

20 CONSTRUCTION TECHNOLOGY 20 REPORT

9th Edition Brought to You By



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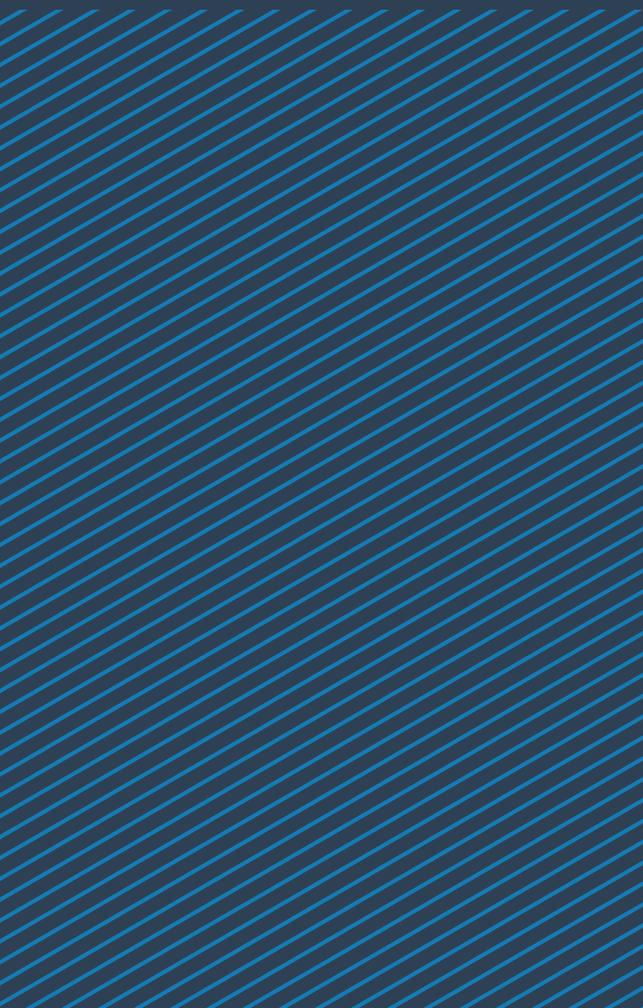
CONSTRUCTION SCIENCE
TEXAS A & M UNIVERSITY



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ABOUT THE REPORT



ABOUT THE ANNUAL CONTECH REPORT

Over the past nine years, JBKnowledge has worked diligently to bring the construction industry the most comprehensive and of-the-moment glimpse at tech for construction. For better or for worse, 2020 has been an exceptional year for many individuals and companies alike. The 9th Annual Construction Technology Report provides a snapshot of the unique challenges companies faced, and the way the industry adapted.

The 2020 ConTech Report also features the reader's favorites like selections for 'Top Mobile Apps for Construction,' 'Top Construction Software', innovation forecasts, and budgeting benchmarking. The 2020 ConTech Report also compares key data to prior years to give readers a more complete picture of how data has evolved over time!

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- » **The data in the report is courtesy of volunteers from the construction industry.** The data represented in the report was self-reported by participants of The Annual Construction Technology Survey. Participants were not compensated.
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Let's Geek Out!

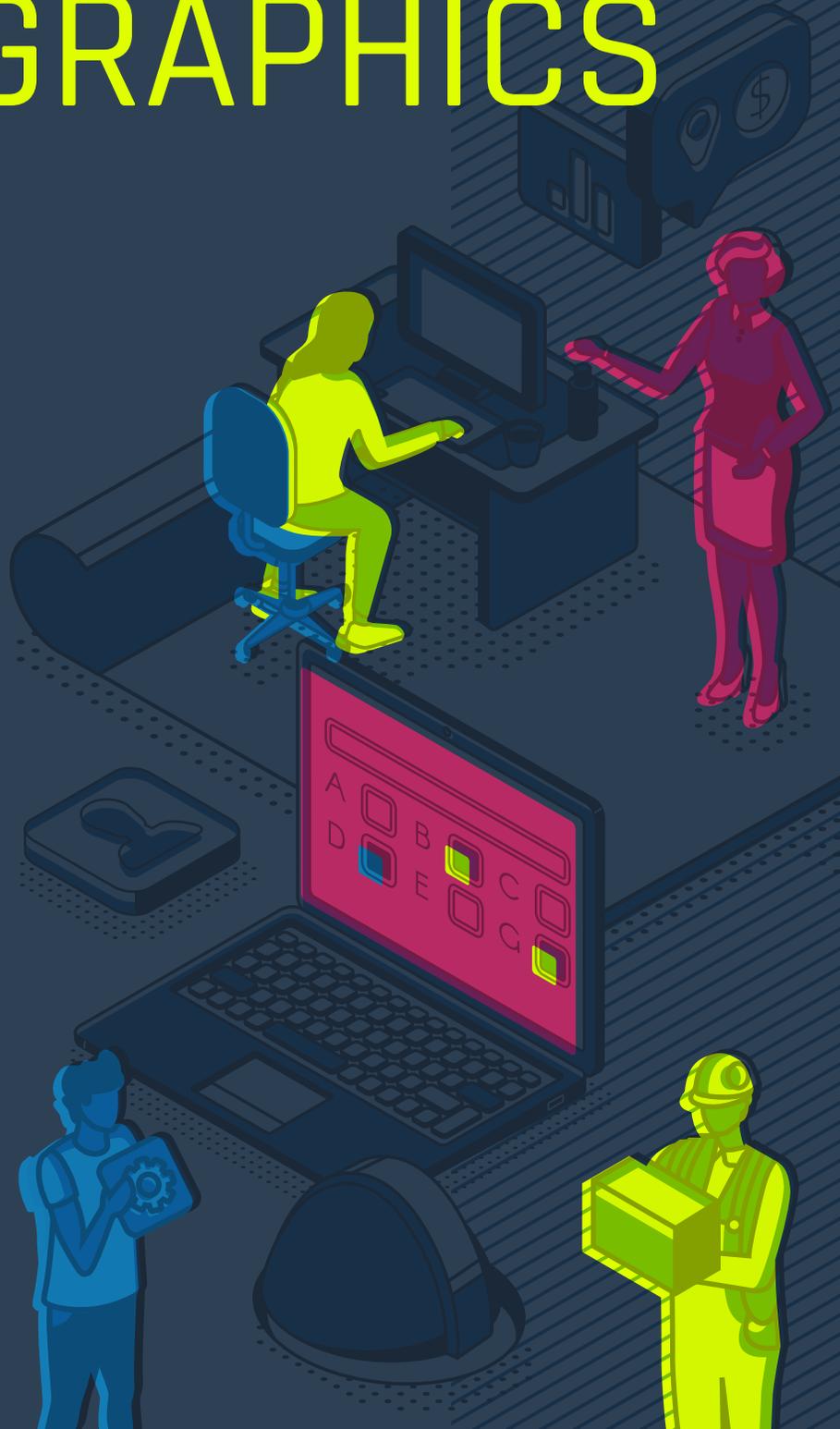
2



DEMOGRAPHICS

67%

of ConTech Report
participants worked in
Commercial Construction
in 2020



DEMOGRAPHICS

Who Replied to The 2020 Construction Technology Survey?

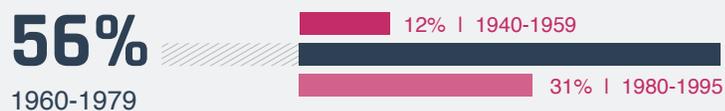
Since 2016, over 50% of the ConTech Survey's respondents were born between the years 1960 to 1979 (Generation X.) While the percent of Generation X respondents has fluctuated by only a few percentage points per year, other generations are steadily changing. Between 2016 and 2020, respondents born between 1940 – 1959 (Baby Boomers) have decreased survey participation from 22% to 12% in 2020, and those born between 1980 – 1995 (Millennials) have increased from 23% to 31%.

It makes sense that Baby Boomers retire and move on from the industry. Could Millennials be joining the construction industry as it gains visibility and becomes a lucrative career option with the opportunity to use technology?

Why Demographics Matter

Some survey respondents inquired why questions about gender and age are even relevant to the ConTech Report. Demographics are important to this report because the construction industry suffers from a skilled-labor shortage and gender diversity. By tracking information about age, readers can see if there is an uptick in young people entering the construction industry, or if construction affords older generations the ability to retire. Data about gender affords readers a view of how the construction industry is becoming more inclusive and appealing to both genders.

Generation of Respondents

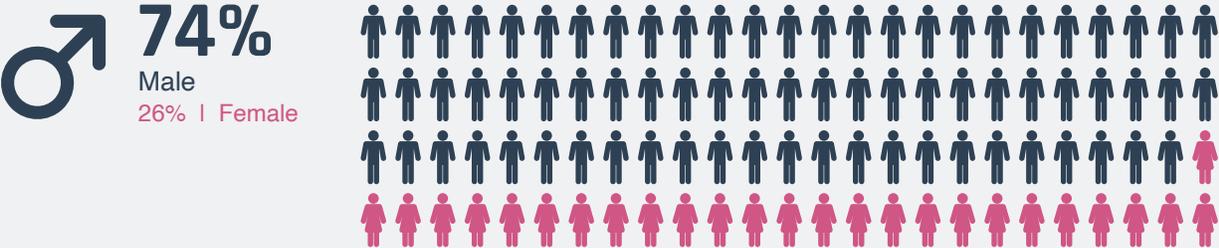


*Less than 1% of respondents reported being born after 1996 or before 1939.

Are Gender Diversity Initiatives in AEC Working?

Construction companies are investing heavily in making the trades (and other facets of construction) safer and more inclusive for women. Leadership trainings, efforts to intentionally recruit women, and other initiatives all push to increase the number of women in the construction workforce. The 2020 ConTech Report is fortunate to feature 26% female representation although women comprise only 1.5% of the construction industry (NAWIC, 2018.)

Gender of Respondents



At 26% of respondents, women accounted for only one-quarter of all ConTech Survey responses which inspires optimism that construction is becoming more inclusive. Women’s participation in the 2020 ConTech Survey took a 3% dip from 2019. Although 2020’s 26% representation is lower than 2019’s 29% rate of participation, it shows a 5% growth over the previous 5 years.

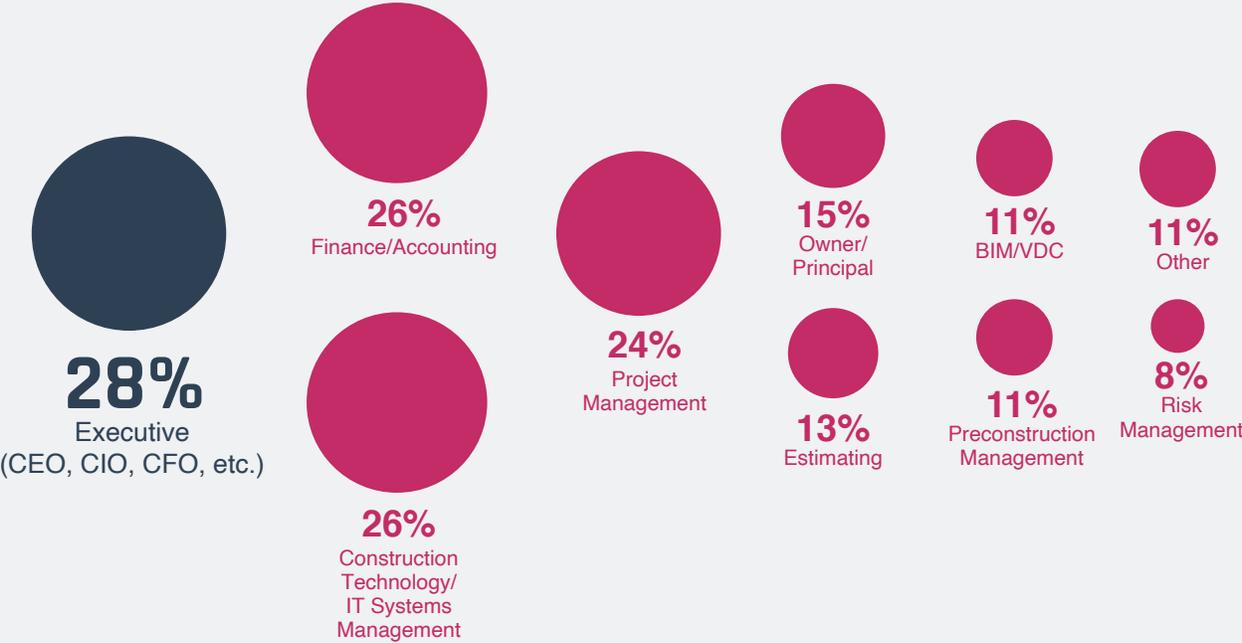
It’s difficult to speculate why a growing number of women have entered the construction industry in recent years. Are women entering construction because of gender-based initiatives? Another possibility is the evolution of the construction industry is creating more career opportunities regardless of gender.

Female Participation in The Report



What Job Titles and Company Roles Are People Filling?

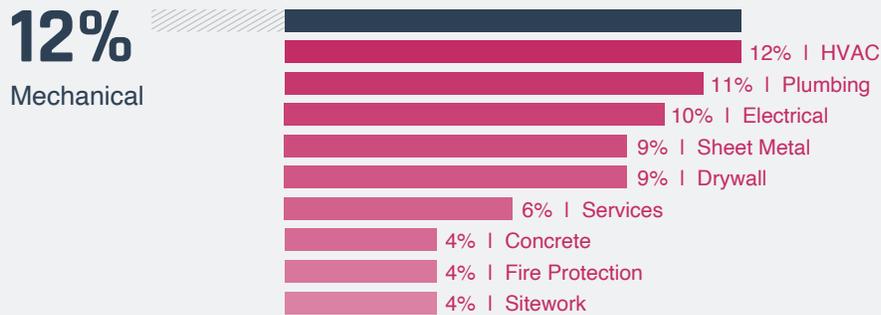
Most Reported Job Titles



Less frequent roles include: Quality Assurance, 7%; Safety Management, 7%; Project Supervisor/Foreman, 6%; Engineer, 6%; Design, 5%; Fabrication, 3%; Architect, 2%, and 11% of "Other" support roles that did not match other job titles.

As in previous years of the report, the report includes the experiences of people from all facets of the industry, from the subcontractors, to the executives and accounting departments. Executive job titles were reported the most with 28%, finance/accounting and IT tied for second place with 26%.

Top Subcontractor Trades of 2020

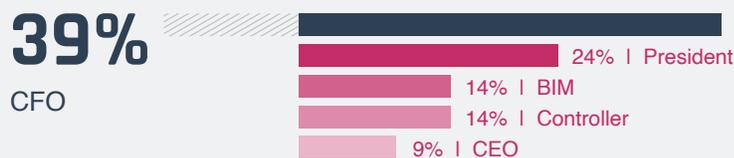


* Painting 5%, Demolition 4%, Flooring 3%, and Millwork 2%. 22% of respondents wrote in their trades as 'other' including Glasswork, Ceilings, and others with <1% of responses

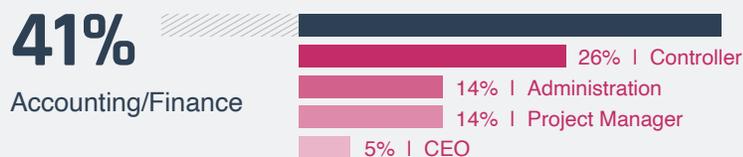
Mechanical contractors are the most represented trade in 2020. Mechanical Contractor's were the most popular trade in the 2018 ConTech Report, then eclipsed by HVAC in 2019' by only a fraction of a percentage. The return of Mechanical Contractor's first place position is a return to the top after falling to fifth position in 2019. The most dramatic increase of this category is Drywall at 17% since 2019.

Top Jobs By Gender

Male Respondents



Female Respondents



Job titles across genders have little crossover until it comes to C-suite level titles. The disparity between men and women in CEO positions is less than many would assume. Men carry a mere 4% lead over their female counterparts for the CEO job title.

Most Popular Job Titles Over The Last 5 Years

2020

28%

Executive
(CEO, CIO, CFO, etc.)



2019

16%

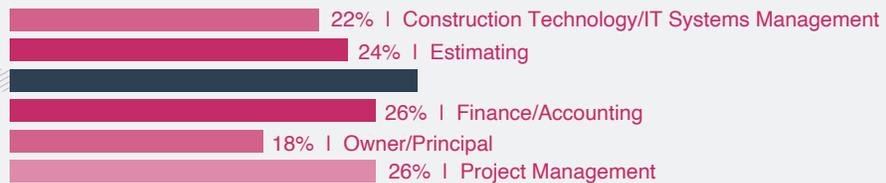
Finance/Accounting



2018

29%

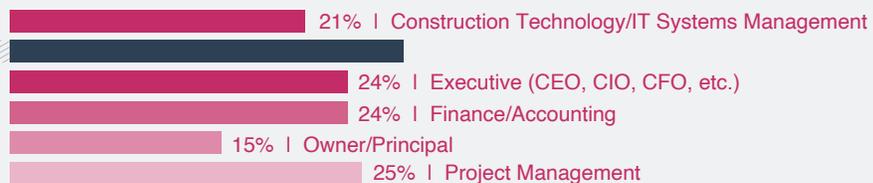
Executive
(CEO, CIO, CFO, etc.)



2017

28%

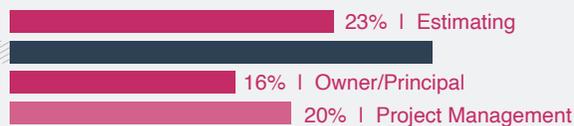
Estimating



2016

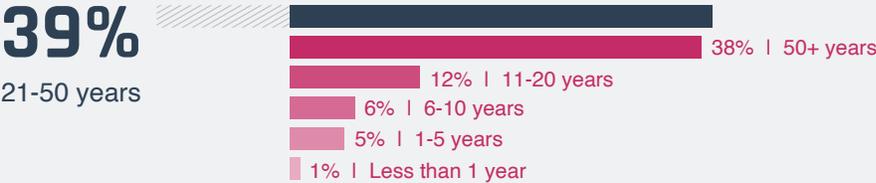
30%

Executive
(CEO, CIO, CFO, etc.)



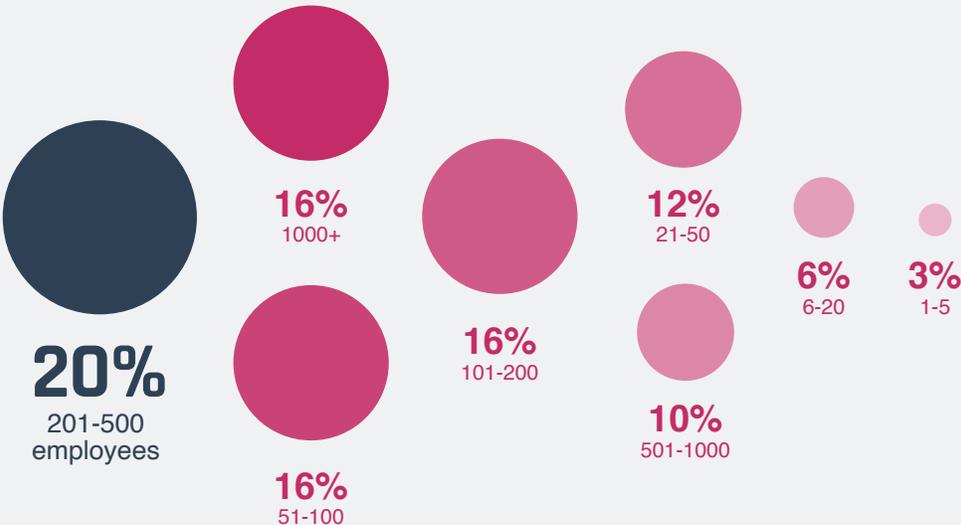
For the first time since 2016, IT/Construction Technology finally made the move into the top three job titles, while job titles like estimating and owner/principal titles are shrinking. It's promising to see technology-based job titles prioritized as technology becomes more and more integral to construction companies.

Age of Company



Although companies aged between 1-5 years old grew 1% this year, older companies continue to reign as the most reported company age in 2020. (Despite the number of companies in business decreasing slightly between 2019 and 2020.) 76% of all participating companies have been in business for 21+ year. After decades of operation, workflows and process are deeply engrained. Older companies may be 'set in their ways' and reluctant to make changes – especially when the company has been successful for decades. An outside consultant or specific figures within the company may be necessary to drive tech adoption, implement new workflows and to demonstrate the ROI of new tech and processes.

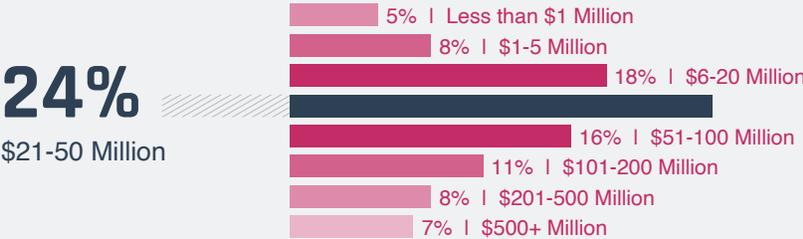
Number of Employees Per Company



* A little less than 1% of survey respondents weren't sure how many people the company they work for employs.

Companies with 201 – 500 employees continue to be the most reported by respondents. Company size of 101 - 200 employees continues to see growth and is at the highest reported percentage in 5 years.

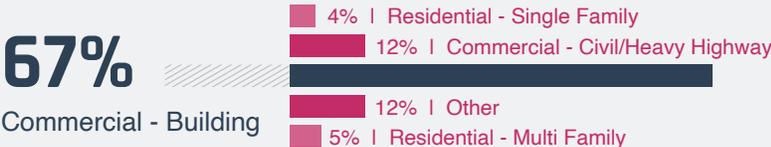
Company's Average Annual Sales Volume



* 3% of respondents reported 'I don't know.'

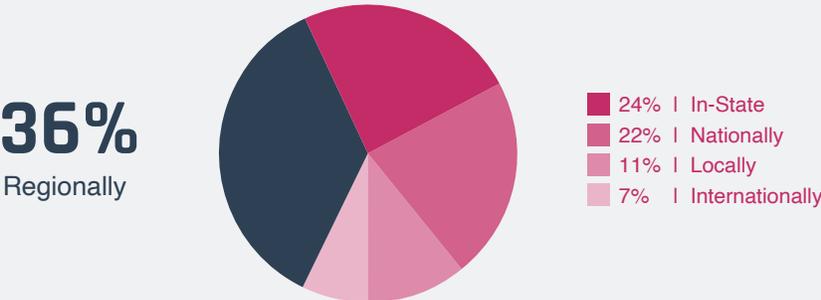
2020's most reported Annual Sales Volume is very evenly distributed toward the center with volumes reported in the 'moderate' range for construction companies.

Primary Industry



Commercial building continues to lead the Primary Industry category with nearly 70% of the share of participation. Responses to "Other" included write-in answers largely describing combinations of commercial and residential projects.

Range of Work

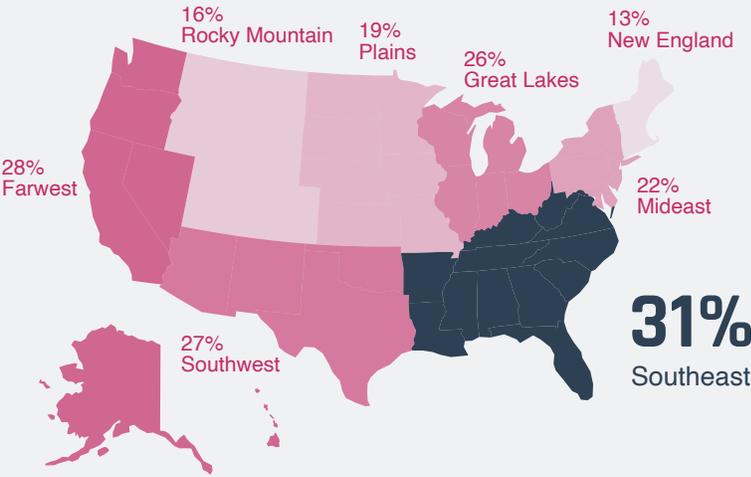


Despite receiving participation from 35 countries, the largest group of responses were based in North America.

Countries Where Construction Companies Are Working



Regions of The US Where Companies Are Working



The ConTech Survey had respondents from all over the world, although in the tradition of the report, the bulk of responses are from those who work 'regionally' in North America. One departure from prior years, the regions have moved further east to the South East and Great Lakes area. The change in region begs the question, if construction is migrating away from the west, or just picking up the pace in eastern regions?

3



IT STRATEGY & BUDGET

13%

of Respondents Experienced
A Data Security Breach
In 2020



IT STRATEGY & BUDGET

How Are Companies Prioritizing IT?

As technology infiltrates our day-to-day lives – from our smartphones, car safety technology, and IOT home appliances, all industries have noticed technology. Are construction companies realizing the value of technology budgeting, training, and staffing needed to be a success?

IT Strategy

49%

We have a dedicated IT department

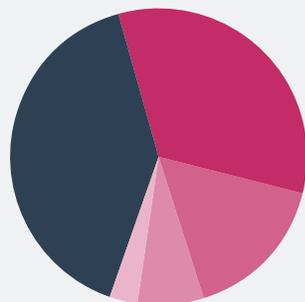


Budgeting responses were virtually static from 2019 to 2020, with responses varying only between .5% – 2% for each option. The reason budgeting changes have been stagnant may be due to typical organizational decisions or because of setbacks related to the pandemic.

How Companies Are Billing IT Expenditures?

40%

Not Billing for IT at all



- 33% | Depends on the expense
- 16% | Indirect Billing
- 7% | Direct Billing
- 3% | I don't know

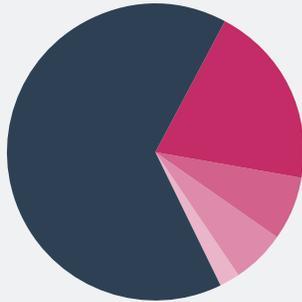
40% of companies are missing out on the opportunity to bill for some of the crucial IT helping them to get the job done faster, safer, and with increased ROI. Even implementing simple indirect billing protocols can help companies positively impact their bottom-line with minimal effort.

Indirect billing can offset the costs of technology with something as minimal as an extra line-item for 'technology' or 'IT expenses'. Another tactic for indirect billing is adding a premium to services for technology costs to offset the costs associated with technology. Whether companies choose to deploy 'direct' or 'indirect billing, it's important that companies develop a plan to recover some of the IT expenditures.

Number of Employees Dedicated to IT

65%

1-5 employees



20% | 6-15 employees
7% | 16-30 employees
6% | 50+ employees
2% | 31-50 employees

How Do I Know How Many IT Employees My Company Should Have?

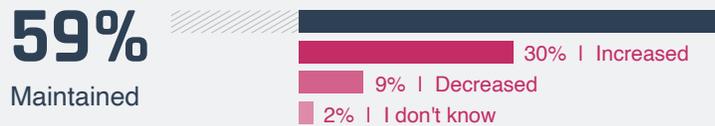
Strategy Based Budgeting is a proven method for giving companies the advantage with technology! Implementing technology is an investment in the future of the company requiring training and support staff in order to be successful.

The ConTech Survey asked participants how their company determines the number of IT employees they need.

Here are the top 3 responses:

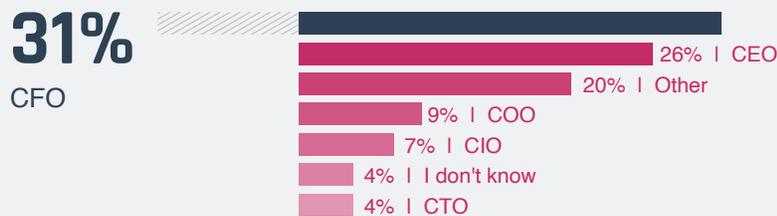
1. The number of employees needing support.
2. The number of internal software applications needing support.
3. The size of current and upcoming projects.

IT Staff Growth Over The Last Year



There have been big changes in IT staff growth through 2020. In comparison to 2019, 3% more respondents reported a 'Decrease' in their company's IT staff in 2020. 10% more respondents reported their company's IT staff had 'Maintained' its size over the past year. In 2019, 49% of respondents said their company's IT staff had 'Increased,' while only 30% of respondents reported increasing IT staff in 2020. Have companies reached the optimal IT staff size or are they reluctant to hire as voraciously in light of the current global health/economy issues.

Who Leads The IT Department?



For the third year, CFO and CEO continue to lead IT departments. Write-in answers for 'Other' were an assortment of answers between specialized IT leadership titles, committee leads, and denoting a complete lack of leadership.

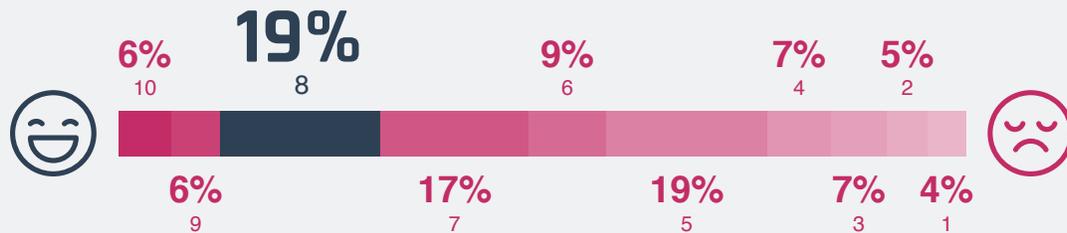
Quotes Straight From Survey Respondents



- » *"Our management's policy towards IT budget is: 'Spend less.'"*
- » *"How do we know how many IT employees we need? [We hire] the minimum number we can get by with."*
- » *"There's no dedicated number to determine, just a feeling that our one IT director is enough."*

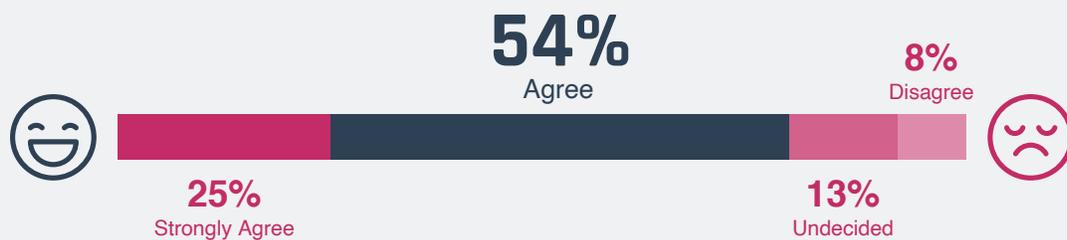
What Are Employees Attitudes Toward IT?

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

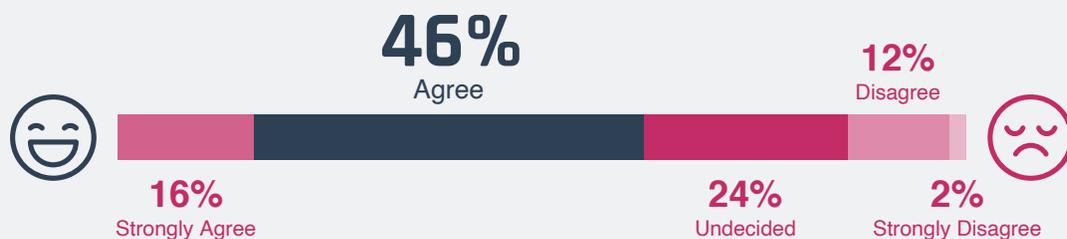


Training in the survey was defined as “1 – I get a log-in and that’s it” to a “10 – I have continual trainings that answer all of my questions.”

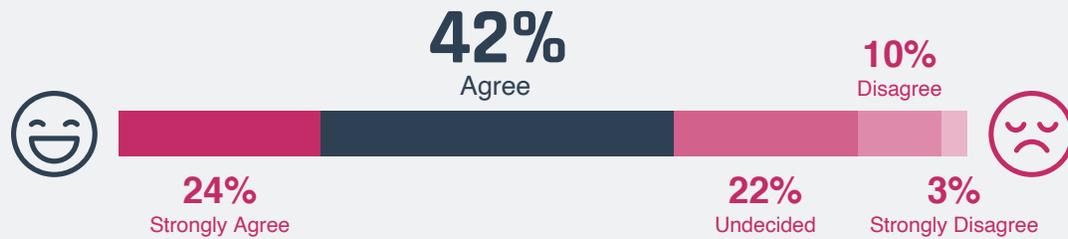
I Receive The Necessary IT Support Needed to Do My Job



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



I Understand The Technology Budget Process At My Company



Quotes Straight From Survey Respondents

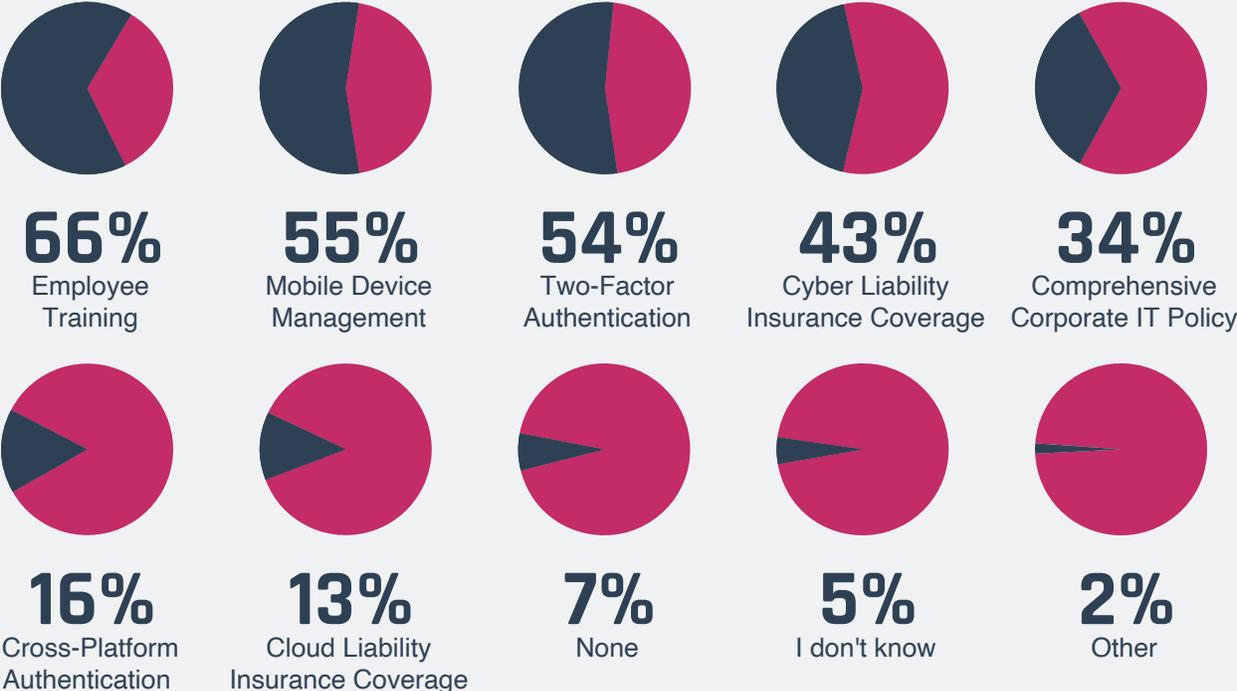


- » *“We really do not have a good handle on a technology budget. However, the support from upper management on [the] technology front is fantastic.”*
- » *“The company is receptive to providing funding for anything I may need to do my job better, but it [is]vetted for feasibility and long-lasting effects.”*

It's difficult to reconcile the positive ratings for trainings, budgets, and understanding against the influx of comments describing the contrary. Could it be that respondents are reporting over-confidence in their abilities and knowledge and using the comments to express their disappointment with company funding and support? Or are respondents simply explaining why they did not give the highest possible rating? Either way, the sentiments conveyed in the comments are in stark contrast from the high ratings.

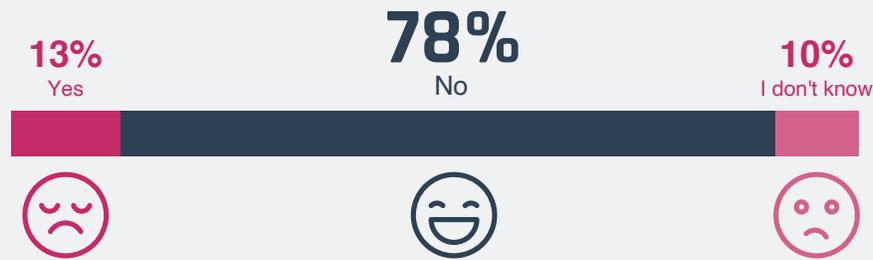
How Is Data Managed?

Percentage of Survey Respondents Using Data Security & Management Solutions



The good news is – less than 10% of respondents are ‘NOT using any’ Data Security Solutions, and only 5% ‘don’t know’ if their company uses Data Security Solutions. Two-Factor Authorization, Training, and Mobile Device Management are being implemented by more than half of all respondents. It was disappointing to see simple yet invaluable solutions like Cyber Liability Insurance Coverage, Cloud Liability Insurance Coverage, and Cross-Platform Authentication under-utilized.

Has Your Company Had A Data Security Breach in The Year?



The number of respondents who reported they 'don't know' if their company had a Data Security Breach in the last year decreased by 2%, as did Data Security Breaches! From 2019 to 2020 the comments about data breaches were much more informed about the nature of security attacks and efforts to combat them.

Respondents on Security Breaches:



- » *"Several attempted breaches were unsuccessful as far as we know."*
- » *"I don't want to jinx it by answering the question!"* [The question: "Has your company experienced a security breach?"]
- » *"Our firewall stopped a virus after about 90 seconds. It was a ransomware type virus embedded in a music player app an employee downloaded from an email with the subject line "FW: Invoice." Some files were lost and some were recoverable."*

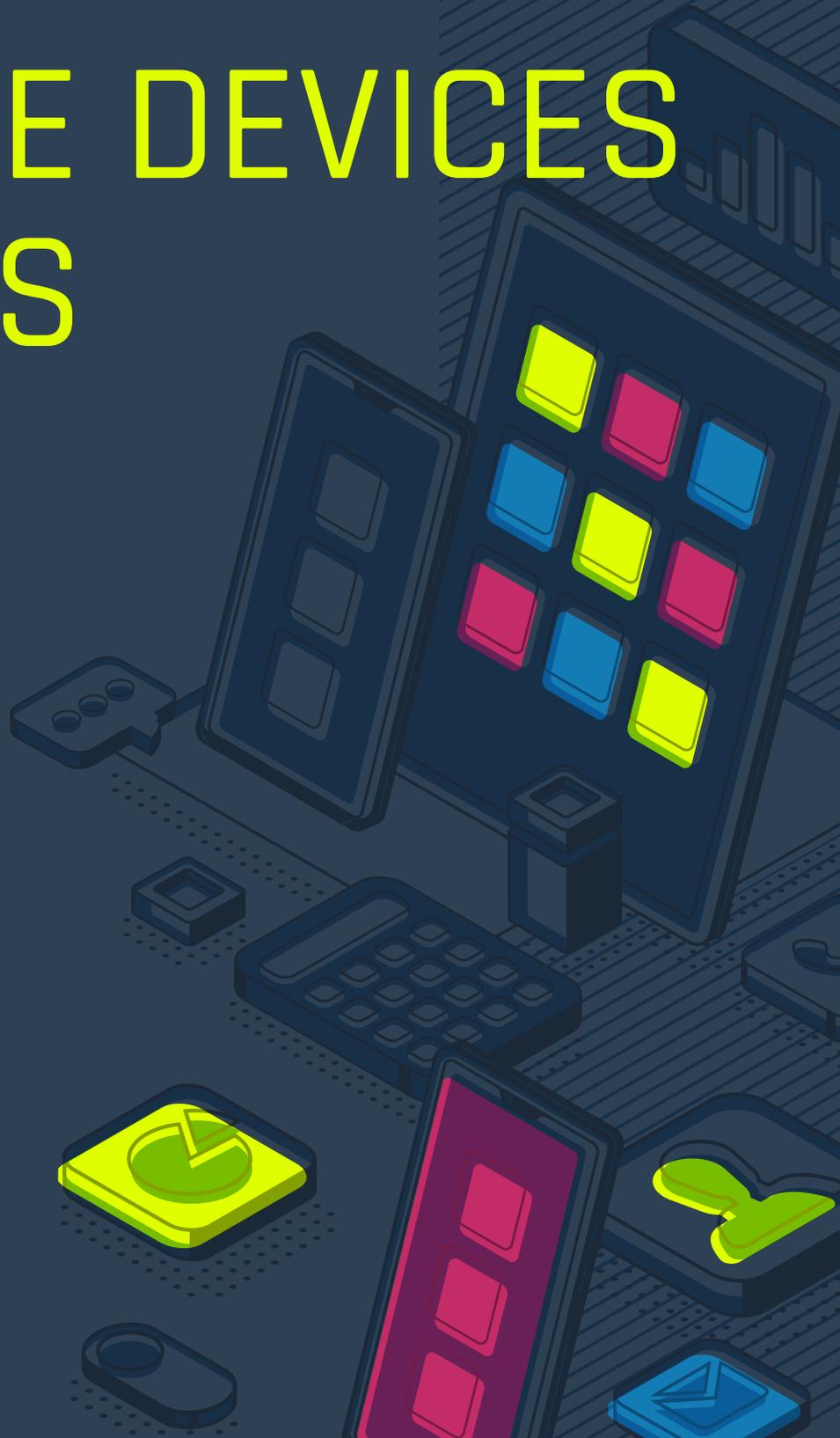
4



MOBILE DEVICES & APPS

92%

of the construction industry
uses a smartphone daily for
work



MOBILE DEVICES & APPS

How Are Mobile Devices Important to Construction?

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

2020



2019



2018



2017

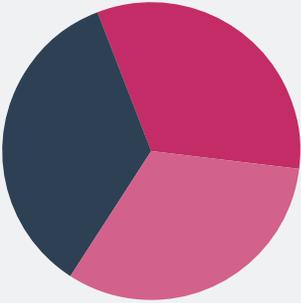


2016



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

35%
Yes



33% | No
32% | I don't know

Most Popular Mobile Operating Systems


75%
iOS (Apple)


49%
Windows


36%
Android


1%
Blackberry

Mobile device usage at work has barely changed over the past year. Smartphones using iOS (iPhones) continue to be the device of choice despite the existence of specialized devices and smartphones designed for construction. For the second year in a row, securing devices for work purposes remains an almost equal three-way split. Those who secure their devices lead by only 2% over those who do not. The fact that one-third of respondents are not securing their devices indicates that companies need to refine their Bring-Your-Own-Device policies.

Reasons Companies Use Mobile Devices in The Field



65%

Viewing BIM models



63%

For installation drawings



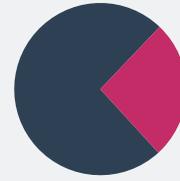
78%

Viewing project documents



71%

Creating project documentation (RFIs, emails)



74%

Service dispatch and billing



71%

Entering time for payroll



2%

We do not use mobile devices in the field

Daily reporting remains the prominent use-case driving mobile app usage in the field. Mobile devices have made BIM file viewing and Plan viewing a much more convenient and standardized process. Day-to-day operations like Time Management and Daily Reporting is well suited for construction sites further eliminating paper processes.

The Importance of Mobile Integrations When Purchasing Software



48%

Very important. There must be a mobile app available.

41%

Important. There must be plans for mobile development.



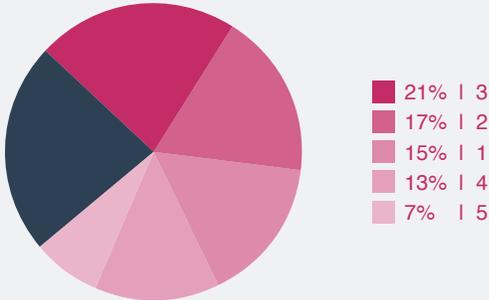
10%

Not very important. We'd purchase either way.

Mobile integrations matter to the construction industry! Only 10% of respondents expressed that they would 'still purchase software even if there was not a mobile integration.' 89% reported that mobile integrations are a dealbreaker when purchasing software – the mobile integration must either already exist or have a plan for release.

Number of Construction Apps Used

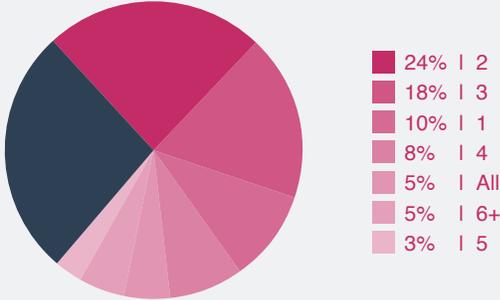
22%
6+



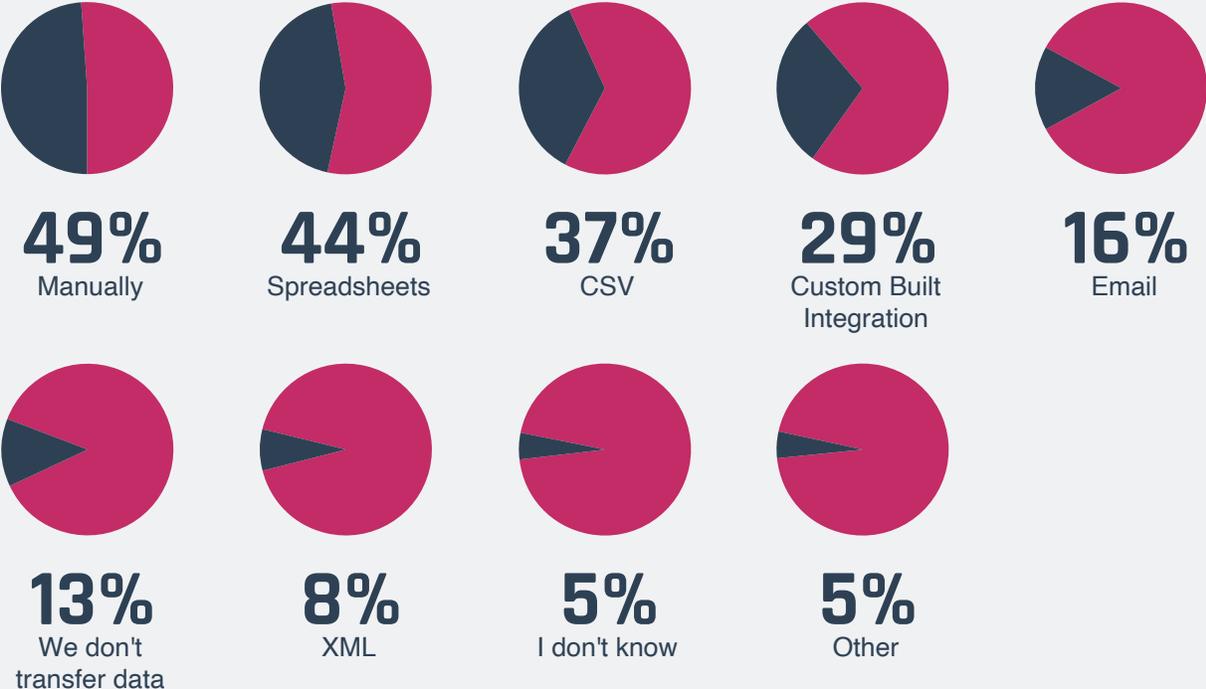
The average American uses nine apps daily. Three apps for construction alone is asking a lot of employees. Needless to say, six or more apps seems excessive, however, 63% of respondents are using three to six or more apps! Are 'best-of-breed' construction app uses so narrow that specialized apps are needed rather than more robust options with more functionality?

Number of Apps That Integrate Data

27%
None



How People Are Transferring Data When Apps Do Not Integrate



Despite professing the dire need for integrations, only 5% reported that 'all' of their apps integrated. 34% reported three or less apps integrate.

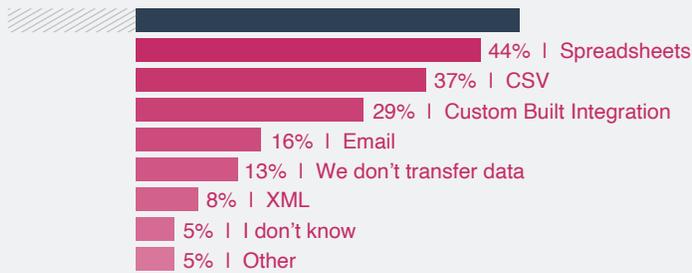
Apps that do not integrate cause costly wasted time on double-work, lost information, etc. Fortunately, 2020 integrations saw tiny victories with incremental (between 2% and 5%) decreases in manual entry, spreadsheet dependency, XML, and CSV. Although the small positive changes are easy to receive enthusiastically, the response "We don't transfer data" grew 2% in 2020. The conflicting information makes it difficult to discern whether integration adoption is picking up traction or if a reluctance to invest in integrations prevails.

How Companies Have Transferred Data Between Apps That Do Not Integrate Over The Past 5 Year

2020

49%

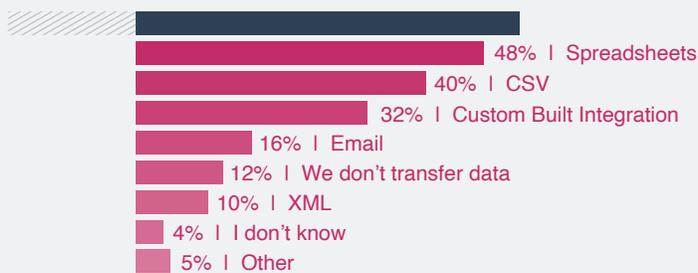
Manually



2019

53%

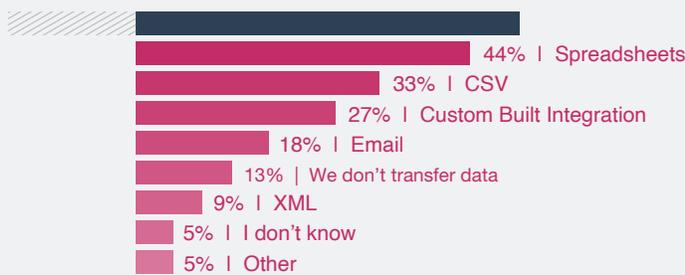
Manually



2018

52%

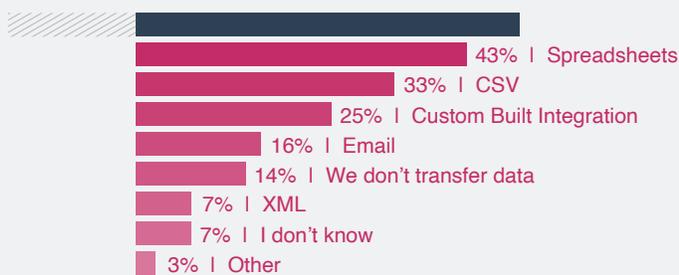
Manually



2017

49%

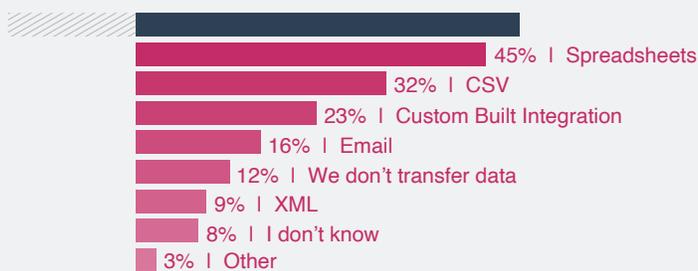
Manually



2016

49%

Manually



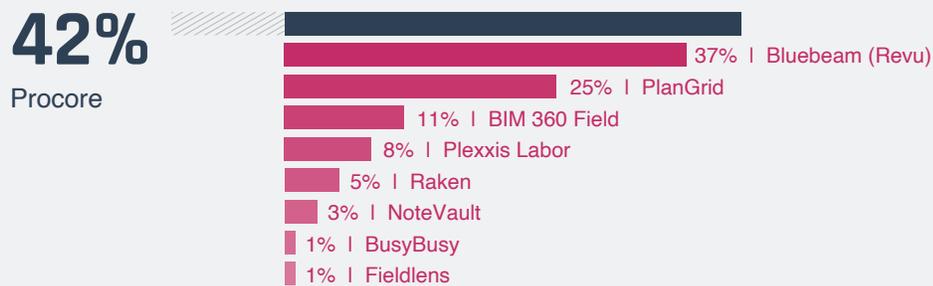
Respondents agree, integrations are important. Still, somehow either we are not shopping for ‘apps that talk to each other’, or the integrations the industry needs simply does not exist yet. ConTech influencers are rather candid in explaining how manual entry and spreadsheets are the antithesis of innovation. Perhaps this notion isn’t widely known yet, or people are unbothered by the redundancies caused by manual entry and spreadsheets. The time has come for smarter solutions, and placing integrations among the most critical features for app and software solutions.

API’s Gaining Momentum?

One surprise uncovered in the write-in comments for the 2020 survey were <1% of respondents reporting to use API’s for data that does not integrate. It will be interesting to see if this response grows in the following years or if these were one-off occurrences.

Which Mobile Apps Were The Most Popular In 2020?

Top Mobile Apps for Daily Reporting

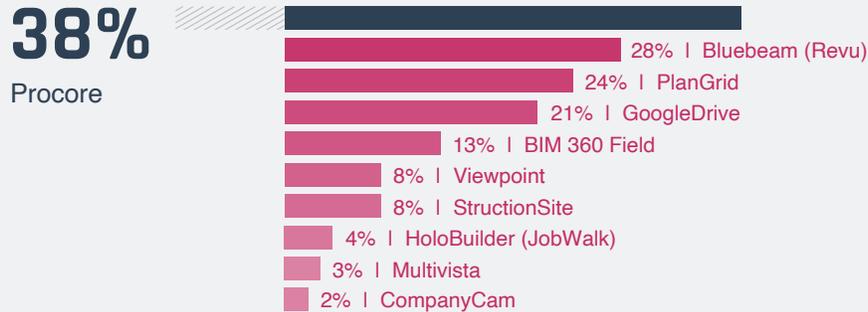


* Other, 36%

The top mobile apps for daily reporting were nearly identical to prior years with Procure, Bluebeam (Revu), and PlanGrid returning as the top three positions.

All three showed increased usage in 2019 from 2020 (18.6%, 14.4%, and 9.5% respectively). Procore gained nearly a 19% increase in reported users over the last year

Top Mobile Apps for Capturing and Managing Photos and Videos

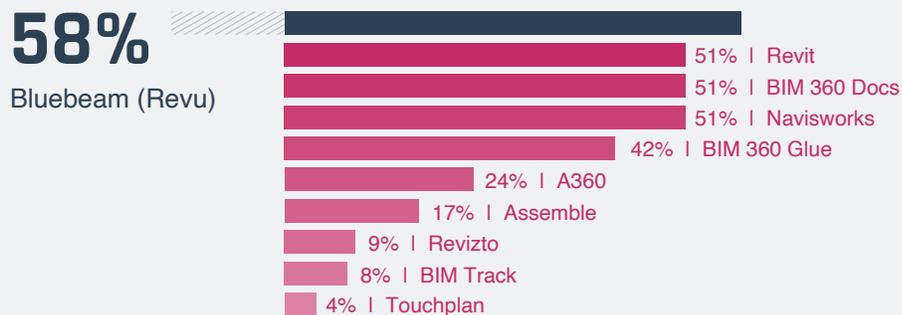


* SmartVid, 2%; FotoIN, <1%; Other, 31%



Procore's popularity as a mobile app for photo/video capture and management overshadowed last year's top photo/video capture and management app, Bluebeam (Revu) by 10% in 2020. Viewpoint and BIM 360 Field swapped standings as BIM 360 Field gained 4% more favor this year.

Top Mobile Apps to View BIM Files

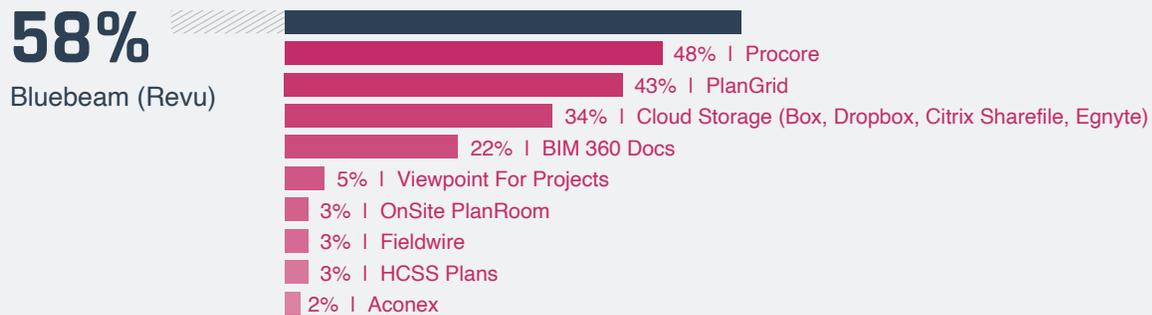


* BIMx, 3%; SketchViewer, 3%; Archibus, 2%; Bimsync, 1%; ArCADia BIM 11, <1%; Kahua, <1%; Turboviewer, <1%, Other, 18%

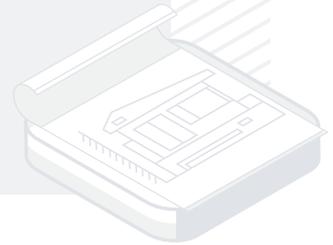


Revit is in second place for BIM file apps, growing from a sporadic write-in answer at <1% in 2019 to 51% in 2020. Use of BIM 360 Docs increased 7% in 2020, while use of Bluebeam (Revu) has decreased 14%. These changes may be the result of more software companies recognizing the importance of mobile interoperability of their product and BIM use in the field, therefore developing and offering a mobile app compatible with BIM technology.

Top Mobile Apps for Managing Plans

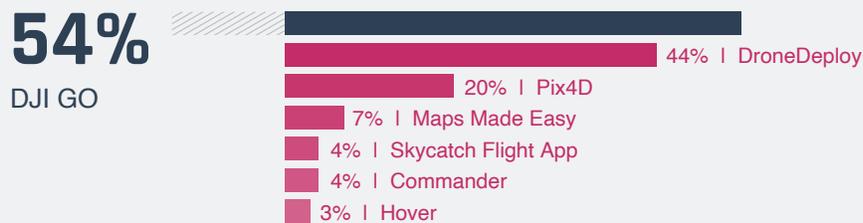


* Buildertrend, 2%; Fieldlens, 2%; BluVue, < 1%; RedTeam, < 1%; SKYSITE, <1%; Other, 16%



2% fewer respondents reported using Bluebeam (Revu) in 2020 than was reported in 2019. At the same time, more companies reported using Procore and PlanGrid (increases of 5% and 1%, respectively) in 2020 versus 2019. BIM 360 showed the most gain of any plan management mobile app in 2020 with a gain of 8% over 2019.

Top Mobile Apps for Controlling Drones

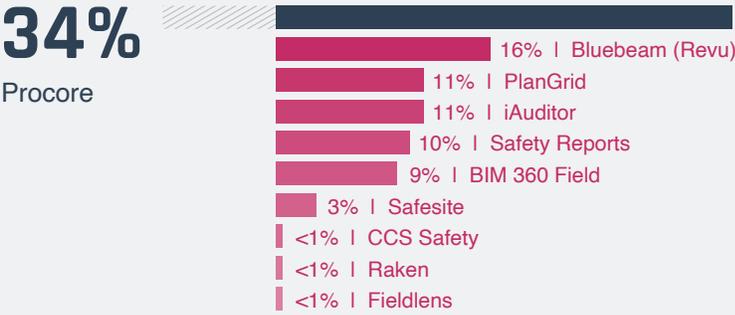


* Other, 22%



DJI GO, DroneDeploy, and Pix4D top the list of preferred apps for controlling drones. DJI GO's first place margin increased 1% from 2019. Maps Made Easy unseated Skycatch Flight App as the fourth place choice for drone apps.

Top Mobile Apps for Safety Management



* GoCanvas, <1%; Hazard Scout, <1%; SketchViewer, <1%; Oracle Latista Field Management, <1%; EHS Auditor, <1%; HammerTech, <1%; Other, 43%

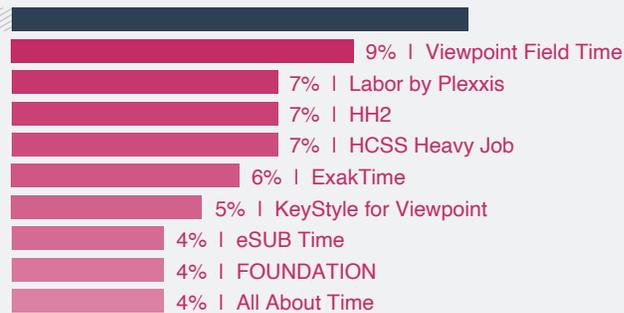
What constitutes as a safety app? There may be some confusion, or perhaps there is no confusion at all. Over 40% of respondents named favorite safety apps that were not listed on the survey, or apps for other primary purposes and only a limited safety function. Either safety is becoming so embedded in other apps that the lines of 'safety' as a stand-alone category are blurring – or in coming years the ConTech Survey must be more deliberate in defining what makes a safety app.

For the second year, Procore is the chosen safety management app by a wide margin. Bluebeam (Revu) comes in second place with 16% for the second consecutive year also. Growing 1% in 2020 allowed PlanGrid to share third place with iAuditor.

Top Mobile Apps for Time Management

12%

Procore



* Tsheets, 4%; Rhumbix, 3%; Raken, 2%; BusyBusy, 1%; mJobTime, 1%; Austin Lane, <1%; ClockShark, <1%; InEight, <1%; Replicon, <1%; Other, 41%

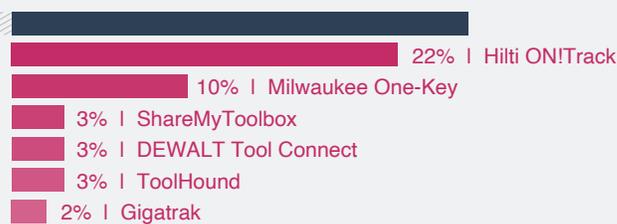


Once again, Procore is the choice app for time management with Viewpoint Field Time coming in for second place.

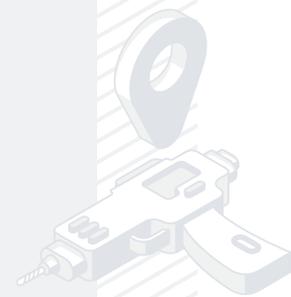
Top Mobile Apps for Tool Tracking

26%

ToolWatch



* Other, 39%



As asset tracking grows in popularity, we have added a question about preferences for tool tracking apps. ToolWatch and Hilti ON!Track are easy favorites, while Milwaukee One-Key makes an appearance in third place.

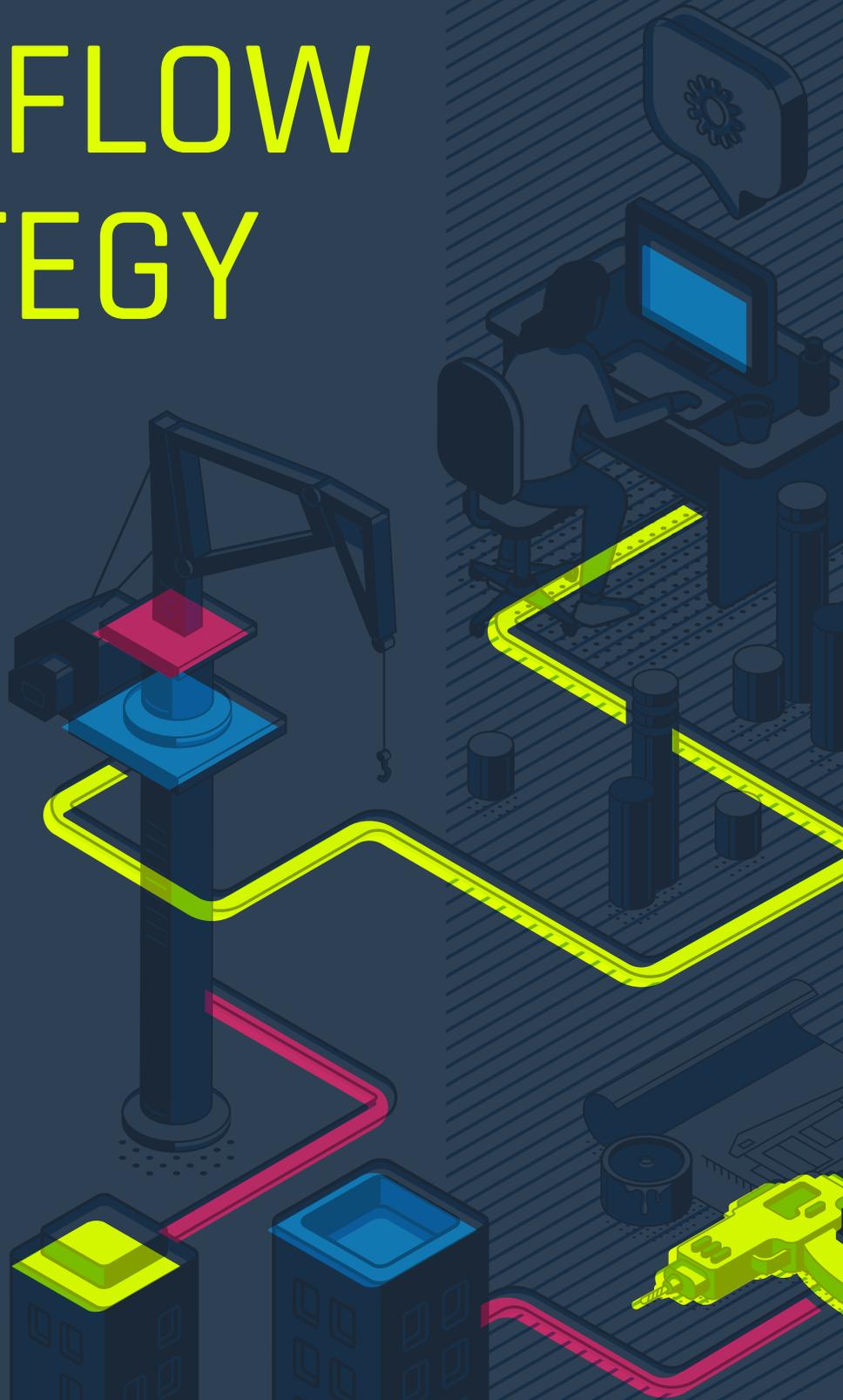
5



WORKFLOW STRATEGY

45%

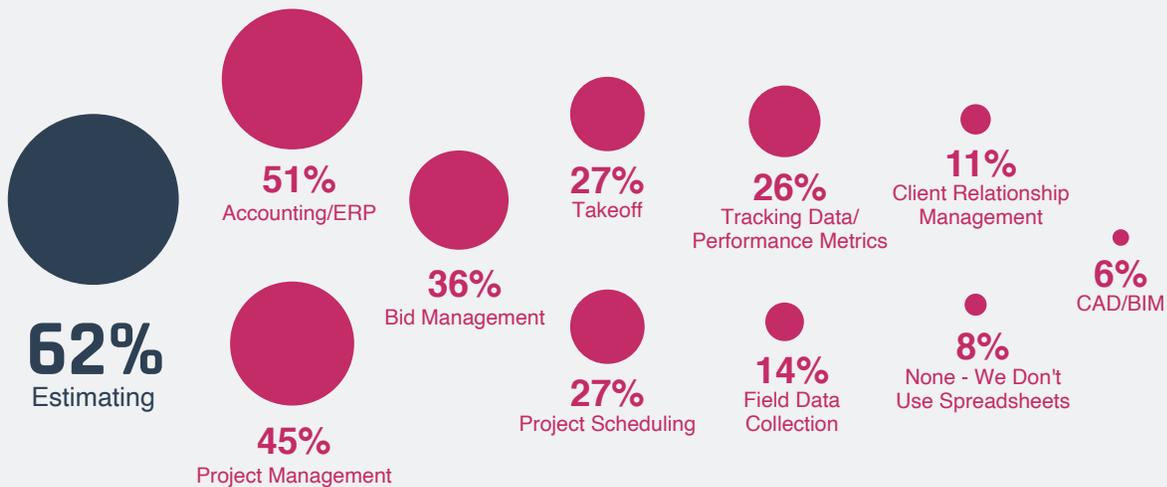
of Project Management workflows are still depending on spreadsheets



WORKFLOW STRATEGY

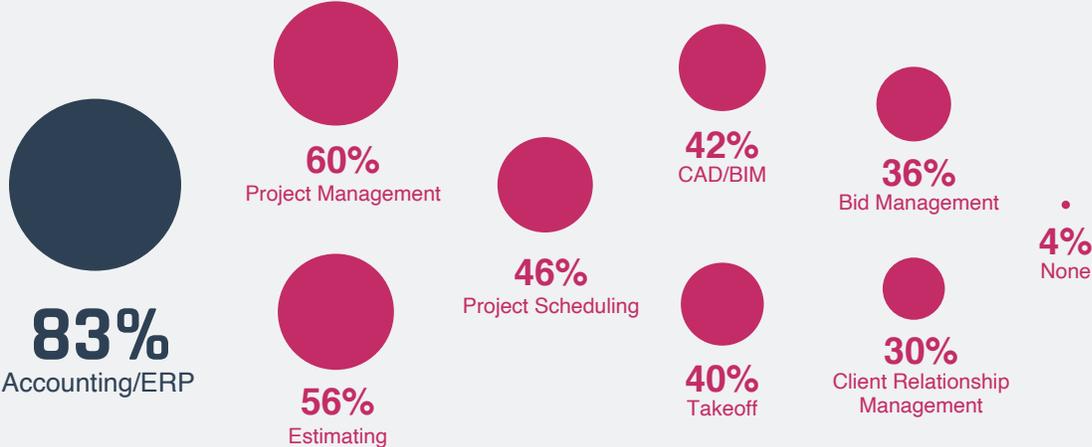
Are Workflows Improving in 2020?

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



It is true that the same occupations are spreadsheet dependent year after year, although 2020 saw an overall decrease in workflow dependency. Each category trimmed between 1% to 4% from 2019 to 2020. While we cannot be certain, our hope is that this is indicative of a small shift toward replacing the spreadsheets with apps or software.

Workflows Companies Are Most Likely to Rely on A Dedicated Software



Project Management, Take-Off and Bid Management each saw growth in 2020. While the changes aren't staggering, the small conversions from spreadsheet to software should not be overlooked. Whether it's a better understanding of how to use software or respondents finally appreciating the ROI of software – the needle is moving forward.

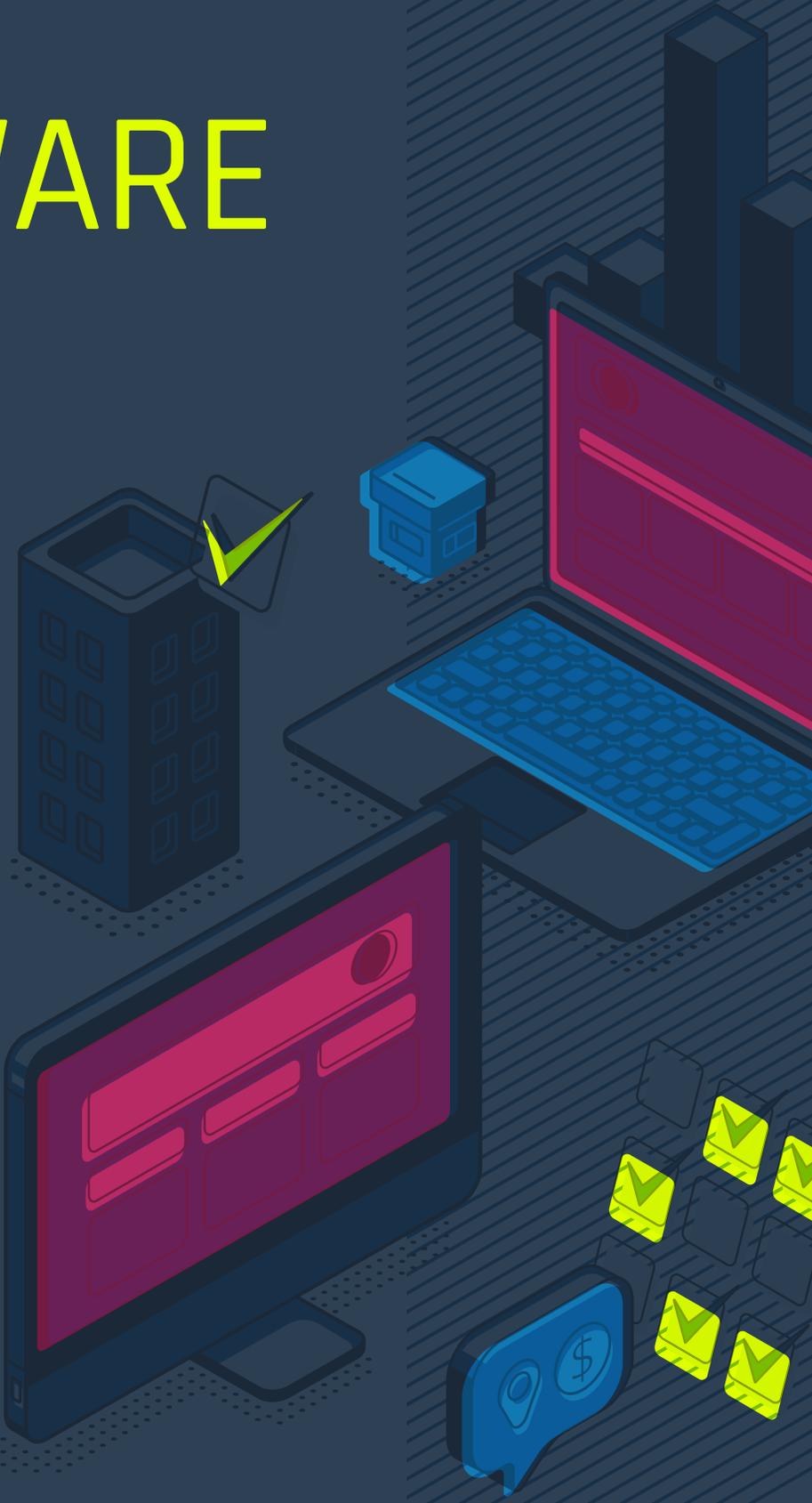
6



SOFTWARE

48%

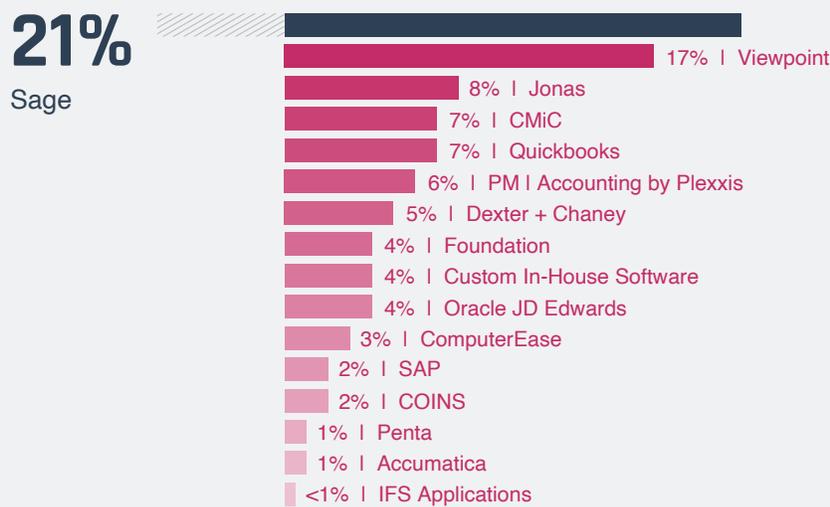
of the construction industry
say integrations are
VERY IMPORTANT when
purchasing software



What Construction Software Was Most Popular in 2020?

As new features for software and apps are developed, we marvel at the unique use cases ConTech Survey respondents find for software! To be fair to the companies with products represented in the survey (of which JBKnowledge has accepted no incentive to favorably promote or position) we have made efforts to remove products being used for purposes outside of their intended category as described by their manufacturer. (For example, time tracking apps may also store photos, but it would not be fair for a time tracking app to be counted as a photo storage/viewing software.)

Top Accounting/ERP Software



* Other, 19%



Sage returns to the number one spot for 2020, although the big disrupt for accounting/ERP software was Jonas' growth from less than 2% in 2019 to third place with 8% in 2020! Plexxis' PM I Accounting popularity grew by 2% in 2020 creating another shift in positioning.

Top Takeoff Software

42%

OnScreen Takeoff



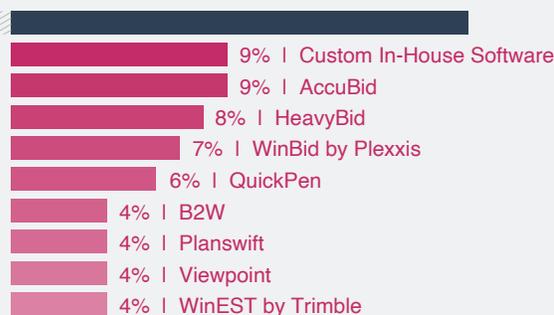
* ESTmep, 2%; HardDollar / InEight, 2%; The EDGE, 2%; B2W, 1%; ProEst, 1%; Other, 23%

OnScreen Takeoff has been the top choice of Takeoff Software every year since 2016. Bluebeam is gaining on OnScreen by increasing 3% in 2020 while OnScreen Takeoff decreased 6% in 2020.

Top Estimating Software

19%

Sage Estimating



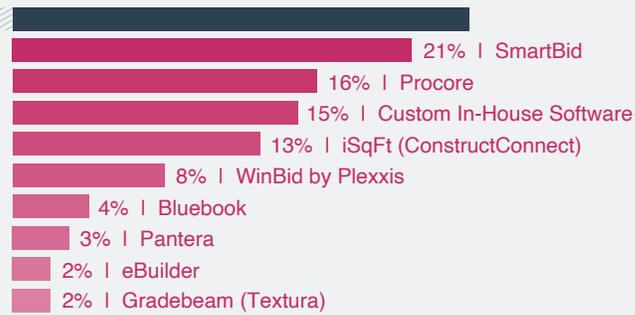
* DESTINI Estimator, 3%; HardDollar / InEight, 3%; MC2ICE, 2%; ESTmep, 2%; ProEst, 1%; STACK Estimating (Formerly Cloud Takeoff), 1%; Other, 35%

Despite losing 3% of popularity this year Sage Estimating has held on tightly to the top choice for estimating software. Over the last five years, there have been no serious contenders to the number one position. There is not a lack of estimating software on the market, which makes Sage Estimating's wide popularity margin a mystery.

Top Bid Management Software

24%

BuildingConnected



* Pipeline Suite, <1%; Other, 20%



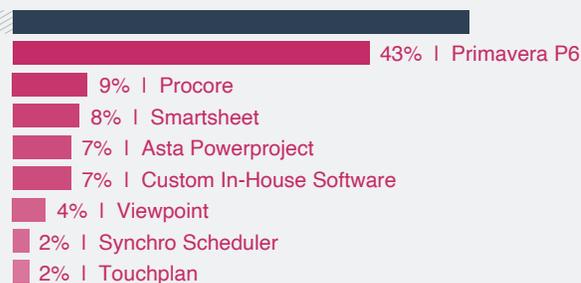
After four consecutive years at number one, SmartBid has slipped into second place behind BuildingConnected's 4% lead. ISqFt (ConstructConnect) dipped from its previous spot in third place to fifth place after dropping 5% in 2020.

Changes in bid management software changes in 2019's report could be explained by the acquisitions of popular bid management software. (In 2018, Autodesk acquired BuildingConnected and ConstructConnect acquired SmartBid.) It's also prudent to note that Procore is not a stand-alone bid management software, despite the popularity of companies using Procore to consolidate workflows.

Top Project Scheduling Software

55%

Microsoft Project

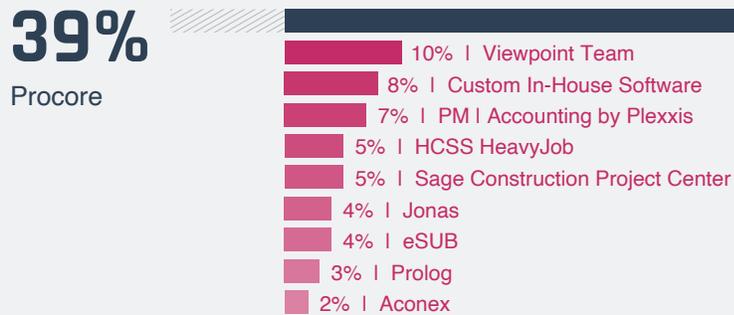


* Other, 15%



We saw very few changes in the rankings for most popular project scheduling software. Microsoft Project came in as the first choice with 55% - exactly the same percentage as 2019! The only change in project scheduling software's preferences was the departure of Phoenix. In 2019 Phoenix garnered roughly 4% of support only to completely drop off the list in 2020.

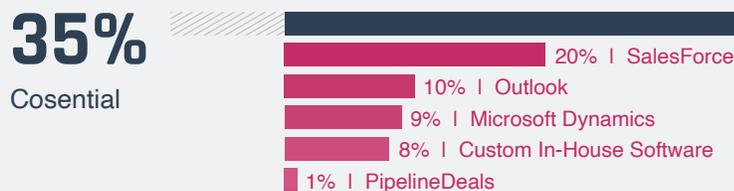
Top Project Management Software



* eBuilder, 1%; Dexter + Chaney, <1%; InEight, <1%; Kahua, <1%; RedTeam, <1%; Builderbox, <1%; Other, 26%

Lots of action in 2020's top choices for Project Management Software! Procore retained the number one position, Viewpoint held fast in the second most popular position. Some of the significant upsets between 2019 and 2020 include: Aconex's return to The ConTech Report after not making a showing in 2019, Jonas' growth from 1% to 4% in over the past year, and eSub doubling in percentage this year. Prior years popular software CMiC and Dexter + Chaney that carried 2% or more last year departed from the list with <1% in 2020.

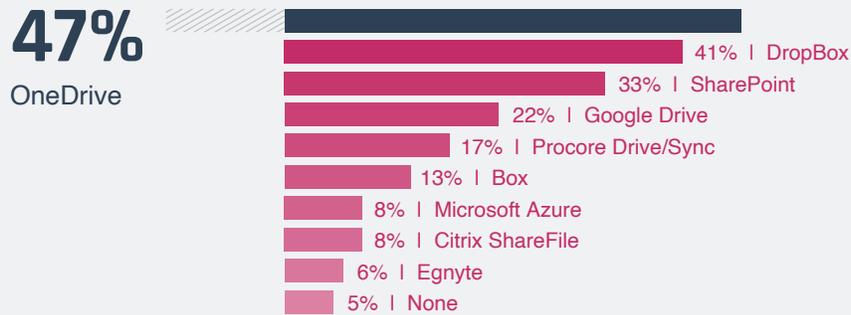
Top Client Relationship Management (CRM) Software



* Other, 24%

For four consecutive years, Cosential dominated respondent's top choices for CRM software with Salesforce trailing behind at between 9% to 15%. The 'Other' category included a collection of write-in answers prior popular CRM's such as Zoho, or Deltek – although none of them appearing frequently enough to comprise 1% or more.

Top File Storage, Sharing and Collaboration Solutions



* Evernote, 2%; Amazon S3, 2%; Salesforce Files, 1%; YouSendIt, <1%; Other, 13%

OneDrive prevails in the battle for collaboration solutions. As with other industries, construction is also working hard to determine what is a better fit - the convenience and speed of DropBox? Or the superior pricing and more robust functions for business use of OneDrive? Construction favors OneDrive... for now!

7



BIM

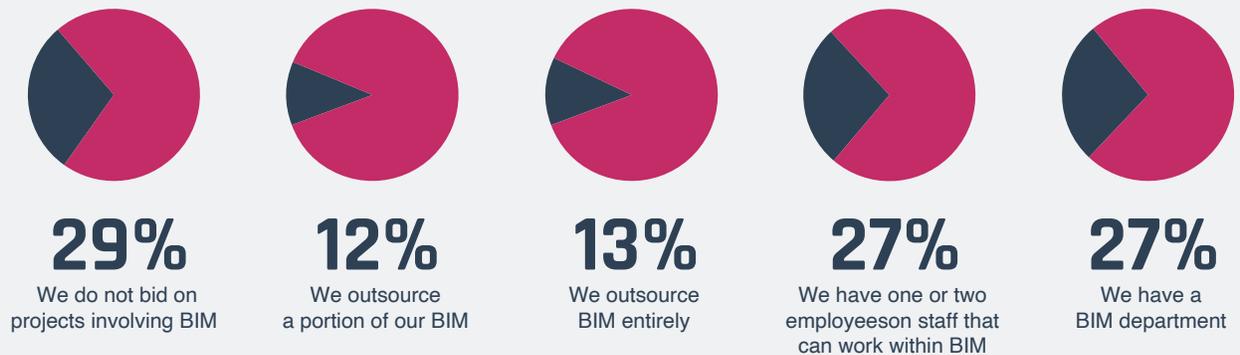
28%

of the construction industry
are using mobile apps to view
BIM files



How Companies' Are Strategizing BIM?

Approach to BIM

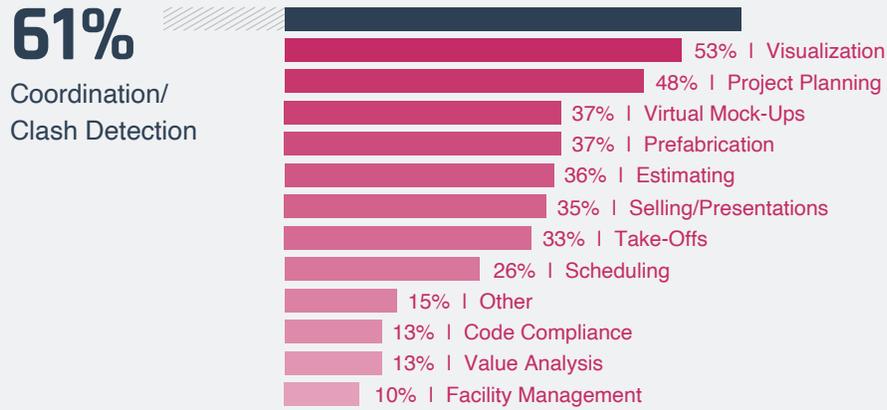


Where's The BIM?

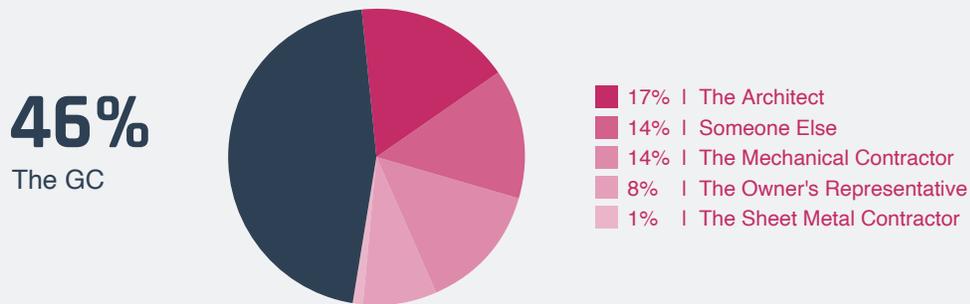
2020 marks the fifth ConTech Report where BIM is not gaining traction. The BIM mandate in the UK is unlikely to be an isolated fad that will fade away, the proverbial writing is on the wall - BIM adoption is important and saves companies money.

This begs the question...why - (for four consecutive years) has the most reported response to the question "What is your company's approach to BIM?" been "We do not bid on projects involving BIM"?

How Companies Are Using BIM



Who is Typically Taking The Lead on BIM Projects



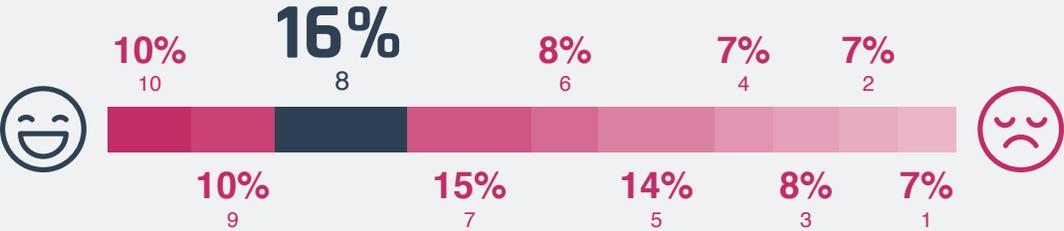
Prefabrication grew 3% this year as off-site construction continues to grow as a popular innovation in 2020. Coordination and Clash Detection continue to be the most prevalent use case for BIM. As with prior years, general contractors take the lead when it comes to BIM projects with subcontractors and architects reported in fewer instances.

Respondents on BIM/VDC:



- » “At this time, we see no benefit to the field versus the costs of BIM.”
- » 1” minus MEP lines are not included in models, this becomes a very large issue when overhead space is at a premium and a 1” water line suddenly becomes a 4” line after insulation. Now, multiply the aforementioned 1” line by 65 in a real build and the space above the cannot-be-changed ceiling height in a \$12M kitchen becomes very tight and hard to coordinate. In the model, there is ‘plenty of space.’ In reality? Not so much.”
- » “Creating a single-source-of-truth model allows for maximization of the investment in the model. Downstream workflows could consume the model for purposes such as QTO, Estimating, Scheduling, and Coordination.”

How Would You Rate Your Company’s Building Information Modeling (BIM) & Virtual Design and Construction (VDC) Process?



While other figures have made it clear that BIM is not catching fire, a puzzling figure is respondent’s exceptionally high rates of confidence in their company’s BIM/VDC Processes. How can respondents be so confident in processes they claim not to use or be in favor of?

8



INNOVATIONS

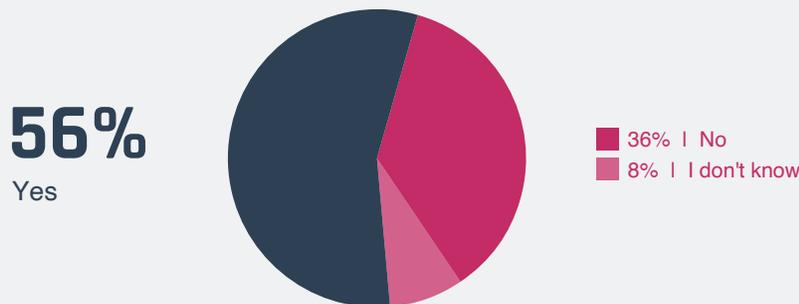
78%

of commercial construction
used prefabrication in 2020

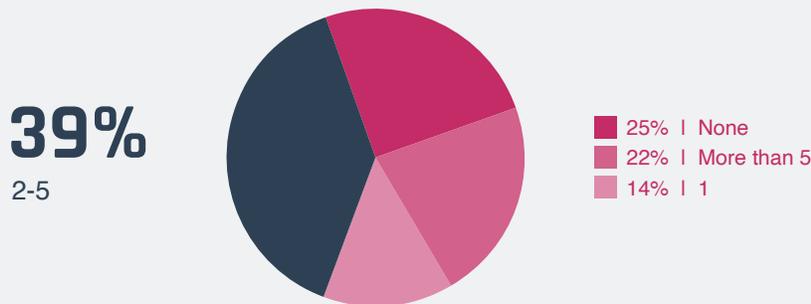


What Innovations Are Shaking Up Construction?

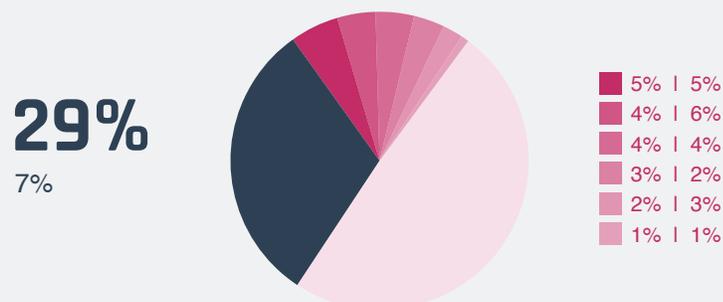
Does Your Company Have A Well-Defined Process for Testing and Implementing New Technology?



Number of Dedicated R&D Employees



Percent of Company's Annual Sales Volume Used for Research & Development Budgets 2020



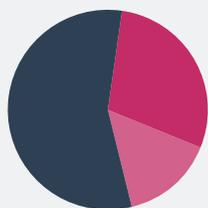
* 46% of respondents were unsure of their company's R&D budget

Dedicated R&D Budget

2020

56%

No

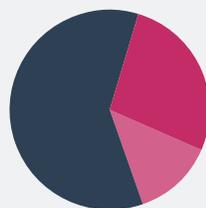


29% | Yes
15% | I don't know

2019

60%

No

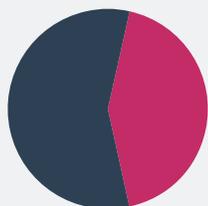


27% | Yes
13% | I don't know

2018

57%

No

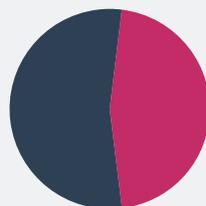


43% | Yes

2017

54%

No



46% | Yes

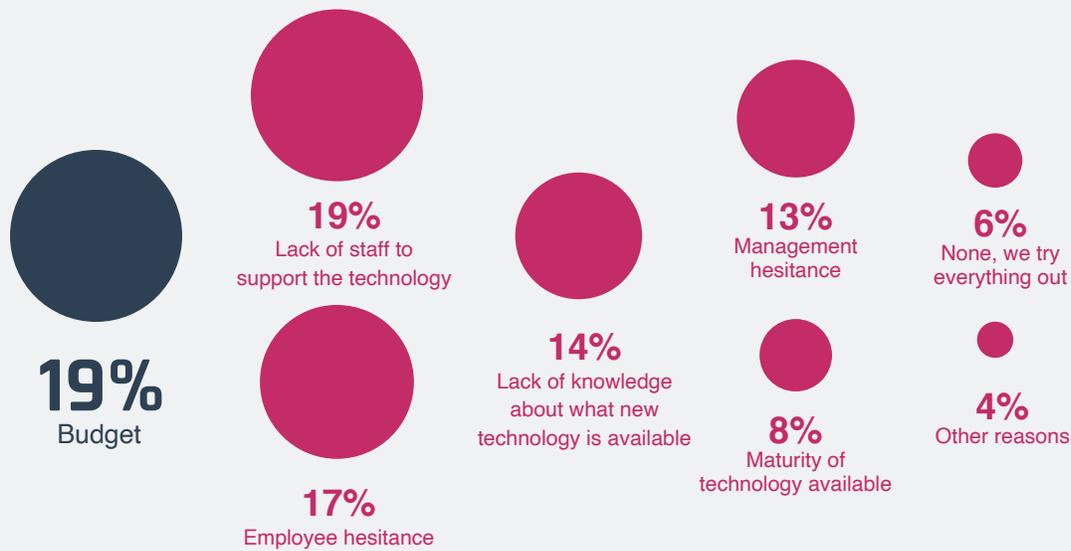
More companies have defined Research & Development processes than in the history of the construction technology report boasting 14% growth since 2019. Three-quarters of respondents reported their company has at least one employee tasked with Research & Development.

R&D staff is especially important, all it takes is one 'Mad Scientist' to drive innovations. Considering the enthusiastic jump in processes and staffing, on the surface it appears that R&D had a great year – however, Research & Development in 2020 has a serious problem.

Research & Development budgets aren't shrinking...but they aren't really growing either. An improvement to the 2019 ConTech Survey revealed a vulnerability in our previous years' data collection on R&D budgets by adding "I don't know" as an option for respondents to select. The subsequent survey results show respondents were over-reporting R&D budgets when they were unsure about their company's plan. Over the past 4 years, reports of 'no dedicated R&D budget' only fluctuated within 5%, while comparatively reports of 'yes my company has a dedicated R&D budget' fluctuates within 3% year-to-year.

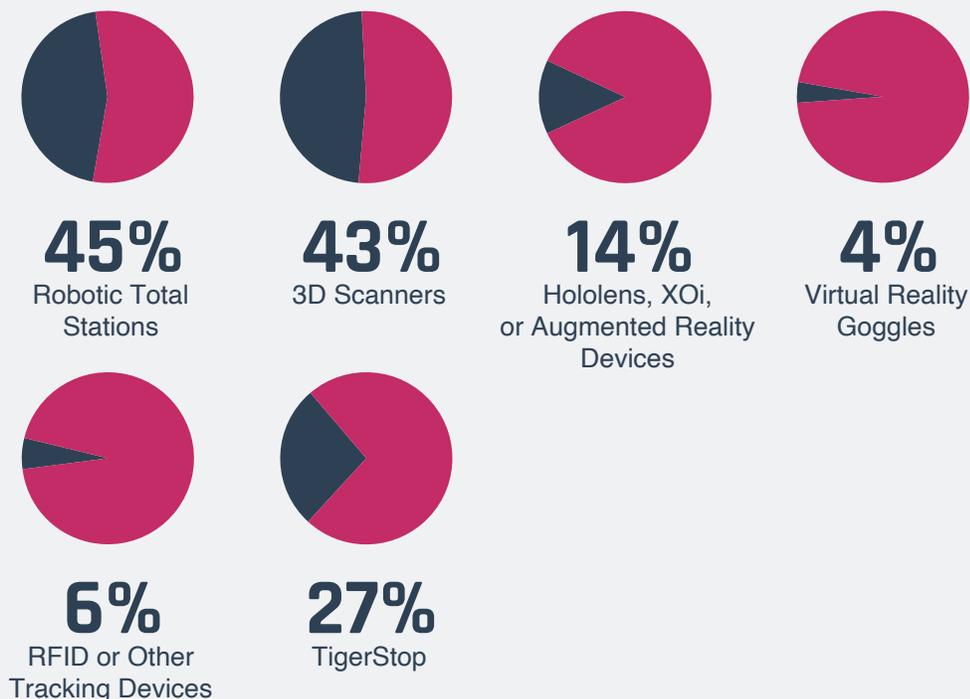
One thing is clear – Research & Development budgets have reached a holding pattern. If a company wants to experience the kind of exponential growth and results technology can afford, budgeting for R&D is crucial. Innovations cannot materialize without capital.

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



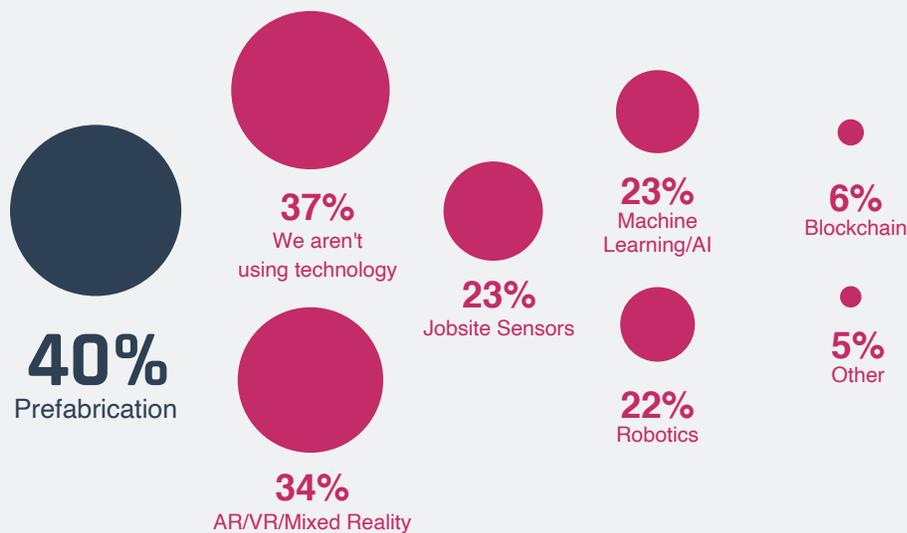
In light of economic issues facing every industry, it's unsurprising to see that 'Budget' grew the third most limiting factor to number one. 'Lack of Staff to Support the Technology' remains one of the paramount concerns of tech adoption. Construction technology consultants are able to assist companies mitigate limitations by teaching companies methods for choosing, deploying, and sustaining new technology.

Hardware Technology Companies Are Using

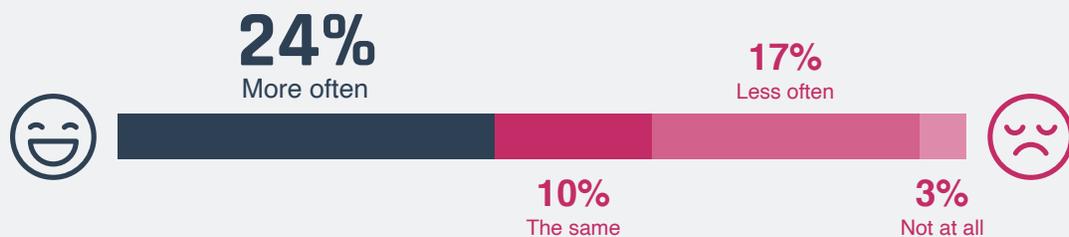


Despite the economic hesitance plaguing some companies, certain types of tech hardware for construction showed growth in 2020. Robotic Total Stations, 3D Scanners, and TigerStop demonstrate their ROI's quickly. There was a slight drop in the reported use of VR Goggles, tracking devices, and Hololens/AR devices (perhaps this is because of improved functionality of other devices and apps.) It appears that the value of hardware is being realized for reducing labor and safety ROI - even during a period of time when some companies are reluctant to spend.

What Technologies Are Giving Your Company A Strategic Advantage?

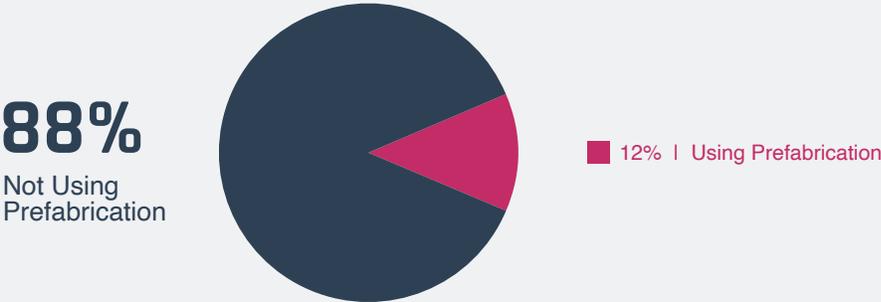


How Often Are Companies Using Off-Site Construction in 2020?

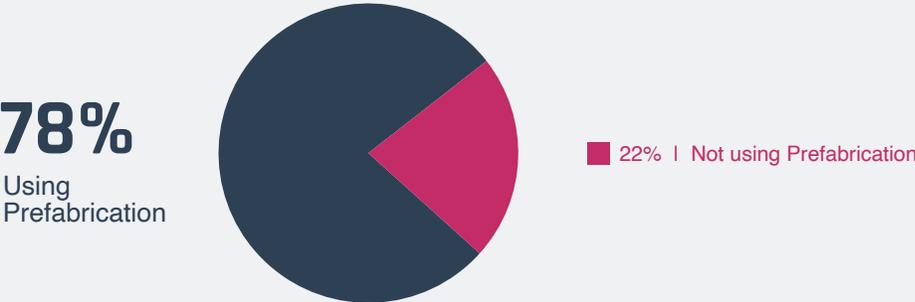


Pre-fabrication or off-site construction is one of the innovations making a big impact in the way we build. With 40% of respondents reporting that Pre-fabrication was giving their company a strategic advantage. Due to restrictions regarding the pandemic, 24% of respondents reported their companies relied on off-site construction more than in prior years

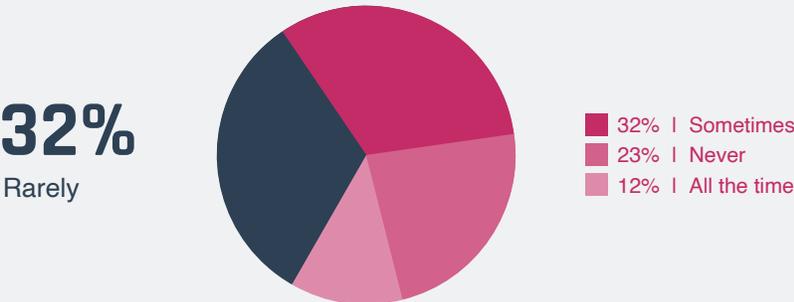
Residential Projects Utilizing Prefabrication



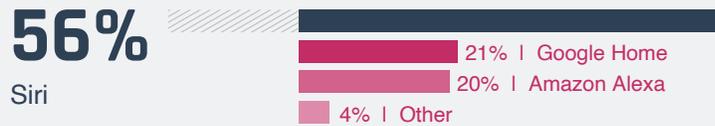
Commercial Projects Utilizing Prefabrication



Are People Using Voice Assistance Technology?

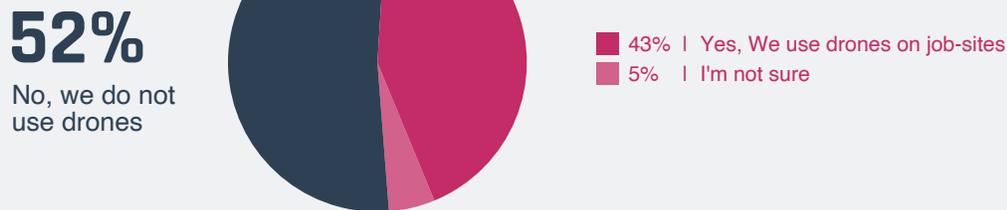


Most Popular Voice Assistant



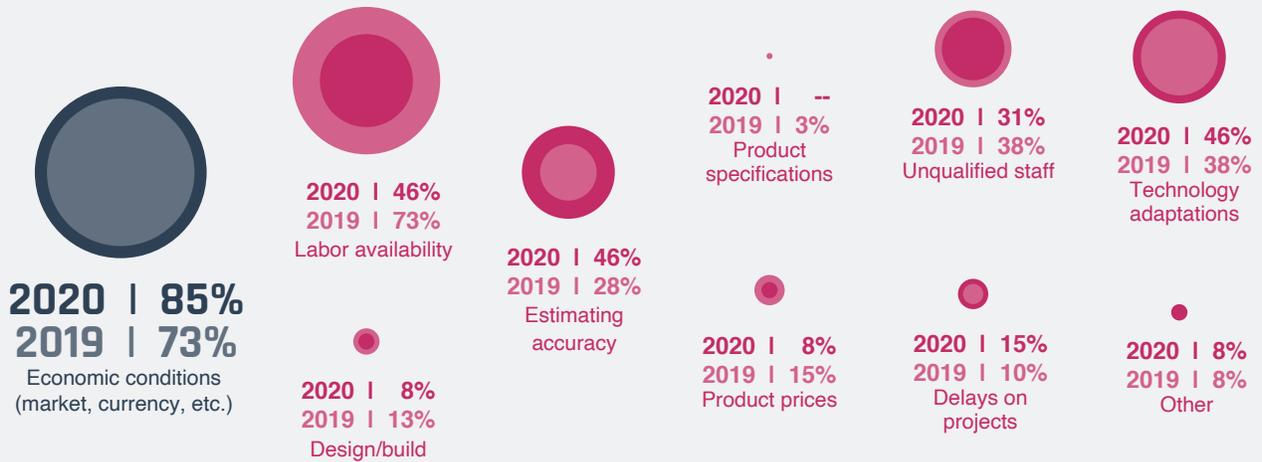
When it comes to Voice Assistance, utilization was same as 2018. Manual data entry is still the preferred method of the construction industry. **The convenience of Voice Assistance hasn't caught on, despite the fact we are more likely to talk than write which could lead to more thorough documentation.** Voice assistance solutions showed a slight change. Amazon Alexa gained 3% more this year while Google Assistant (which claimed 2.4% of prior year's votes) completely dropped out of the rankings in 2020.

Drone Technology Use on Job-sites



Drone usage grew 5% from 2018 to 2019 then only <1% from 2019 and 2020. While fewer respondents reported adopting drones this year than in prior year, there was not an increase in reports of not using drones. It is also important to consider that while some construction projects have a perfect application for drones, some subcontractors would not find drones necessary and would be unlikely to recoup ROI.

Factors People Are Most Concerned Will Impact Future Profitability

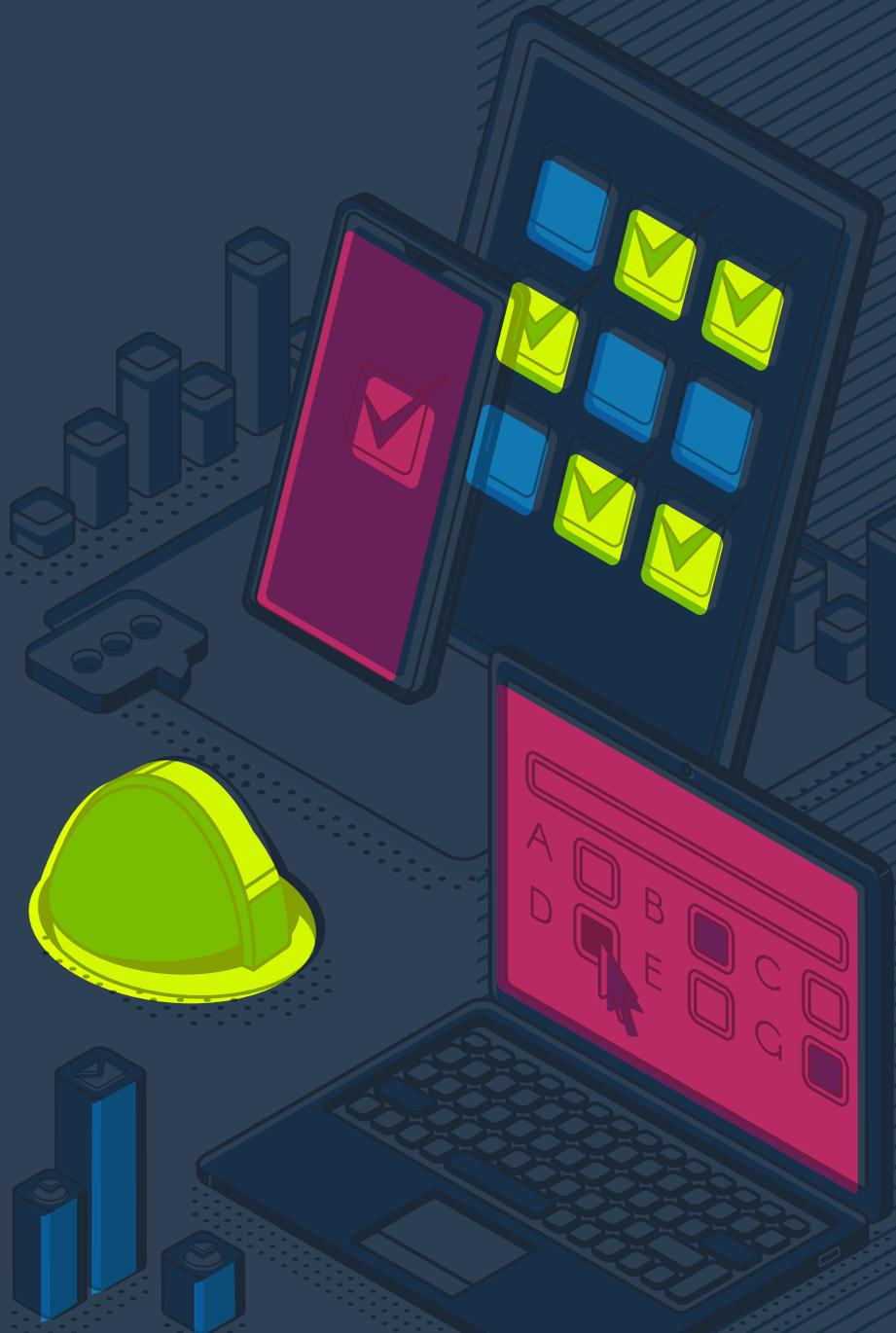


It's impactful to see what factors concerned respondents in 2019 versus the concerns of people who have been forced to weather the unavoidable tides of a global pandemic in 2020. The impending threat of the skilled-labor shortage (the primary concern of last year) now pale in comparison to fears about economic uncertainty. While economic factors are out of our hands, we can work together to ease concerns about estimating errors and technology adoption.

9



CONCLUSIONS



WHERE ARE WE HEADED FOR 2021?

Technology Saves Lives And Money

Several of the challenges in 2020 were mitigated by using technology to make our world safer and to continue building! For a few months in 2020, the entire world seemed to be propped up by technology, this was a great moment to prove tech adoption is always possible if we are diligent. The necessity for tech adoption pushed the elderly to learn to Skype and kindergarteners to manage daily dashboards. Perhaps 2021 will push construction toward implementing digital workflows.

Don't Underestimate The ROI of Technology

It's difficult to convince companies that are comfortable to invest more when things are fine as they are. The value of investing in a construction technology simplifies projects and helps increase profit. Pieces of hardware like Robotic Total Stations or 3D scanners bring even demonstrable ROI quickly – even to 'comfortable' companies.

Bim Is Reaching A Tipping Point

BIM mandates in the UK are unlikely to be an isolated. If your company hasn't already started planning to adopt BIM, start considering BIM as an inevitable future. General Contractors, owners, and Sub-Contractors must push forth the initiative in planning for BIM – even if it's just securing a reliable source for outsourcing BIM.

Dear Reader,

Thank you so much for downloading the 2020 Construction Technology Report by JBKnowledge! I realize some of you have faithfully downloaded for every year since we started, I want to personally thank you for supporting the report. Our team is committed to bringing you the best information every year to help you benchmark your company's progress and present ideas for a more productive future using Technology, People, and Process. I hope you have enjoyed this year's report as much as I have!

Enjoy The Ride And Geek Out!



James M. Benham
CEO



Thanks For Reading, See You Next Year!

10



SPECIAL THANKS



CONTECH IS A COMMUNITY

The creation of the annual Construction Technology Report hinges upon the participation of everyone involved for success. We would like to recognize the unique pieces of the industry pulling together to make our report possible.

Special Thank You

...to the survey respondents, we couldn't do it without you!

...to our sponsors, **MCAA, NECA and CFMA!** The trade organizations' commitment to building a better workforce using technology drives significant change in the construction industry. We are proud to have you as report sponsors! Thank you.

...**Texas A&M University's Department of Construction Science** for their sponsorship and for lending us the shining stars of your department, Anthony Marraro and Shannon Degenhart for additional analysis.

...**the readers!** Thank you for caring about construction technology and working hard to stay informed!

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Staff

Editor-in-Chief

Kara Dalton-Arro

Asst. Editors

Sadie Burt

David Sombrio

Director of Design

Pablo Landriel

Design Team

Miguel Vivas

Cristian Maza

Santiago Soler

Analysts

Anthony Marraro, PMP, DBIA (Texas A&M Dept. of Construction Science)

Shannon H. Degenhart, PhD (Texas A&M Dept. of Construction Science)

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GEEK OUT



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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 (PCA), the National Certified Pipe Welding Bureau (NCPWB), the Manufacturer/Supplier Council (M/SC), and the John R. Gentile Foundation (JGRF). 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.