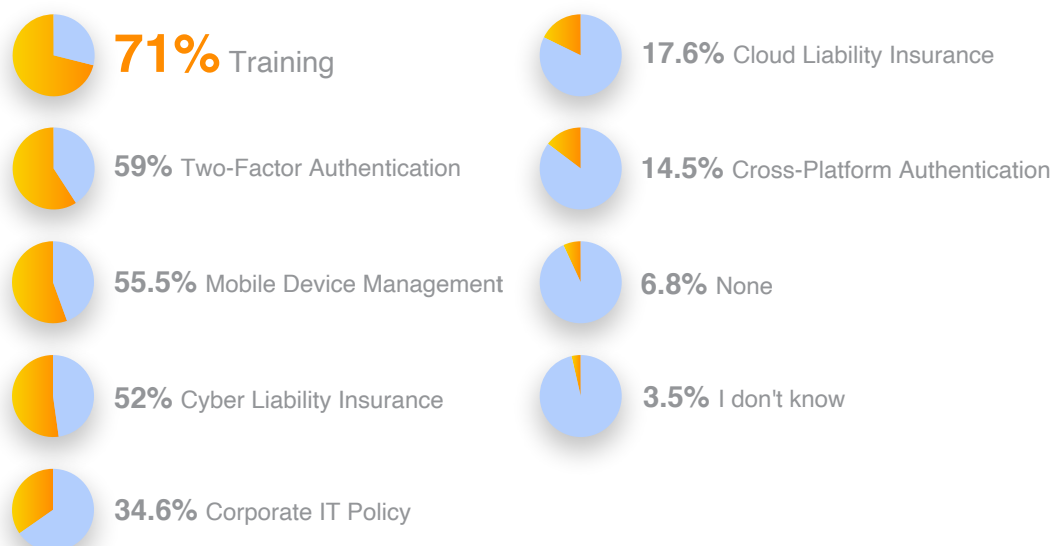


QUOTES STRAIGHT FROM SURVEY RESPONDENTS

- » *“We increased and restructured our IT team this past year when we looked long term at the projects we had planned. We decided we needed a fully operational IT team in place to allow that growth.”*
- » *“We have a large IT department, however, other than our local IT specialist, I have no contact with the IT team typically.”*

How Are Companies Protecting Their Data?

Percentage of Survey Respondents Using Data Security & Management Solutions in 2021



Cyber security experienced some victories and some failures in 2021.

Since 2016, two-factor authentication had grown from a paltry 14.5% (2016) to an inspiring 59% this year. While not every measure of data security has been embraced as widely, there are some wins to celebrate. Employee trainings increasing 4.7% in 2021 and more than half of all respondents reporting they used mobile device management, two-factor authentication, and cyber-liability insurance.

Security methods including comprehensive corporate IT insurance policies, cloud liability insurance coverage, and cross-platform authentication have not caught on with the same type of vigor. Although using some security options are better than none, rolling out a comprehensive plan with provisions for all aspect of security should be every company's goal. Security software like WhiteHat or Security Fanatic can be useful in combatting attacks, although if a company is truly unsure of where to begin with cyber security, hiring an outside security consultancy should be given sincere consideration.

2021'S SURVEY RESPONDENTS UNDERSTAND DATA SECURITY

Has Your Company Had A Data Security Breach in 2021?



Over the years, people who steal data for nefarious purposes have gotten better at procuring information and their use cases for the information have become more sinister.

The only thing more troubling than a data security breach is not understanding what a data breach is or how to prevent them. In 2020, 13% of respondents reported they had experienced a data breach, but equally as troubling were the 10% who reported they did not know whether their data had been compromised or not. “I don’t know” is another way of answering “yes, my company experienced a data breach,” only with the caveat of “I don’t know how to prevent someone from stealing my information.”

In 2021, the number of reported data breaches only decreased slightly, (13% in 2020 versus 12% in 2021) however in 2021, reports of “I don’t know” decreased by 4%. (10% reported in 2020, 6% reported in 2021.)

Data breaches cost companies time, money, and have the potential for devastation. Perhaps the more definite answers this year are indicative of the industry being more proactive about education on data security.

• MOBILE DEVICES & APPS

35%

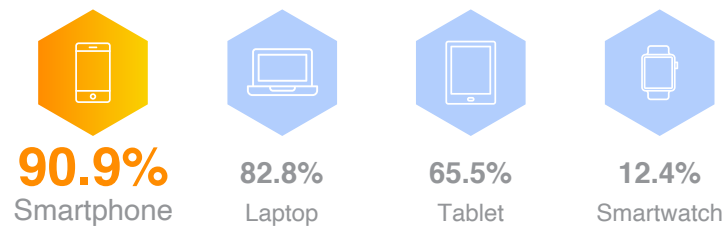
of Construction Pros Do NOT Use
Personal Devices at Work.

MOBILE DEVICES, MOBILE APPS

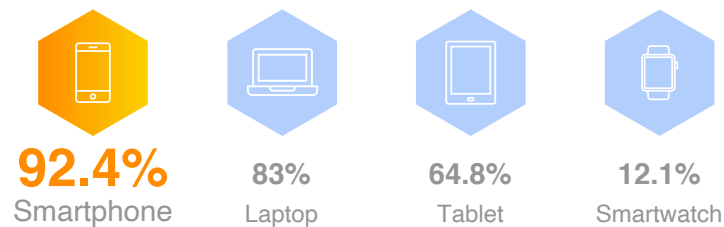
How Do Mobile Devices Impact Construction?

What Mobile Devices Do You Use on A Daily Basis for Work Purposes?

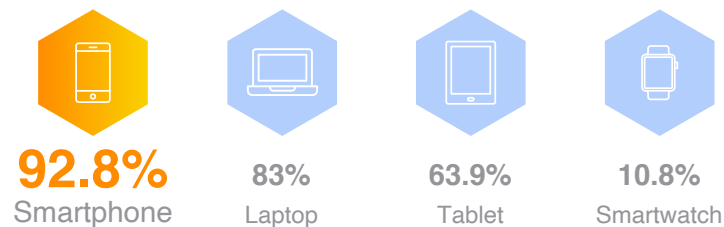
2021



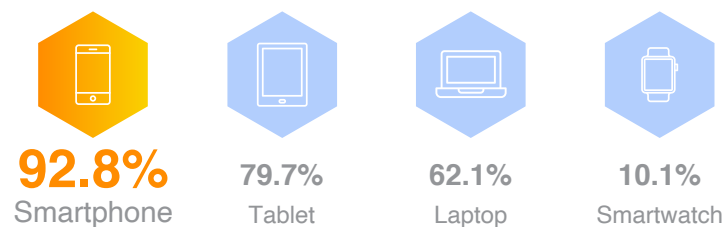
2020



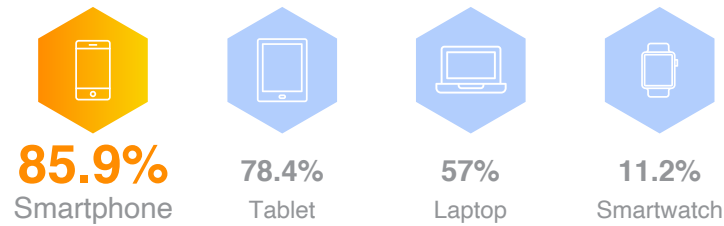
2019



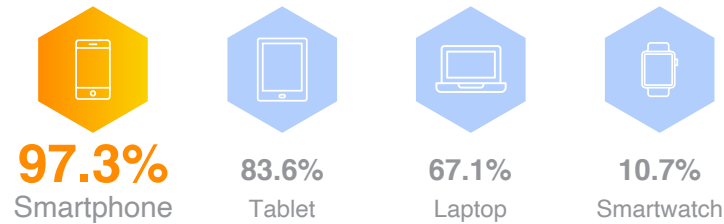
2018



2017

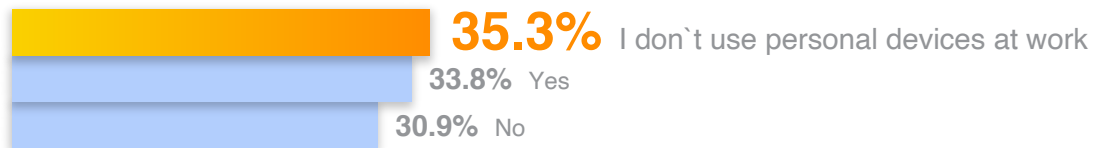


2016

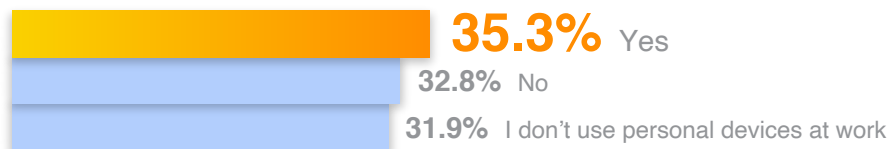


Does Your Company Request to Secure and/or Approve Your Device Before Using for Work Purpose

2021



2020

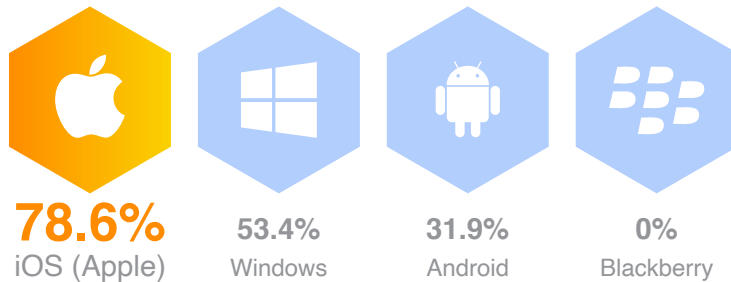


Although the number of construction professionals are not particularly growing year after year, with over 90% of construction pros using Smartphones and over 80% using laptops for work on a daily basis, mobile devices are essential to the construction industry.

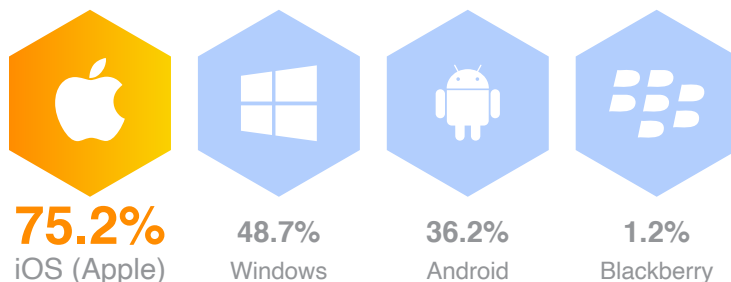
While mobile devices are being utilized on the jobsite, bring-your-own-device program popularity may not have reached full potential yet. When questioned about securing personal devices for work purposes, most respondents reported “I don’t use personal devices at work” or “No” they do not secure their personal devices at work. With 97% of Americans owning smartphones in 2021, it would be advantageous for construction companies to learn more about bring-your-own-device programs and how to secure them.

What Mobile Devices Do You Use on A Daily Basis for Work Purposes?

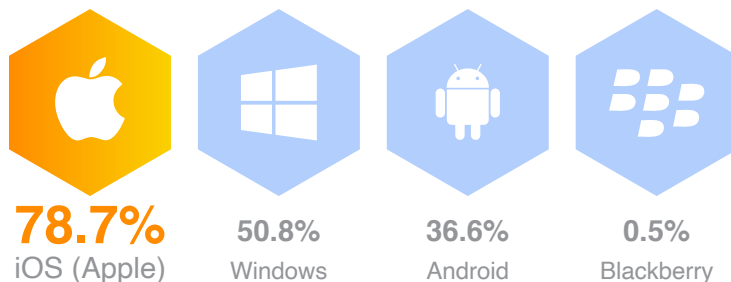
2021



2020



2019

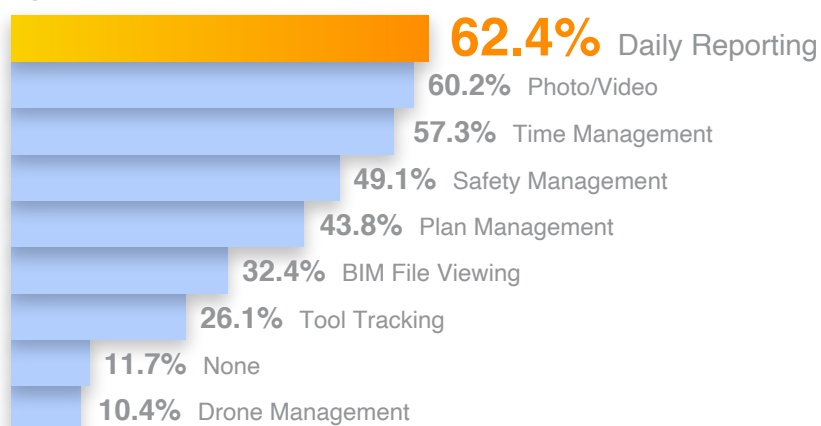


THE DECLINE OF BLACKBERRY OS

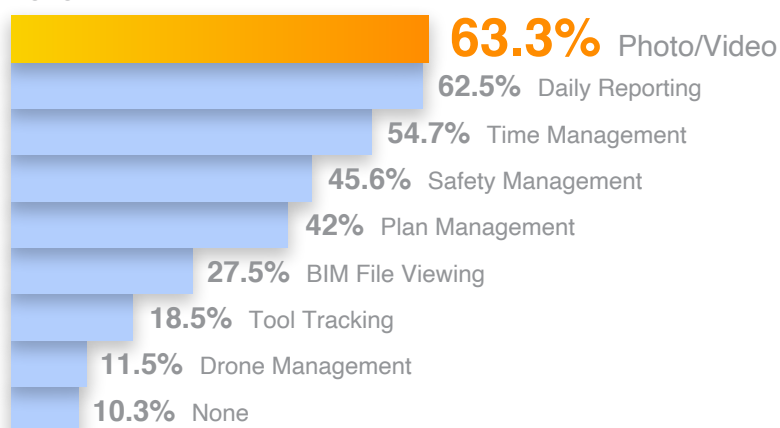
In 2011, Blackberry controlled 50% of the smartphone market. iPhone was introduced in 2007, so Blackberry was hardly alone in the smartphone market. How could a titan of technology disappear completely within a decade? Slow releases compared with competitors relegated smartphone users into camps of iPhone or Android users, making Blackberry a relic of the past decade. Blackberry is a fantastic reminder that no technology-titan is invincible. Meanwhile, Apple continues to devote time to security, testing prior to release, and creating superior products

Reasons Companies Use Mobile Devices in The Field

2021



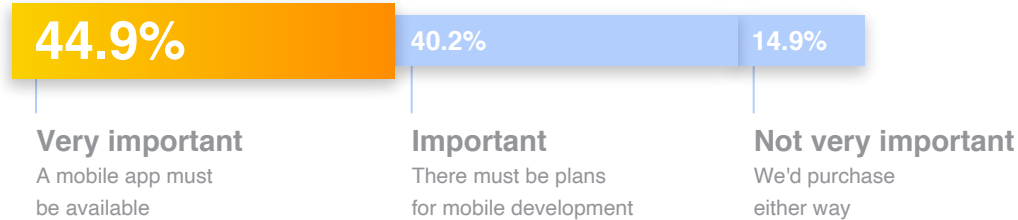
2020



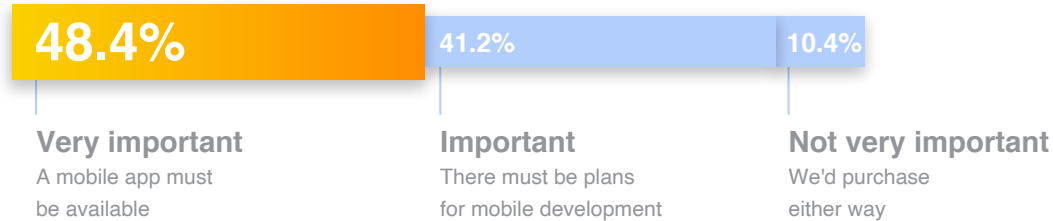
Daily reporting and photo/video purposes remain the most popular reasons construction professionals are using mobile devices in the field. Tool tracking is gaining popularity as a built-in feature of mainstream tool companies. Adoption may take a few years to catch on in the field, but we should see wider implementation in the coming years.

The Importance of Mobile Integrations When Purchasing Software

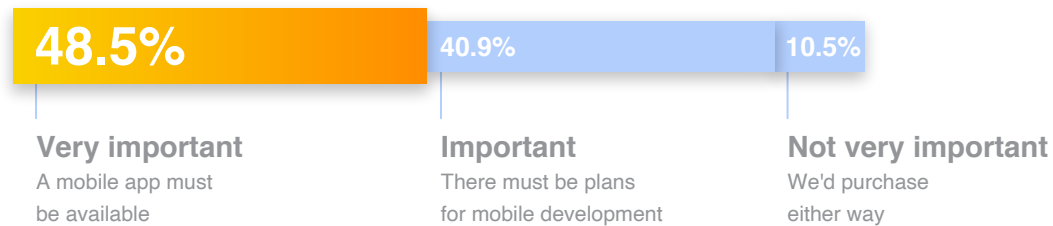
2021



2020



2019

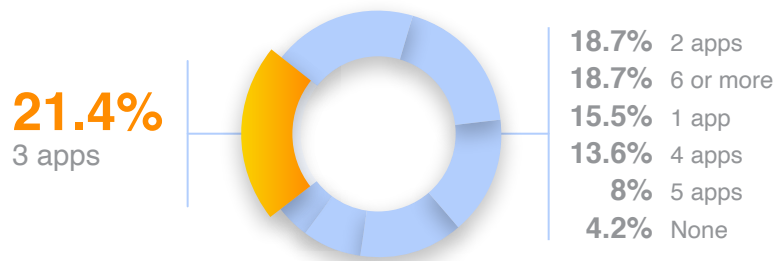


Mobile apps are a must.

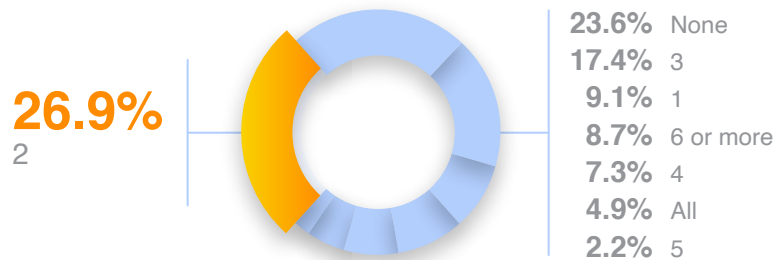
Anyone who has been on the fence about whether a mobile app is necessary, the construction industry has spoken – mobile apps are key.

Since 2016, survey responses indicating a lack of emphasis on the importance of integration have dwindled. People are growing tired of data entry and manual data transfer, especially when mobile integrations are becoming the norm- this is great news! A lack of integrations does not just cost wasted time and money on duplicate processes, human-errors in manual data entry can have serious repercussions.

Number of Construction Apps Used



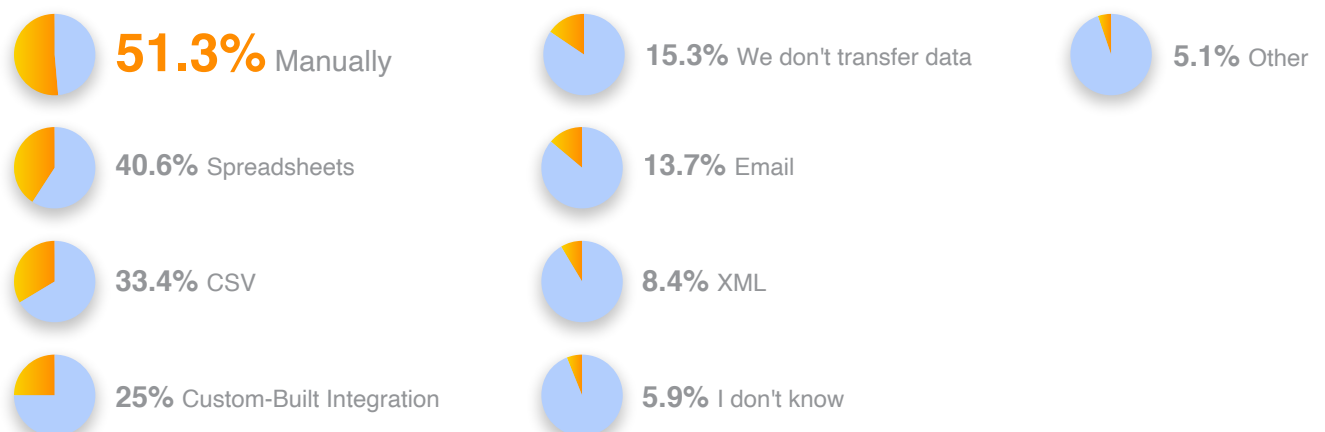
Number of Apps That Integrate



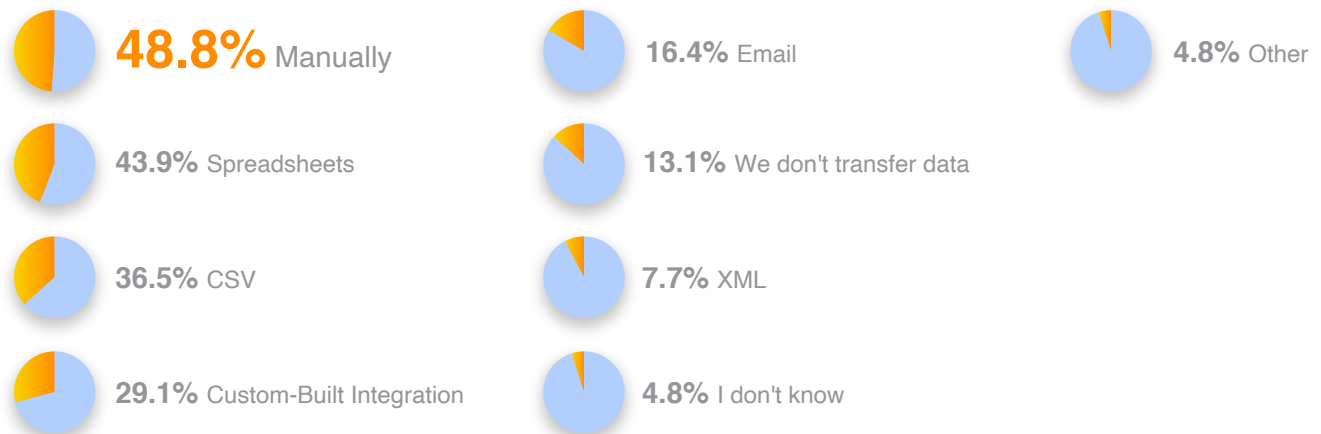
Smartphone users in 2021 use an average of 9 to 10 apps daily or [up to thirty in the span of a month!](#) Construction professionals using ‘3 construction apps’ are expected but even using ‘6 construction apps or more’ is not completely unheard of. While using 6+ apps may sound extreme, when you consider how many people may not be using construction integrations and adding more and more apps to the pile – this number makes sense.

How People Are Transferring Data When Apps Do Not Integrate

2021



2020



There amount of time wasted on manual entry is staggering, and unfortunately there is still a sad lack of integrations. Not all integrations are as difficult to find and implement as even a few years ago. In recent years, companies like Autodesk Ecosystem and Procore app Marketplace have started pre-stitching apps together to simplify integration, offering one-stop solutions. (These are great options, but not appropriate in every case.) Consumer-facing middleware providers like IFTT and Zapier can help integrate pass like Salesforce or Office for a more synchronous experience. The lack of integrations are not only wasting time, they are also costing people money.

The years are rolling forward, but integrations are staying in the past.

Technology integrations remain a big challenge for most companies with a staggering 51.3% of all respondents still manually transferring data for apps without integrations. The lack of available integrations, or prioritization of purchasing software that integrates, means outdated methods like manual transfer, spreadsheet imports, email, or other time consuming, error-prone processes may continue to cost companies time and money.

Another sobering fact from responses about data transfer is for the second year in a row, there has been yet another 2% increase in reports of “We don’t transfer data.” The number has grown from 11.8% in 2019 to 15.3% in 2021. The construction industry is overdue for more discussion and proactive measures surrounding the importance of data transfer and reducing human error and redundancies. Smart solutions and software integrations exist, so it begs the question of whether the industry is unaware or simply unwilling to prioritize this transformation.



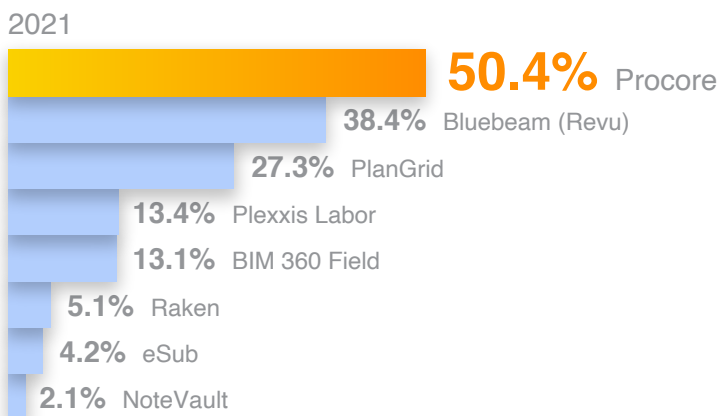
QUOTES STRAIGHT FROM SURVEY RESPONDENTS

- » *“Office software is the priority at our company, however mobile app integration would be convenient, but it can’t be bloated with unnecessary features.”*
- » *“[I wish I could improve the company I work at with] communication between software systems. Integration would save so much time for our office staff!”*
- » *“Seamless integration from pre-con to boots on the ground [would improve our processes.]”*

How Do Mobile Devices Impact Construction?

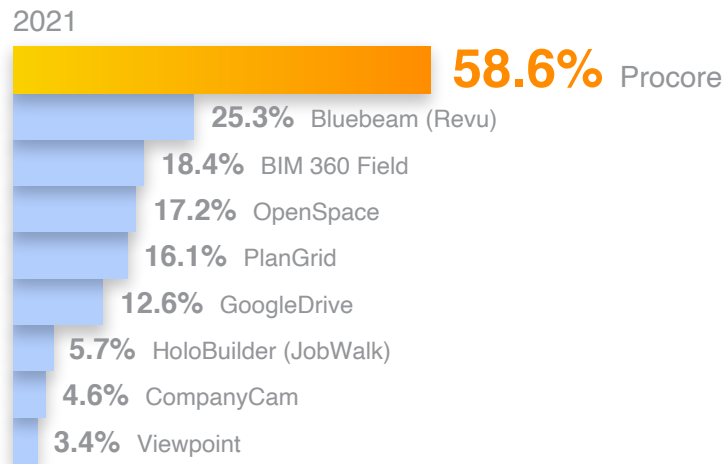
Over half (50.4%) of all respondents from 2021 named Procore as their app of choice for Daily Reporting in 2021. Bluebeam (Revu) is holding tight to second place with a 2.1% increase since last year. PlanGrid returned to third place with a 2.2% increase, and Plexxis Labor gained 5.7% over 2020 retaining their hold on fourth place.

Top Mobile Apps for Daily Reporting



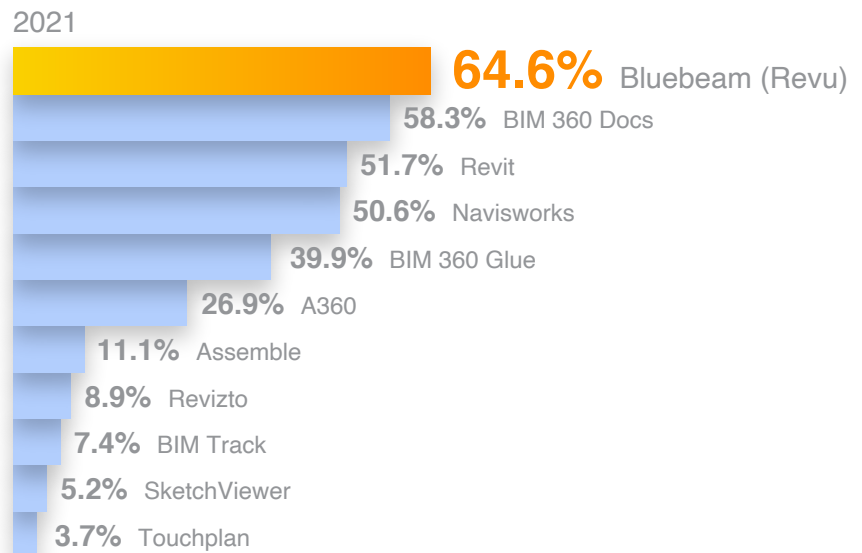
Procore maintains their stronghold on photo and video capture. A positive result for 2021 is GoogleDrive has fallen in popularity in favor of construction-specific apps! BIM 360 Field grew 6.1% in popularity since 2020 while Viewpoint plummeted to 3.4% but remained within the top 10 apps for capturing and managing photos and videos this year.

Top Mobile Apps for Capturing and Managing Photos and Videos



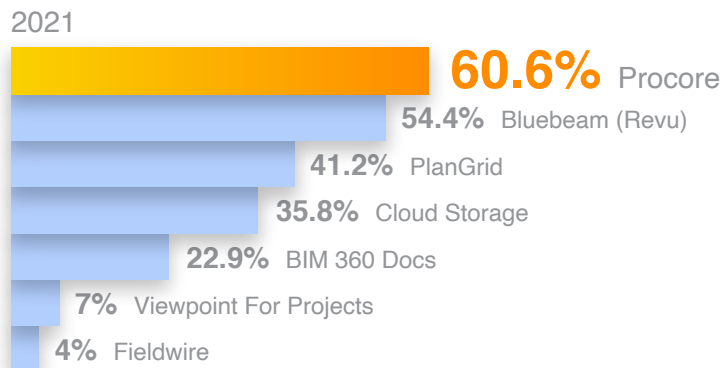
Bluebeam (Revu) continues its streak as the choice for viewing BIM files in 2021. Close contenders for viewing BIM files, each selected by more than 50% of respondents, include BIM 360 Docs, Revit, and Navisworks. (Respondents were allowed to choose more than one response.) 2021 saw respondents eschewing smaller companies in favor of longer-standing products on the market. It is unclear whether the reasoning for this is superiority, increased features offered by these products or just larger companies having more brand recognition. (Not all the apps listed are capable of viewing 3D models, some of the apps selected are being used for viewing BIM files in 2D only.)

Top Mobile Apps to View BIM Files



Procore returned as the preferred app for managing plans in 2021 at a 12.9% increase in position compared to 2020. PlanGrid also grew in popularity in 2021, although not at a comparable rate to Procore's head-and-shoulder's lead for managing plans. PlanGrid's upswing in popularity could be attributed to their acquisition by Autodesk. Fieldwire is still holding onto a space managing plans at 4% this year.

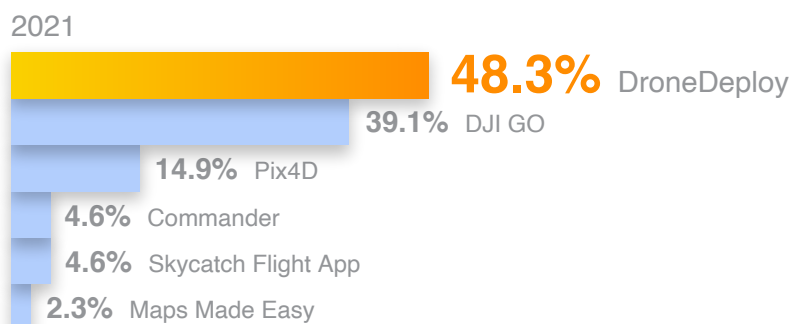
Top Mobile Apps for Managing Plans



Procore's continued growth since 2019 is likely due to their ability to integrate with other construction-specific point solutions. This strategy positions Procore as a powerhouse software that connects with "best of breed" products that may be present in their customer's businesses.

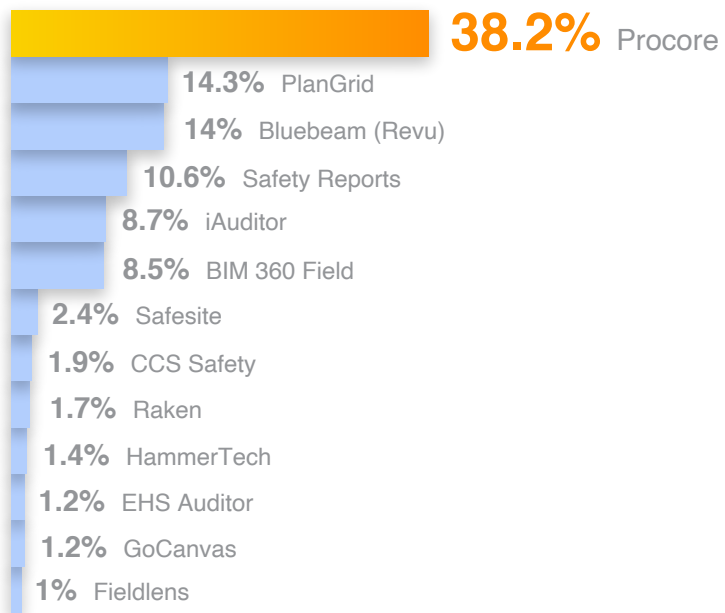
After surrendering the top spot to DJI GO in 2020, DroneDeploy is back on top in 2021! DroneDeploy's popularity took a major step forward in late 2020 when they announced their innovative jobsite reconstruction feature in collaboration with Boston Dynamics. DJI GO remains a popular drone tool inside and outside the construction sector despite products like DroneDeploy being better equipped for construction use-cases.

Top Mobile Apps for Controlling Drones



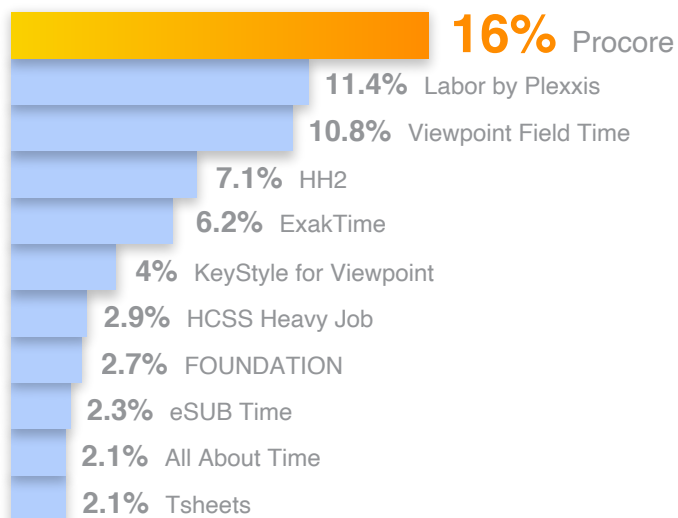
Safety applications run a wide gamut; the ConTech Survey did not specify between apps expressly for the purpose of safety and construction apps with safety features. For the third consecutive year, Procore was chosen by survey respondents as number one for mobile safety apps. With 38.2% of the responses selecting Procore as their safety app of choice, this is by far their biggest lead over prior years. PlanGrid eclipsed Bluebeam (Revue) for second place this year, and Safety Reports surpassed iAuditor for third place by 1.9.% of the vote share. Safesite made a showing in seventh place with their unique app for safety and insurance compliance.

Top Mobile Apps for Safety Management



Procore's 4% growth over their previous year's lead puts 2021's numbers for time management at a record-breaking advantage. Labor by Plexxis moved into the second-place position in 2021, unseating Viewpoint Field Time; ExakTime, and Keystyle for Viewpoint moved up in standings sending last year's fifth-place position, HCSS Heavy Job, to seventh.

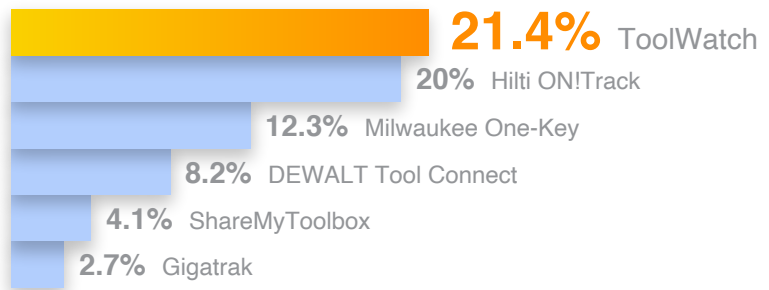
Top Mobile Apps for Time Management



The popularity of asset tracking in recent years is due to the fast ROI from recovering expenses usually reserved for replacing tools or other equipment from the jobsite. ToolWatch remains planted in the number one position for mobile apps for tool tracking despite a 4.7% reduction in popularity in 2021. More than 20% of companies reported using Hilti ON!Track in 2021, a trajectory that could easily overturn ToolWatch in the future.

Top Mobile Apps for Tool Tracking

2021



• SOFTWARE



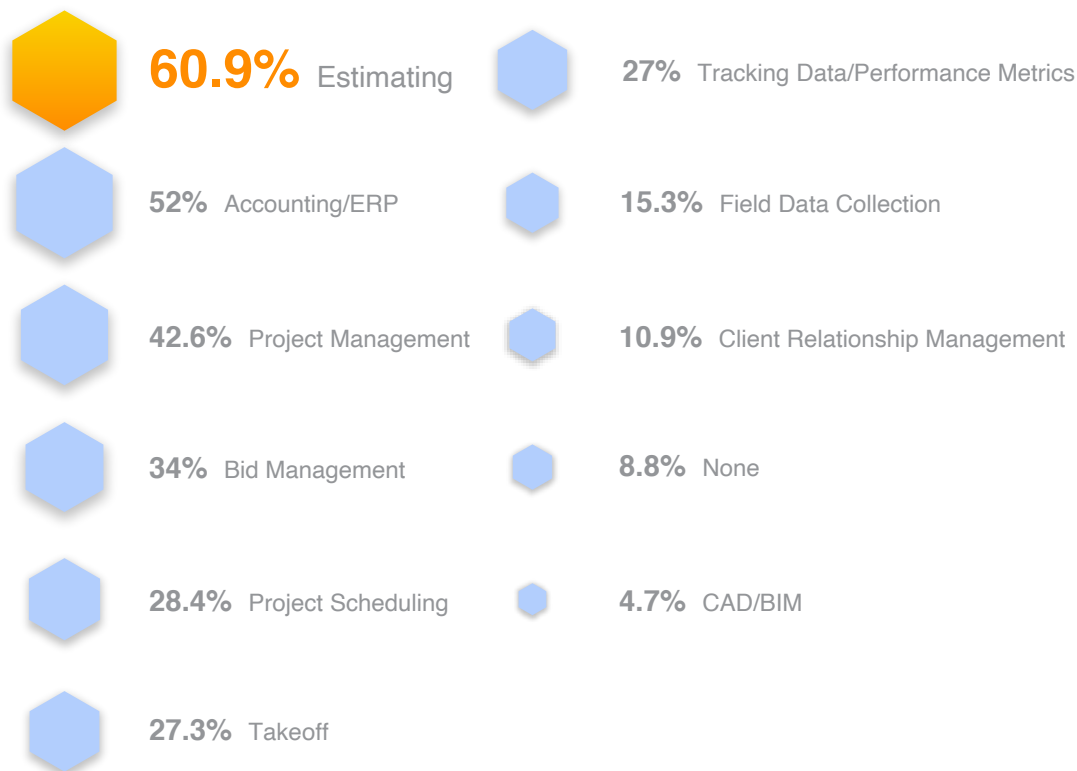
3%

of All Construction Companies
Reported NOT Using Dedicated
Construction Software.

SOFTWARE

Which Workflows Have Improved In 2021?

Workflows Companies Are Most Likely to Rely on Spreadsheets Instead of Software

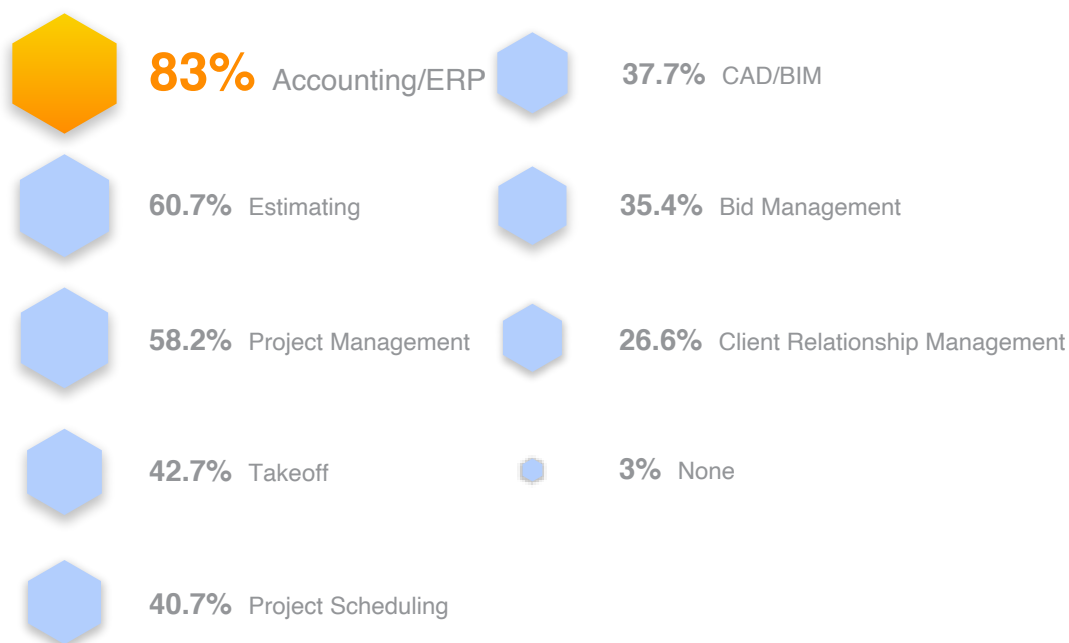


Since 2017, The Annual ConTech Report has reported the same categories making a few percentage points of progress in reducing spreadsheets use one year then undoing it the next, back and forth ad nauseum. While other disciplines may rely on spreadsheets because of habitual comfort, or a lack of understanding of other resources available - estimating relies on spreadsheets for varied reasons. Estimating has its own unique challenges specific to an estimator's geographic region, specific costs and special estimating needs that can differ wildly from firm to firm. While

several software choices for Estimating exist, not every software fits the needs of every Estimator.

This use case aside, overall construction a systemic dependency on spreadsheets that must be addressed before any real change can begin, and until then, many companies will continue to rely on spreadsheets rather than software. Continually trimming or gaining 1-3% in each category annually is hardly the renaissance the industry needs to make prolific and long-standing changes.

Workflows Companies Are Most Likely to Rely on A Dedicated Software



Given the intricacy of accounting for construction, it is unsurprising that construction pros rely on dedicated software for Accounting/ERP more than any other workflows. Construction has concentrated a lot on ERP's because of the unique challenges that come with scheduling, reporting, and other facets of construction accounting. Some companies may be comfortable using a pencil or Excel sheet for project scheduling, but it is no substitute for a robust ERP. As for other workflows, there is definitely more resistance to breaking old habits and getting used to using dedicated software.

There is not much traction toward convincing resistant processes such as Bid Management to adopt software in 2021. An overarching shift in attitude about

dedicated software and understanding of what is possible in terms of ROI and production may be necessary to cause a significant cultural shift.

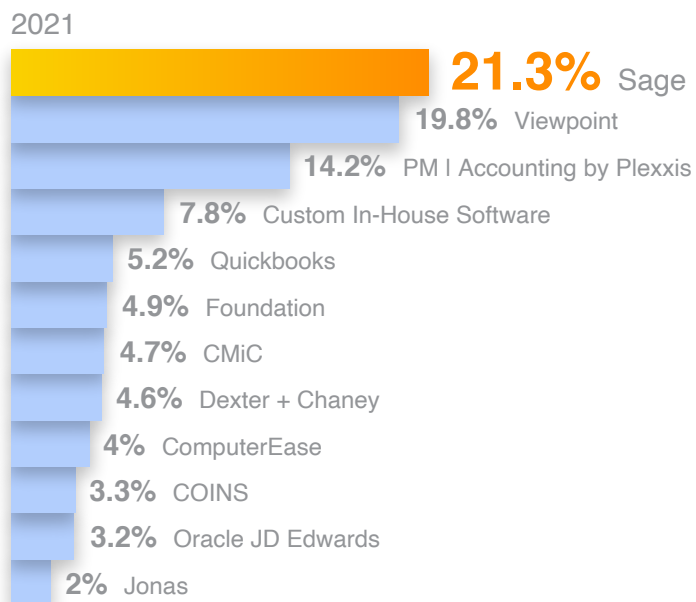
Most Popular Construction Software of 2021

Construction professionals are creative! Every year our analysts marvel at the unique uses respondents are finding for utilizing software (construction specific or even random iOS tools!) in the field. Because many of our readers use The Annual Construction Technology Report as a guide for benchmarking or learning about software and tools, we do have to narrow our focus and only include entries to our software categories when the software is used for its intended feature purpose in its category as described by its manufacturer. It is also prudent to remind our readers that JBKnowledge does not accept incentives to favorably promote or position products or apps within the report.

Since 2016, Sage and Viewpoint have blazed the trail as a favorite Accounting/ERP Software and 2021 was no exception. (Viewpoint and Dexter + Chaney are both owned by Trimble, which combined has a larger share of votes than Sage. The ConTech Report team acknowledges this but must acknowledge each product was voted on as two separate products.)

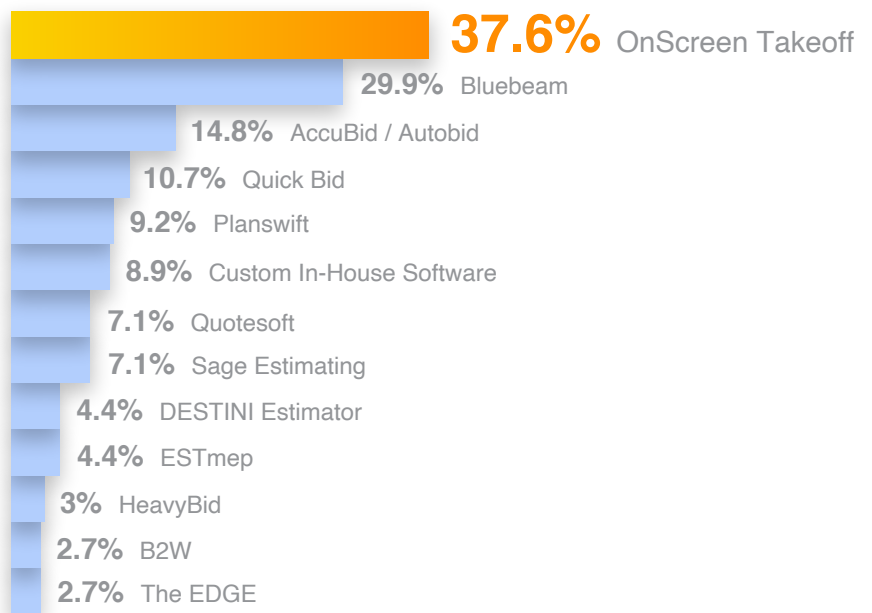
A surprising upturn this year was the rise of PM Accounting by Plexxis, a software with a focus on subcontractors, surpassed last years' favorites Jonas and CMiC by a wide margin. A significant number of respondents are still dependent on in-house software and Quickbooks

Top Accounting/ERP Software



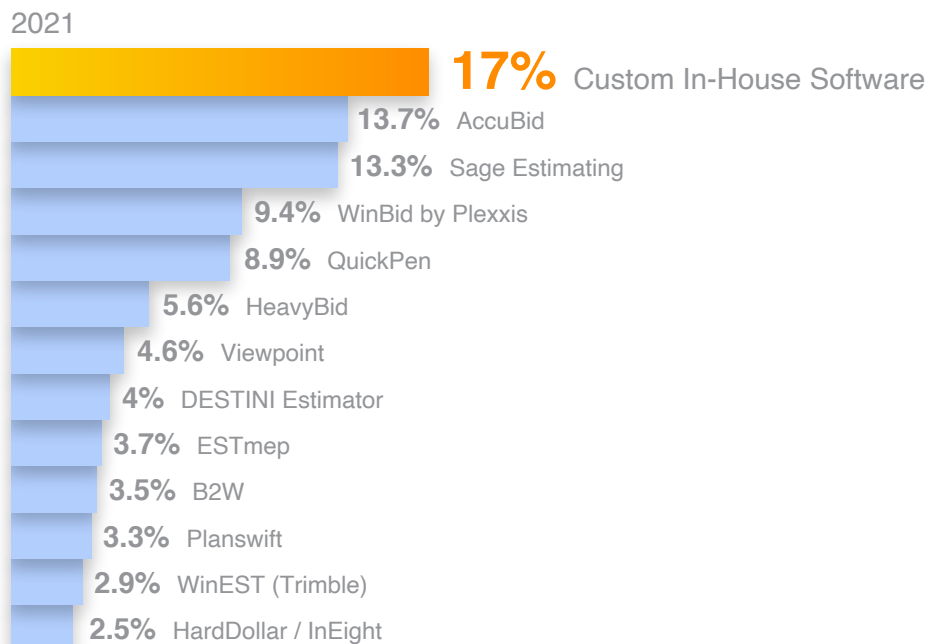
OnScreen Take-off has kept a commanding lead in take-off software since 2016. 2020 saw a contender stepping in to close the gap as Bluebeam moved in at only 5% behind. (It is important to note that Bluebeam's primary function is not a take-off, although the convenience of a take-off tool built into a plan/pdf viewing software shows promise.) This year, OnScreen Take-off widens their advantage to 8% over Bluebeam. It will be surprising to see how the next five years play out for this solid player in take-off tech.

Top Take-Off Software



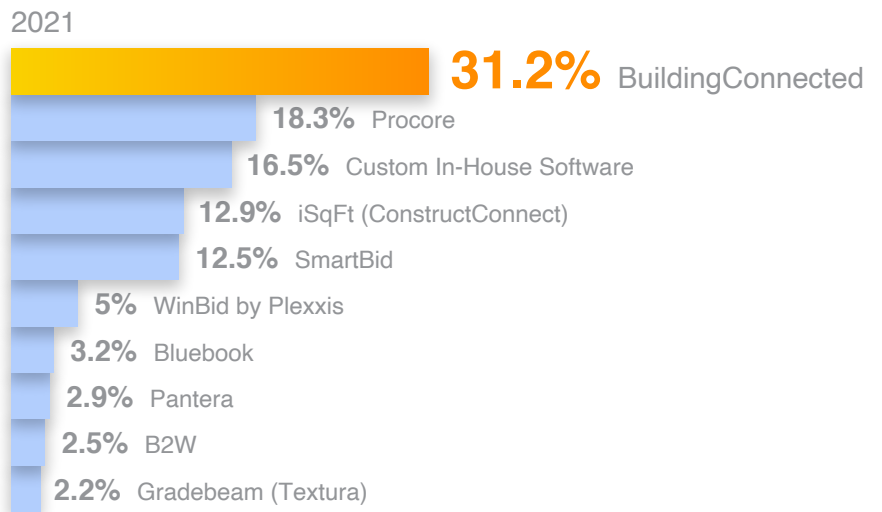
Lots of estimating software on the market means lots of action in the estimating software category. It's surprising to see that although so many estimating options have appeared in the market, apparently 'custom in-house software' is the top choice of ConTech Report respondents in 2021. It is prudent to note that although the instructions in the survey asked for construction specific software it is likely that spreadsheet software like Excel and Smartsheet were included as 'in-house software' solutions although not necessarily specified in the survey comments.

Top Estimating Software



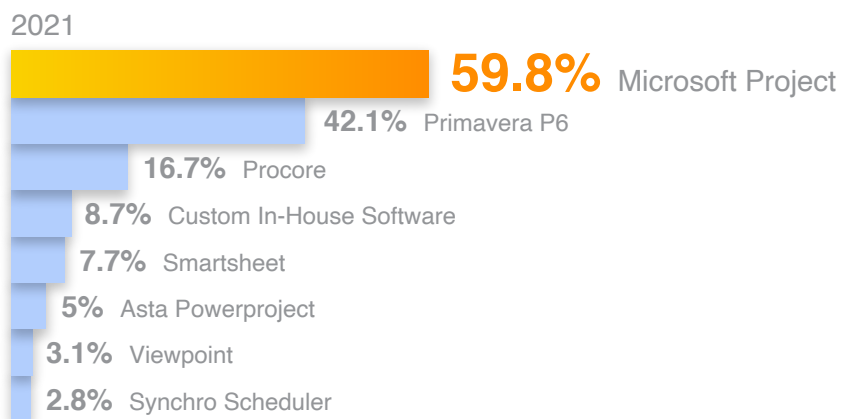
BuildingConnected is the top bid management software, although Procore (while not a dedicated bid management software) is the second most popular choice! Procore's popularity is likely due to its integrations and ability to consolidate workflows. Custom in-house software was chosen as the third most popular choice as a bid management software, this is unsurprising in bid management because many opt for using spreadsheets or Smartsheet.

Top Bid Management Software



Project Scheduling software is holding tightly to Microsoft Project and Primavera P6 with only small increases in reported numbers in 2021 over 2020 (4.7% increase for Microsoft Project and 1% decrease for Primavera P6.) Smartsheet ranks fifth, allowing respondents to stay the comfort of an 'Excel-like' environment with the freedom of collaboration and synchronization.

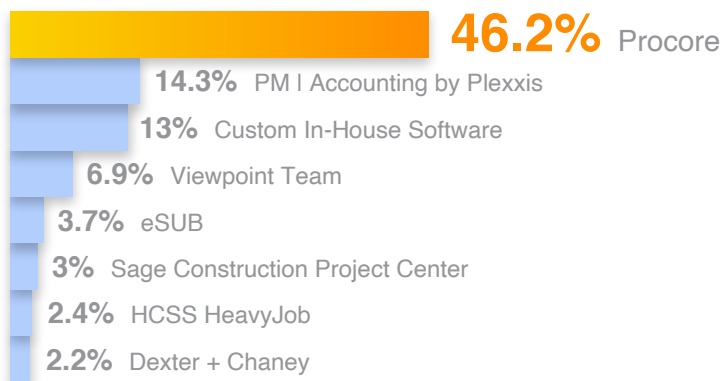
Top Project Scheduling Software



Procore may have had a blowout lead in Project Management software category, but PM I Accounting by Plexxis still made a showing with just under 15% of all responses. It is also important to mention the reported use of custom in-House software which takes lots of time and nurturing to produce desired results. Coming up the list this year is fieldwork mobile PM software solution eSub.

Top Project Management Software

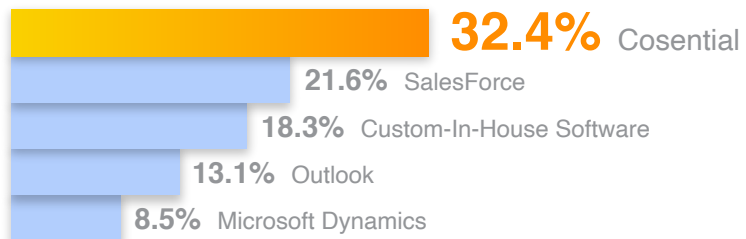
2021



Cosential has cemented its first-place position for the fourth year in a row for the Client Relationship Management software of choice in 2021. Cosential's lead is likely due to their construction project specific approach to sales and marketing as opposed to products and services. Outlook tightened the gap between second and third place with 13.1% of the market share as compared to last year's 9.6%.

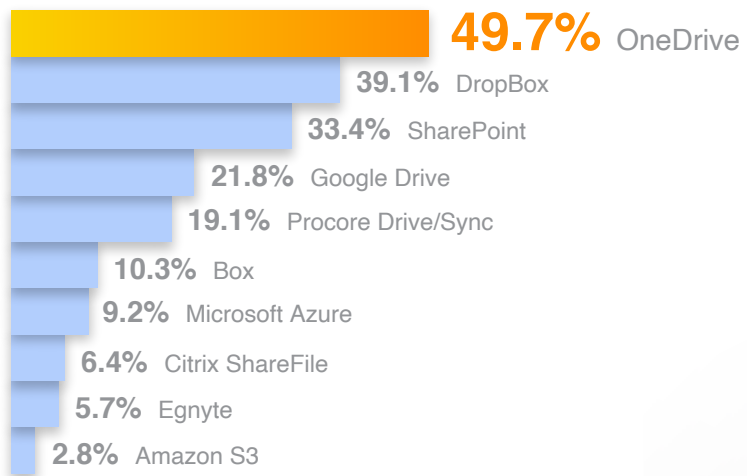
Top Client Relationship Management (CRM) Software

2021



In the search for File Sharing & Storage software, there isn't as much motion as last year. OneDrive, DropBox, and SharePoint experienced only incremental changes from 2020. It is common for Office 365 based companies to use Sharepoint in the office and integrated tools like OneDrive or Procore Drive in the field. Procore Drive construction-specific and catching up to the competitors. Egnyte is also up-and-coming for syncing to the cloud for construction.

Top File Sharing & Storage Software



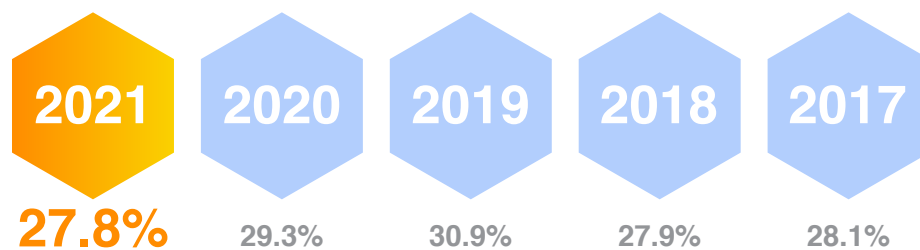
• BIM

35%

of Construction Businesses
Outsource BIM.

Are Construction Companies Strategizing BIM?

The Number of Companies That Do Not Bid on Projects Involving BIM/VDC Over the Years



There are very few legitimate reasons for companies not to use BIM.

BIM saves money by preventing mistakes before they occur, which makes respondents reluctance to embrace or invest in BIM confusing. Many respondents were very candid about why their firm struggles with BIM/VDC implementation.

For five years, The ConTech Report has cautioned that BIM is not a fad; moreover, a mandate (like the public sector mandate in the UK) could be imminent in the future. The number of companies who reported they are not bidding on projects involving BIM at all over the last five years is hovering from between 25% to 30%, and the number for 2021 is at 27.8%.

The 28% of construction pros who reported they are not bidding on projects involving BIM are not matching the level of sophistication of their competitors and will eventually lose business. Companies should not write off the future because of resistance to adopt new technology.

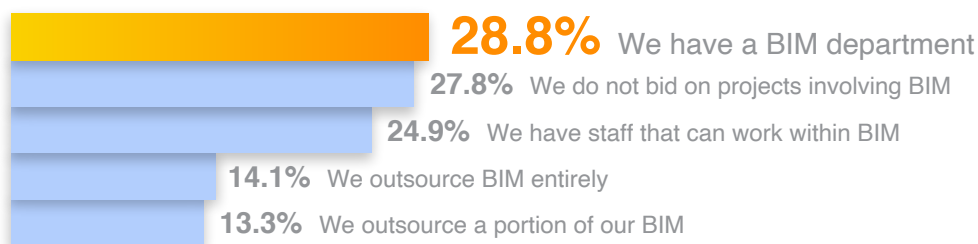


QUOTES STRAIGHT FROM SURVEY RESPONDENTS

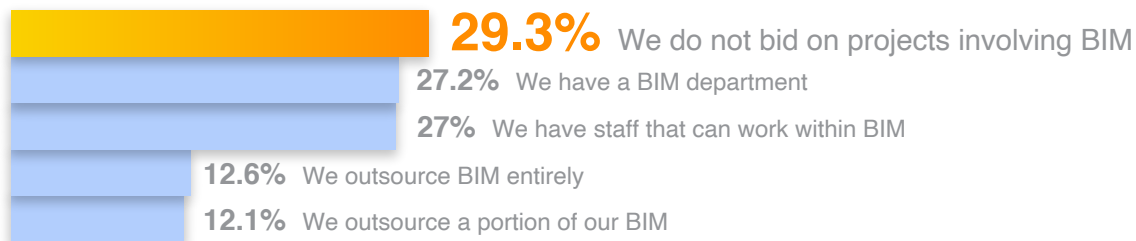
- » *“We don’t currently have the capital or staff to successfully implement BIM.”*
- » *“Not everyone follows and installs per the BIM process.”*
- » *“The biggest challenge with the BIM process is:*
 - 1. Having project teams taking charge to efficiently facilitate proper coordination process.*
 - 2. Finding other trades to keep up with project coordination speed.*
 - 3. Timing to incorporate project changes into the modeling (as changes are frequent).*
 - 4. Finalizing project modeling in time to execute project scope.”*
- » *“For our trade specialty BIM is a big waste of time.”*

Approach to BIM

2021



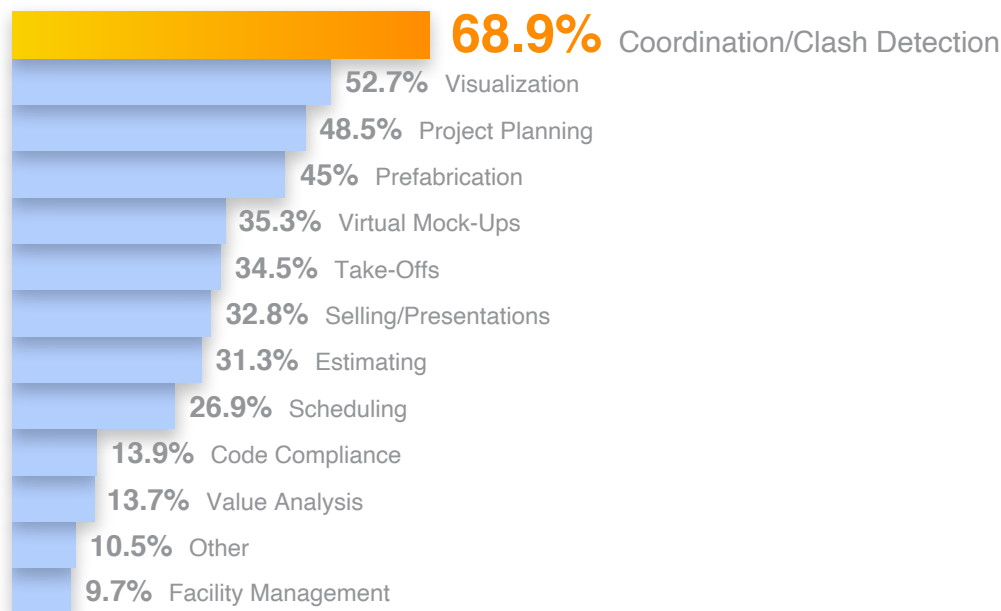
2020



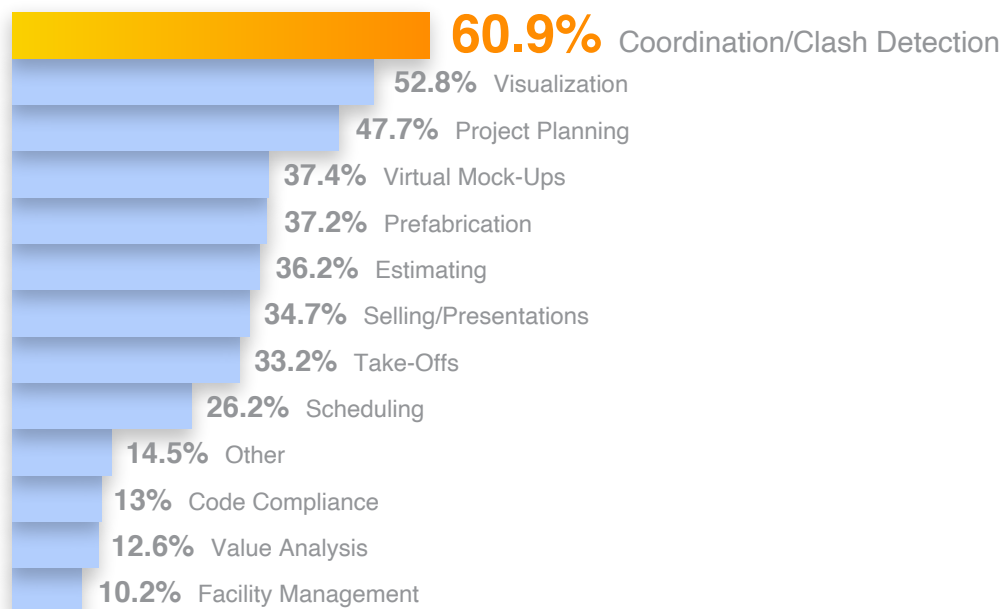
The good news is, for the first time in the past five years more respondents reported their company had a BIM department rather than the opposite of avoiding projects involving bid – the unwelcome news is this lead change is only a 1% difference. The issue of not bidding on projects involving BIM remains, despite this small win. Construction companies should bear in mind that it does not take a full in-house team to successfully implement BIM. Whether firms are outsourcing BIM or adding internal staff, an investment in BIM allows companies to scale their business and break into other markets by reducing mistakes, increasing productivity, and maximizing profitability.

How Companies Are Using BIM

2021

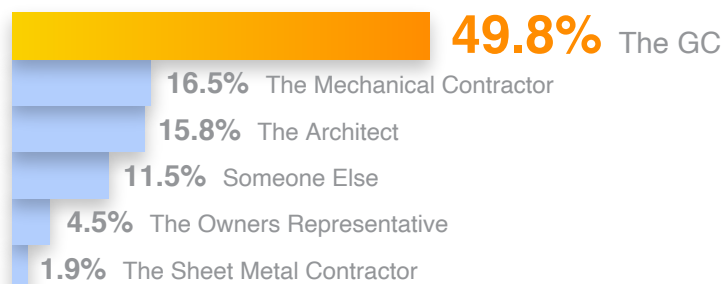


2021

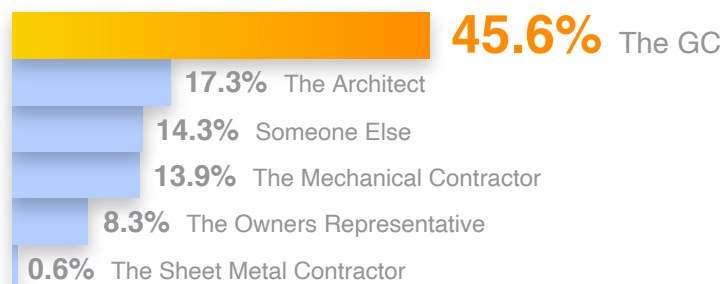


Who is Typically Taking The Lead on BIM Projects

2021



2020



General Contractors return for the fifth year as the project lead for BIM-related projects, head-and-shoulders ahead of other job titles. In second place, Mechanical Contractors have a huge opportunity to take the helm on BIM projects in an official capacity.

BIM's primary use cases remain preventing problems before they occur with clash detection and visualization, saving time, money, increasing safety, and decreasing delays. Once these advantages are known and the ROI are understood better by resistant construction leadership, adoption may be more widespread.

• INNOVATIONS

37%

of Construction Companies are
Using Drones on the Jobsite.

INNOVATIONS

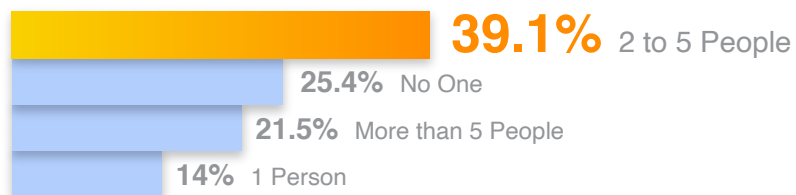
What Innovations Are Influencing Construction?

Number of Dedicated R&D Employees

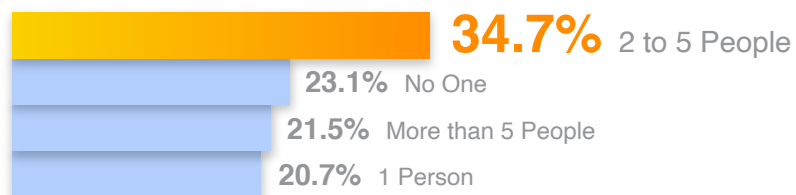
2021



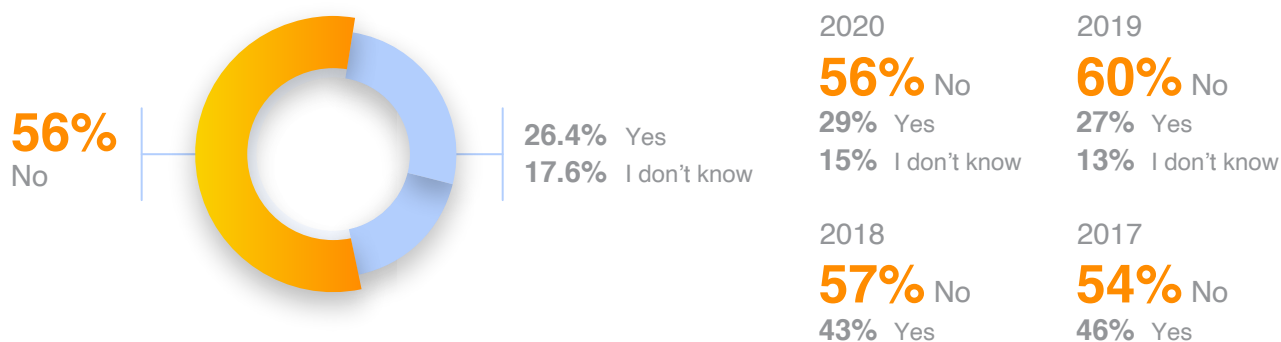
2020



2019



Companies with Dedicated Research & Development Budgets in 2021



The most important thing to remember about Research & Development is: If you make R&D a ‘spare time’ endeavor, you will only receive ‘spare time’ results. It is important to have dedicated personnel for R&D, even if it’s just a single-person department. 2021’s ConTech Survey results showed a slight 2.2% decrease in companies that reported having “a well-defined process for testing and implementing new technology” (55.9% in 2020 compared to 53.7% 2021.) If only slightly more than half of companies have a well-defined process for Research & Development, decreasing engagement is disheartening even at only 2%.

As with previous years, the issue with R&D comes down to brass-tacks – Research & Development budgets leave something to be desired. 2021 is the first year R&D budgets have declined slightly with a 3% decrease since 2020. While 3% may seem unimpressive, R&D budgets rarely increased a single percent. Research & Development needs funding in order to be successful without adequate budgets R&D cannot flourish. Companies would do well to consider the difference between tax credit eligible Research & Development and “true” Research & Development focused on building new solutions. Segmenting expenses by project is another way to drive efficiencies and directly reimburse costs associated with R&D.

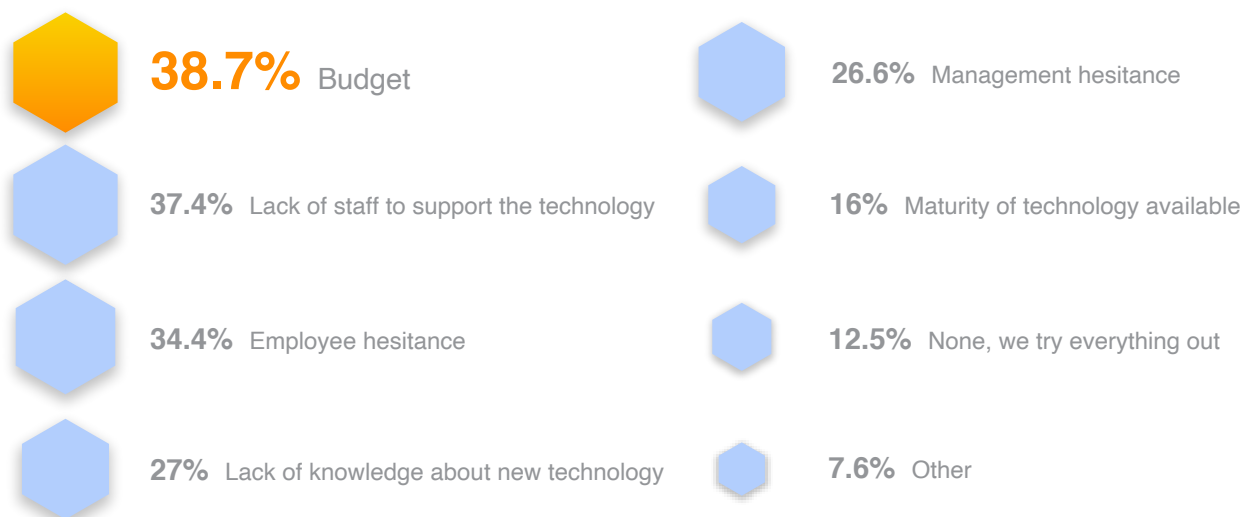
43.4% of respondents this year reported their R&D team was composed of between two to five people. It is exciting to see these teams assemble, and any number of R&D personnel at all is step in the right direction. We cannot emphasize enough that it only takes one champion to be the catalyst for change. ‘Mad Scientists’ (employees with the forethought to think analytically and creatively about advancements) drive innovations at companies of all sizes.

What is The Most Limiting Factor in Trying and/or Adopting New Technology At Your Firm?

2021



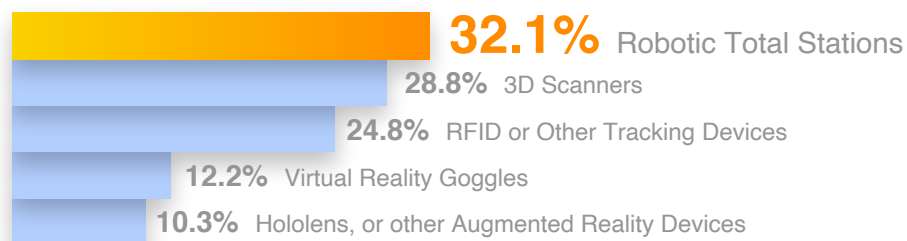
2020



In a first for The ConTech Report, we have a 3-way tie! There is no shortage of limiting factors preventing companies from adopting new technologies, respondents can take their pick. Whether it is employees' reluctance towards new technology, a lack of training or staff to support the technology, or the budget for technology – there are a lot of considerations plaguing construction firms. Implementing technology is not as simple as choosing, purchasing, and using the new tech. Employees require guidance, additional training, management support, and more.

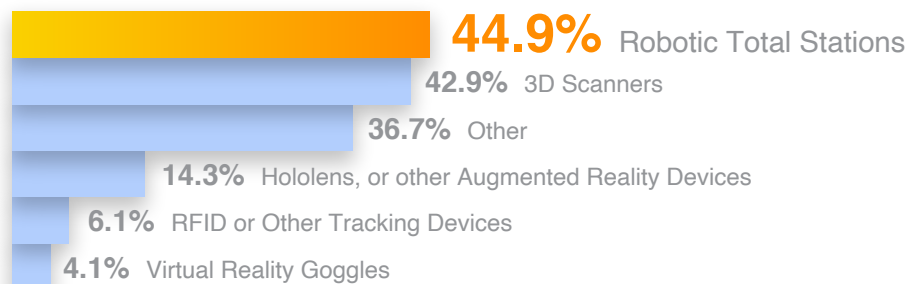
Hardware Technology Companies Are Using

2021

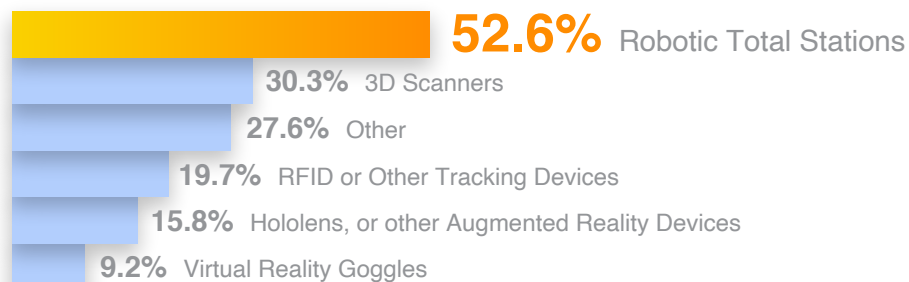


* 42.1% of respondent reported 'other' innovations

2020

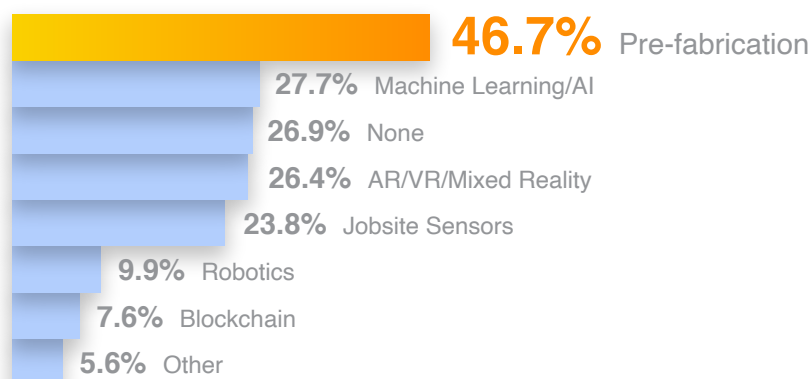


2019

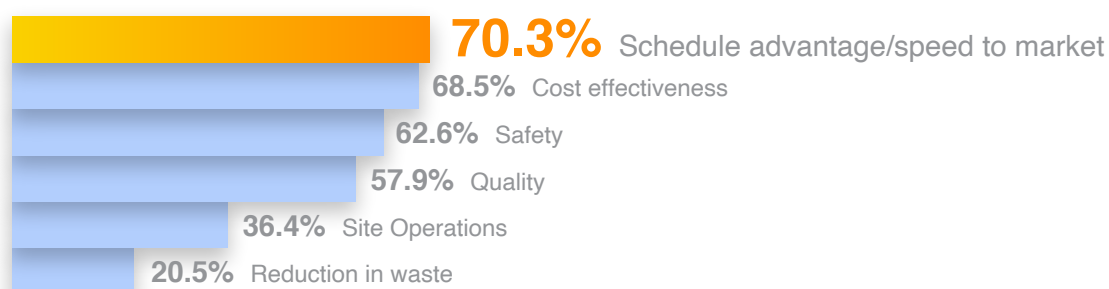


Despite declining numbers of respondents who reported investing in hardware in 2021, some companies are continuing to invest in innovative hardware. Robotic Total Stations remained in the number one spot for most popular hardware tech in 2021 with 32.1% despite experiencing a 20.5% decrease since 2019. 3D Scanners remained the second most reported hardware investment with 28.8% after decreasing 14.1% since last year. Are companies not investing in these items in favor of other non-tech upgrades? Or are companies simply tightening their belts in 2021?

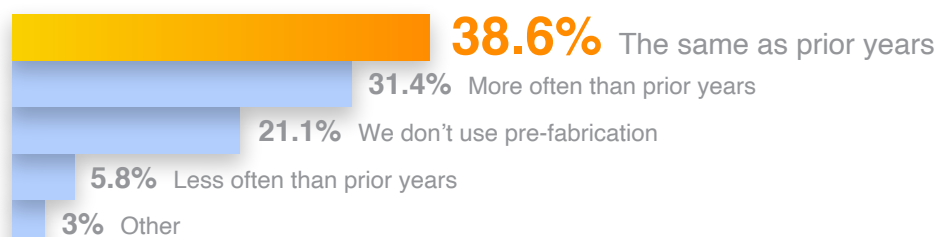
What Technologies Are Giving Your Company a Strategic Advantage?



What do you believe are the benefits of using off-site construction?



In the past 12 months, have you used pre-fabrication?

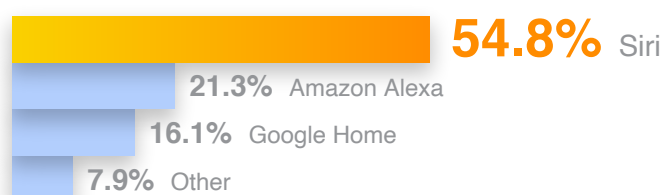


Pre-fabrication has made a big impact, with 46.7% of all respondents reporting that pre-fabrication is the innovation giving their company a strategic advantage in 2021. Off-site construction started its evolution from an add-on to a necessity in 2020 and has continued to grow 31.4% of respondents used pre-fabrication more often in 2021 than in prior years. Touting benefits from speed and safety to waste reduction and quality improvement, pre-fabrication is revolutionizing the way we build.

QUOTES STRAIGHT FROM SURVEY RESPONDENTS

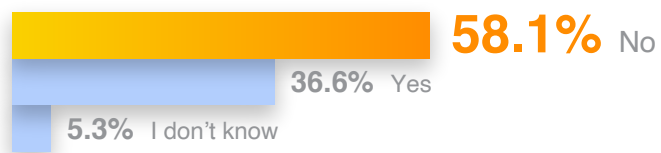
- » *“We just finished construction of our pre-fabrication facility and are beginning to roll out that process. We see it as a cost savings in a controlled environment which will also condense schedules for our projects.”*
- » *“Our market requires pre-fabrication based on 3-D modeling”*
- » *“I believe Pre-fabrication, AI/Machine Learning, and Robotics will provide us a strategic advantage because we are early adopters relative to most competitors in our region. As BIM is more widely adopted on more projects, we’ll be able to leverage that data better than our competition and gain efficiencies from robotic total stations, additional pre-fabrication volume, and machine learning.”*

Most Popular Voice Assistant of 2021



As more technology emerges on the jobsite (and even in our homes), voice assistants can help us with performing small tasks, documentation, and other features. The ease of documentation on the jobsite could be drastically improved by utilizing voice-to-text technology. For the third year, Apple’s assistant Siri remains number one and Amazon Alexa remains in second place gaining 2% over 2020.

Drone Technology Use on Jobsite



6.8% fewer respondents reported using drones on the jobsite in 2021. This may sound like a slip in the wrong direction, but it's important to consider that not all subcontractors have practical applications for drones. Drones are priceless tool for firms with projects to necessitate them, but there aren't clear cut use cases for everyone.

• CONCLUSIONS

CONCLUSIONS

What Have We Learned in 10 Years in ConTech?



The first ConTech Report by JbKnowledge was released in 2012, based on ten core-questions on software, BIM, integrations, data security, and innovations. Every year, the report evolved to probe deeper into related content, the questions we included were fleshed out to be more topical. Options for favorite software and apps changed as products launched and companies were acquired. The ever-evolving questions did not allow for a linear view of ten years of data on each specific question, although the data has uncovered recurring trends that continually emerged over the past decade.

- » Investing in IT Produces ROI
- » Security Infrastructure is More Affordable than Security Breaches
- » Human Errors are Costly
- » BIM Prevents Mistakes Before They are Built
- » R&D Needs Sufficient Budgets to Be Successful

Dear Reader,

Thank you for taking the time to read and download the 2021 ConTech Report by JBKnowledge. Every year I am humbled by the response to the report, I do not take for granted that some of you have diligently read every report for a decade. Our team works hard to put together the most comprehensive survey and report on construction technology topics to help your team make informed decisions for your business. Thanks again for trusting us to be your source for construction technology and trends.

Enjoy the Ride & Geek Out!



James M. Benham
CEO



• SPECIAL THANKS

SPECIAL THANKS

The 2021 Construction Technology Report team would like to acknowledge the invaluable contributions of the following (we could not have done it without you!)

- » **Every survey respondent**, without you there would not be a ConTech Report.
- » **ConTech Report Sponsors, MCAA, NECA, SMACNA, and CFMA.** We are honored to have the support of trade organizations committed to building a stronger workforce with technology.
- » **Texas A&M University's Dept. of Construction Science** for assisting with additional analysis.
- » **Readers like you!**
- » Just a quick reminder, we are happy to arrange any re-print requests, excerpts, or graphs from this report by reaching out via [this form](#). **Reproducing or re-printing any text and/or graphics in this report without permission from JBKnowledge is a copyright violation.**

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Keep up with the latest in ConTech with our weekly podcast! The ConTechCrew features up-to-date ConTech news and interviews with the people behind the biggest innovations in the industry.

GEEK OUT

About Partners



About the Mechanical Contractors Association of America

The Mechanical Contractors Association of America (MCAA) serves the unique needs of approximately 2,600 firms involved in heating, air conditioning, refrigeration, plumbing, piping, and mechanical service. MCAA does this by providing their members with high-quality educational materials and programs to help them attain the highest level of managerial and technical expertise. Through their Construction Technology Initiative, MCAA has partnered with JBKnowledge to provide research, presentations and resources about the impact that technology is having on the built environment and its practices, helping contractors to leverage that information to continue to deliver the best results for owners.

MCAA includes the Mechanical Service Contractors of America, the Plumbing Contractors of America, the Manufacturer/Supplier Council, the Mechanical Contracting Education and Research Foundation and the National Certified Pipe Welding Bureau. For more information about MCAA, visit www.mcaa.org. Follow MCAA on [Facebook](#), [Twitter](#) and [LinkedIn](#).



About the National Electrical Contractors Association (NECA)

NECA is the voice of the \$160 billion electrical construction industry that brings power, light and communication technology to buildings and communities across the U.S. NECA's national office and 119 local chapters advance the industry through advocacy, education, research and standards development. A diverse group of nearly 4,000 member companies account for approximately 300 million manhours per year. Visit www.necanet.org/about for more information.



About the Construction Financial Management Association (CFMA)

Founded in 1981, the Construction Financial Management Association (CFMA) is the only organization dedicated to providing construction financial professionals in North America with unparalleled career development and networking opportunities. Along with publishing the award-winning CFMA Building Profits, CFMA offers educational, professional, and connection programs through its 92 chapters, Annual Conference, and online learning to its more than 8,200 members. CFMA members are CFOs, controllers, and treasurers working at major commercial construction contractors in general, subspecialty trades, and heavy highway sectors, as well as those professionals who service these industry financial professionals, such as accountants, surety agents, bankers and IT specialists. For more information about CFMA, visit www.cfma.org. Follow CFMA on [Facebook](#), [Twitter](#) and [LinkedIn](#)



About the Texas A&M University Construction Science Department (Texas A&M)

The construction education program at Texas A&M University was established in 1946, and now enrolls approximately 1,000 undergraduate students pursuing a Bachelor of Science in Construction Science and 100 graduate students pursuing a Master of Science in Construction Management or a PhD in a myriad of areas. Both the undergraduate and graduate programs were among the first programs in the nation to obtain [American Council for Construction Education](#) (ACCE) accreditation. The program is serviced by approximately 42 full and part time faculty members, 20 of whom hold Ph.D. or equivalent degrees, many of which have extensive construction industry experience. The program integrates principles of architecture, technology, engineering, business and project management, in order to prepare students to effectively manage the total construction process. Specialized course work in building systems, materials and methods of construction, scheduling, cost estimating, structures, construction management, law and business/labor relations are also taught. This interdisciplinary approach provides the student with the best possible exposure to the various tools needed to become a construction industry leader.



About The Sheet Metal and Air Conditioning Contractors' National Association (SMACNA)

The Sheet Metal and Air Conditioning Contractors' National Association (SMACNA) is an international trade association representing 3,500 signatory contracting firms with more than 100 chapters throughout the United States, Canada, Australia, and Brazil. A leader in promoting quality and excellence in the sheet metal and air conditioning industry, SMACNA has offices in Chantilly, Virginia, and in Washington, D.C.

The technical standards and manuals developed by SMACNA contractors are accepted across the globe by the construction community. ANSI, the American National Standards Institute, has accredited SMACNA as a standards-setting organization.

SMACNA standards and manuals address all facets of the sheet metal industry, from duct construction and installation to air pollution control, energy recovery, and roofing. learn more at www.smacna.org.