

Construction Technology Report

2024

PRODUCED BY



STEELTOE
CONSULTING

IN CONJUNCTION WITH



MCAA | NECA | SMACNA
2024 MEP
INNOVATION CONFERENCE

WITH SUPPORT BY



ASC
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MCAA

NECA

SMACNA

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About The Report

2024 MEP Construction Tech Report Overview

Steel Toe Consulting is proud to present the 2024 Construction Technology Report, focusing on MEP Innovation and the Pulse of Innovation Survey. This year's edition synthesizes the expertise of over 400 industry professionals, merging live and detailed take-home survey responses to highlight the latest trends in digital adoption, workforce dynamics, and strategic innovations transforming the industry.

Data Collection Methodology

Our methodology was designed to capture comprehensive insights, involving two phases: Immediate feedback from attendees at the MEP Innovation Conference and detailed input from contractors through a take-home survey. This dual approach enhances our analysis, offering a layered understanding of the MEP construction technology landscape, despite the inherent challenges of open-format surveys and partial data sets. We've carefully accounted for these variables to present findings that accurately reflect industry trends.

Note: Our surveys, designed to gather insights from contractors, inevitably include responses from a mixed audience due to their open format.

A Note on Copyright

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Invitation to Explore

Excited? So are we. This report transcends mere data presentation—it's an ongoing dialogue with the industry about the future of MEP construction technology. We invite you to delve into our findings and join the conversation.

ConTech Survey Part 1: Live Audience Survey Results (MEP Innovation 2024)

OVERVIEW

Part 1 of the 2024 Pulse of Innovation Survey took the stage at the MEP Innovation Conference General Session, engaging over 400 contractors in a live polling experience. The survey was facilitated by Denise Devine and Jonathan Marsh of Steel Toe Consulting, and Amanda Comunale from ASC Engineered Solutions. This survey was made up of 12 carefully selected questions which delved into the demographics, technology, and operations of the contractor participants. This interactive moment not only illuminated industry trends, but it also served as a segway into Part 2 of the survey.



DEMOGRAPHICS

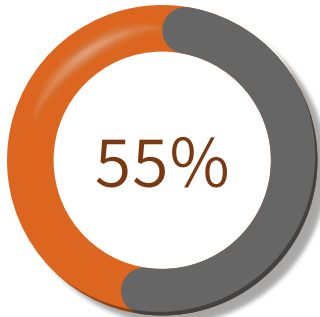
69%

of 2024 MEP Innovation
Conference attendees are in
leadership roles.

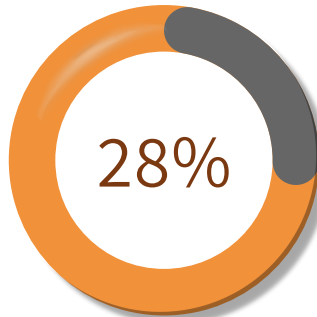
THE DEMOGRAPHICS

We start each survey by collecting demographic information so that we understand who's contributing to the data. During the MEP Innovation Conference, Pulse of Innovation survey over 400 contractors selected the trade that best represented them. This insight helps us gauge the representation of each trade throughout the survey results.

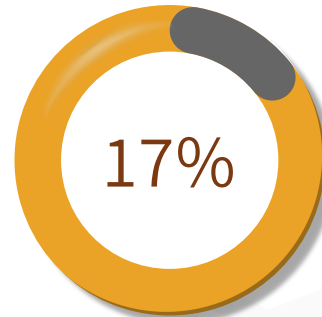
TRADE DISTRIBUTION OF RESPONDENTS



**MECHANICAL/
PLUMBING**



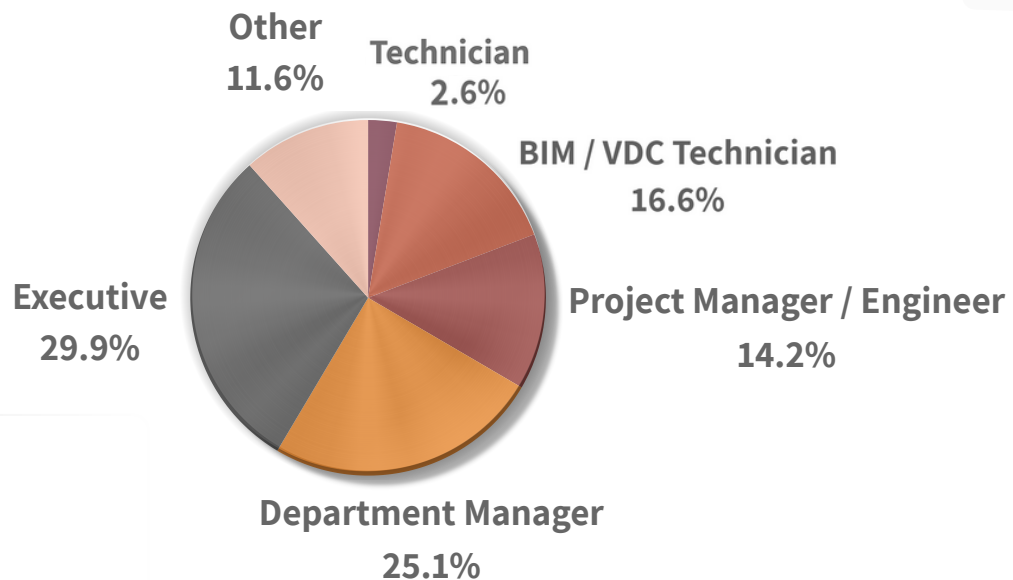
ELECTRICAL



SHEET METAL

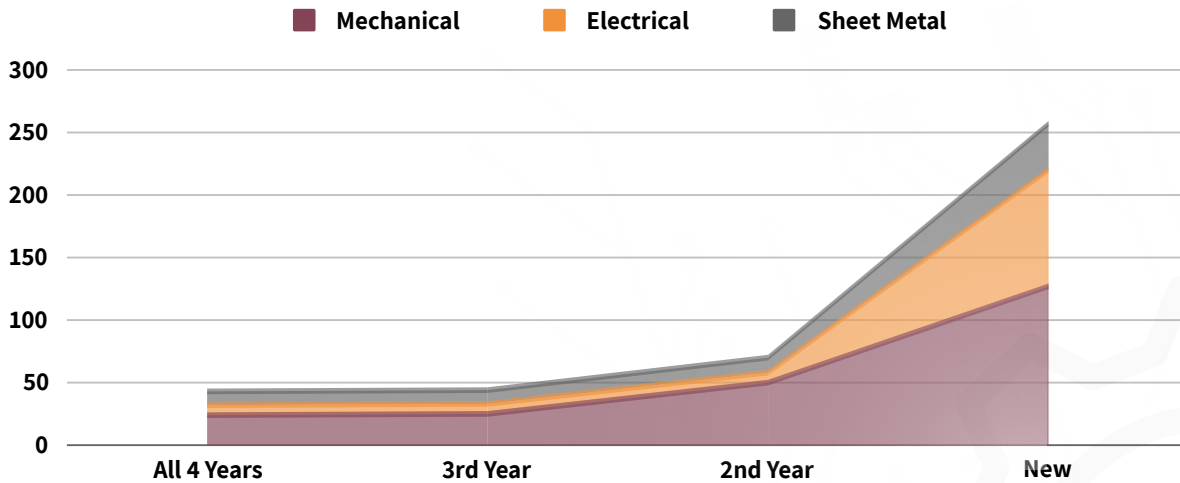
WHO RESPONDED TO THE SURVEY?

While the MEP Innovation Conference attracts a broad spectrum of the industry including manufacturers, consultants, contractors, and engineers, only contractors completed the survey. The majority of these respondents held senior roles, making up more than half of the participants, while BIM and VDC Technicians represented the second-largest group at 16.6%.



HOW MANY NEW AND VETERAN ATTENDEES?

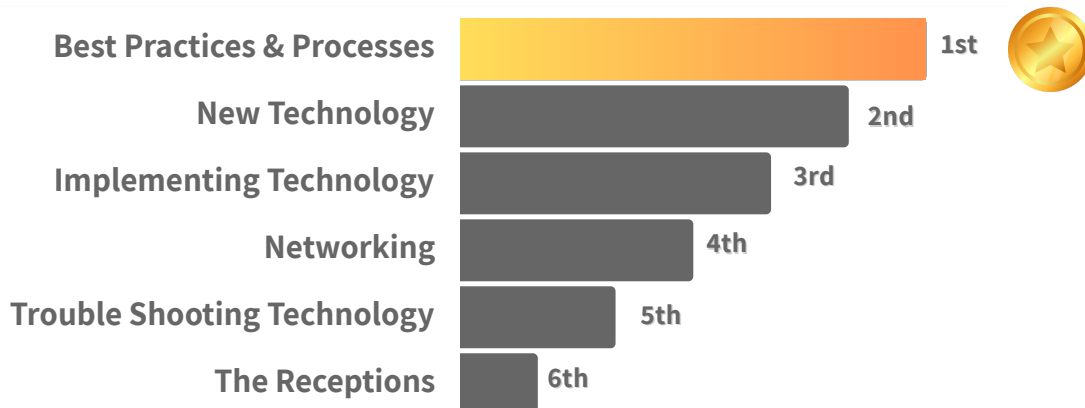
MEP Innovation Conference has shown consistent growth over the years, reaching a record attendance this year with over 700 participants. Among them, 420 answered this survey question. Of them 39 contractors have attended MEP Conference all 4 years, 118 have returned for their second and third years, and an impressive 263 contractors attended for the first time this year!



WHAT ATTRACTED PARTICIPANTS TO MEP INNOVATION?

When it came to ranking reasons for attending MEP Innovation Conference, attendees voted 'Best Practices & Processes' as the highest priority, with 36% of the attendees agreeing that it was the primary reason for their attendance at the conference. 'Networking Opportunities' landed as 4th in priority. Meanwhile, 71% of the votes agreed that 'Trouble Shooting Technology' and 'The Receptions,' were lowest priority. The votes suggest that the attendees are solution-oriented!

Ranking





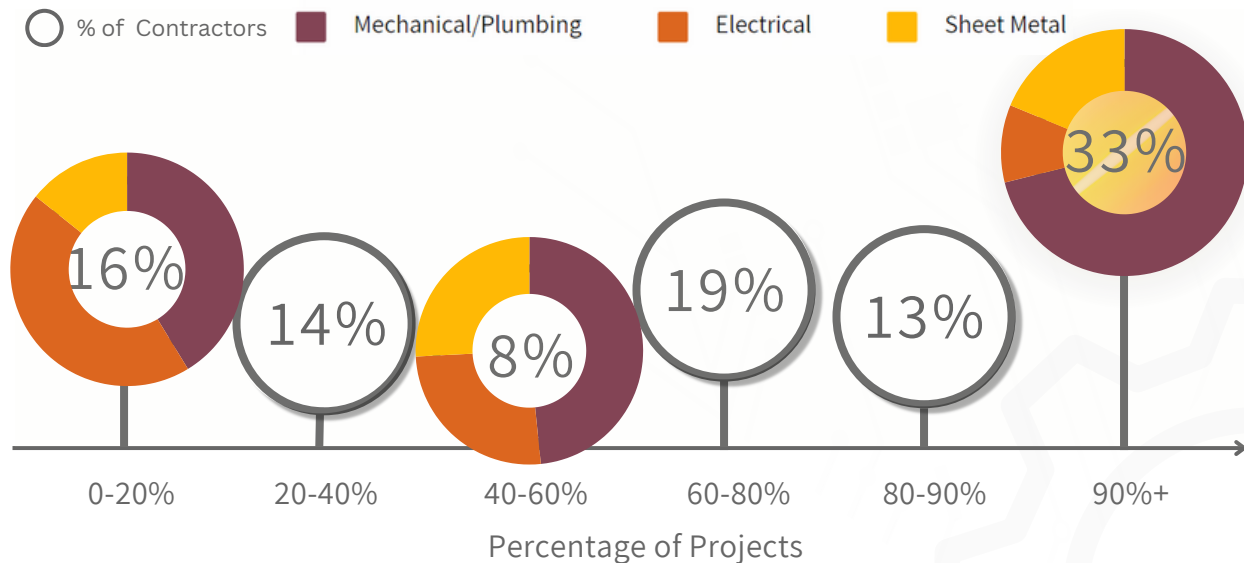
BIM and Technology

32%

of 2024 MEP Innovation
Conference construction pros
prefer ITM over RFA.

WHAT PERCENTAGE OF PROJECTS INVOLVE BIM?

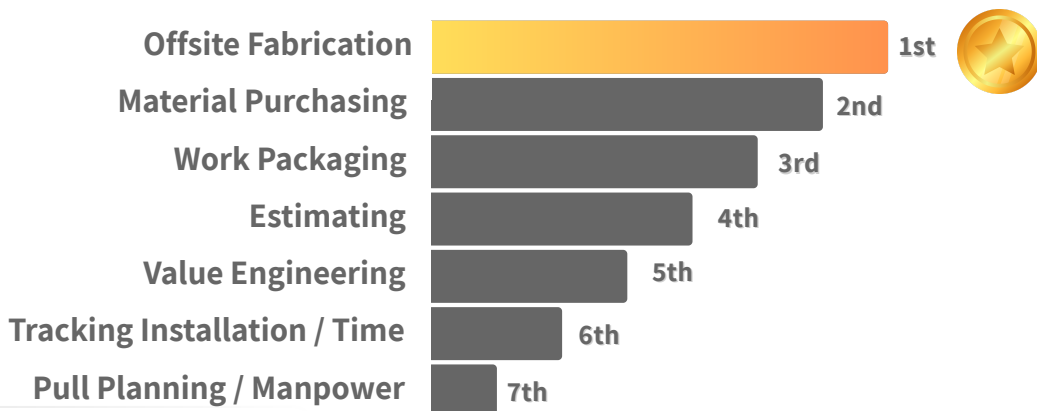
When asked what percentage of projects involve creating or using BIM, the majority, 33% of contractors (71.1% mechanical/plumbing, 18.8% sheet metal, and 10.2% electrical contractors) report using the tool in over 90% of their projects. 16% of contractors (41.3% of mechanical/plumbing, 14.3% sheet metal and 44.4% electrical) report using BIM in 0-20% of their projects.



HOW IS BIM BEING USED?

Beyond coordination and installation, 51% of contractors identified 'Offsite Fabrication' as BIM's primary application. 'Material Purchasing' and 'Work Packaging' were also highlighted as key uses, while 'Pull Planning/Manpower' was least cited, suggesting potential growth areas for BIM.

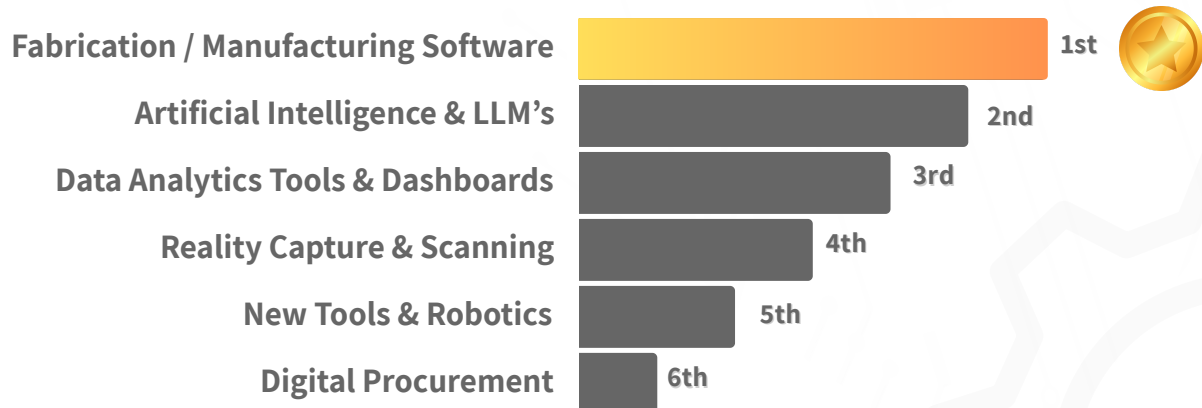
Ranking



HOW DOES CONTECH RANK OVER THE NEXT YEAR?

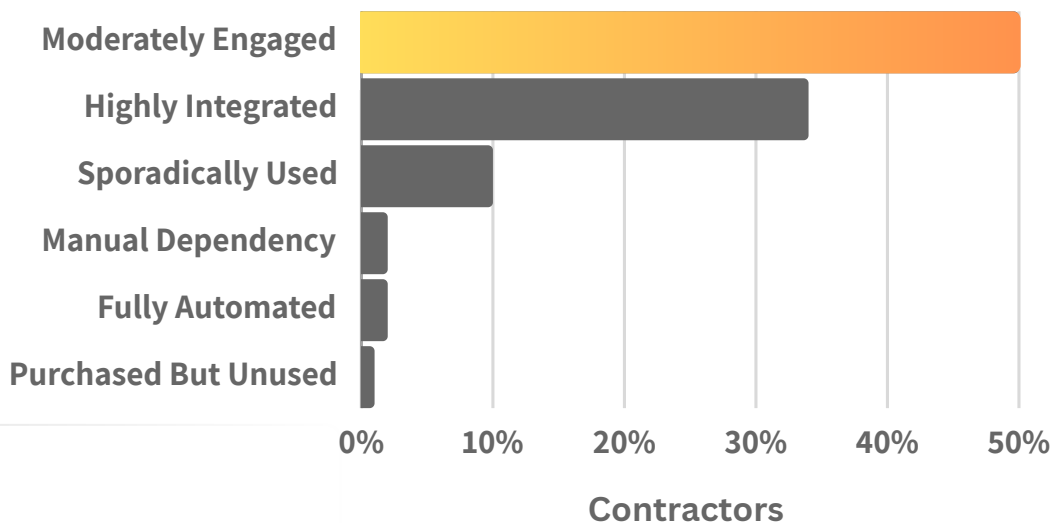
37% of contractors anticipate 'Fabrication/Manufacturing Software' to have the most significant impact over the next year, followed by 'Artificial Intelligence' (AI) and 'Large Language Models' (LLMs).

Ranking



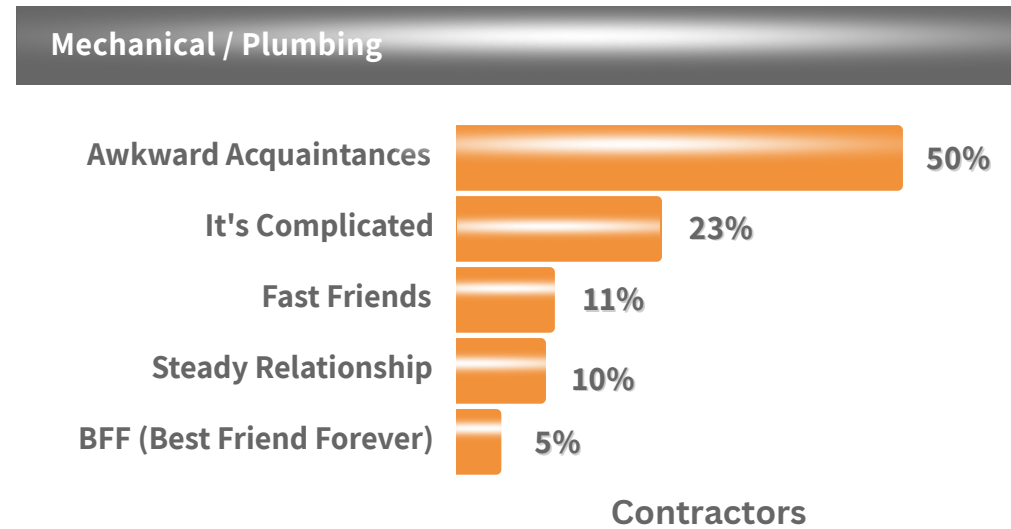
HOW INTEGRATED IS TECHNOLOGY?

Half of the respondents described their company's technology engagement as 'Moderately Engaged,' while 34% reported 'Highly Integrated' systems. A smaller fraction noted either 'Sporadic Use' or 'Full Automation' of technology



HOW COMFORTABLE ARE CONTRACTORS WITH AI AND LLMS?

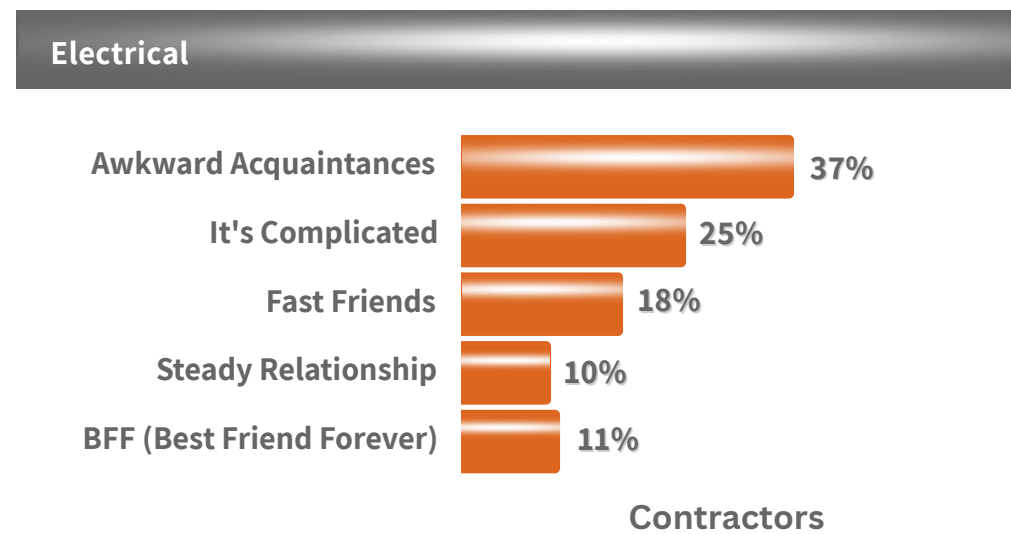
The construction industry is increasingly exploring Artificial Intelligence (AI) and Large Language Models (LLMs). These technologies promise to revolutionize efficiency and project management.



Investments and innovations in AI-enabled solutions are driving a shift towards their integration, enhancing productivity in tasks like progress tracking and quality control.

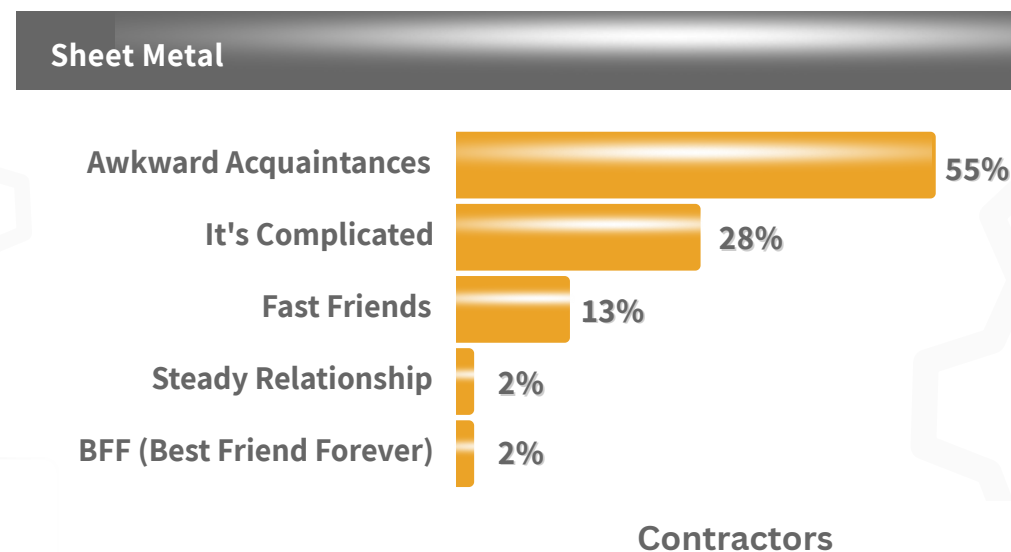
So, who is using them?

Collectively almost half of contractors are beginning to work with these tools, and 28% of contractors are already implementing these technologies in day-to-day work. Meanwhile, 50% of our mechanical/plumbing and 55% of sheet metal contractors are still getting acquainted and just starting to explore what these tools can do.



Looking ahead.

The blend of AI with robotics and machine learning promises to address longstanding challenges, such as labor shortages, by offering smarter, more autonomous systems that can significantly improve operational efficiencies.





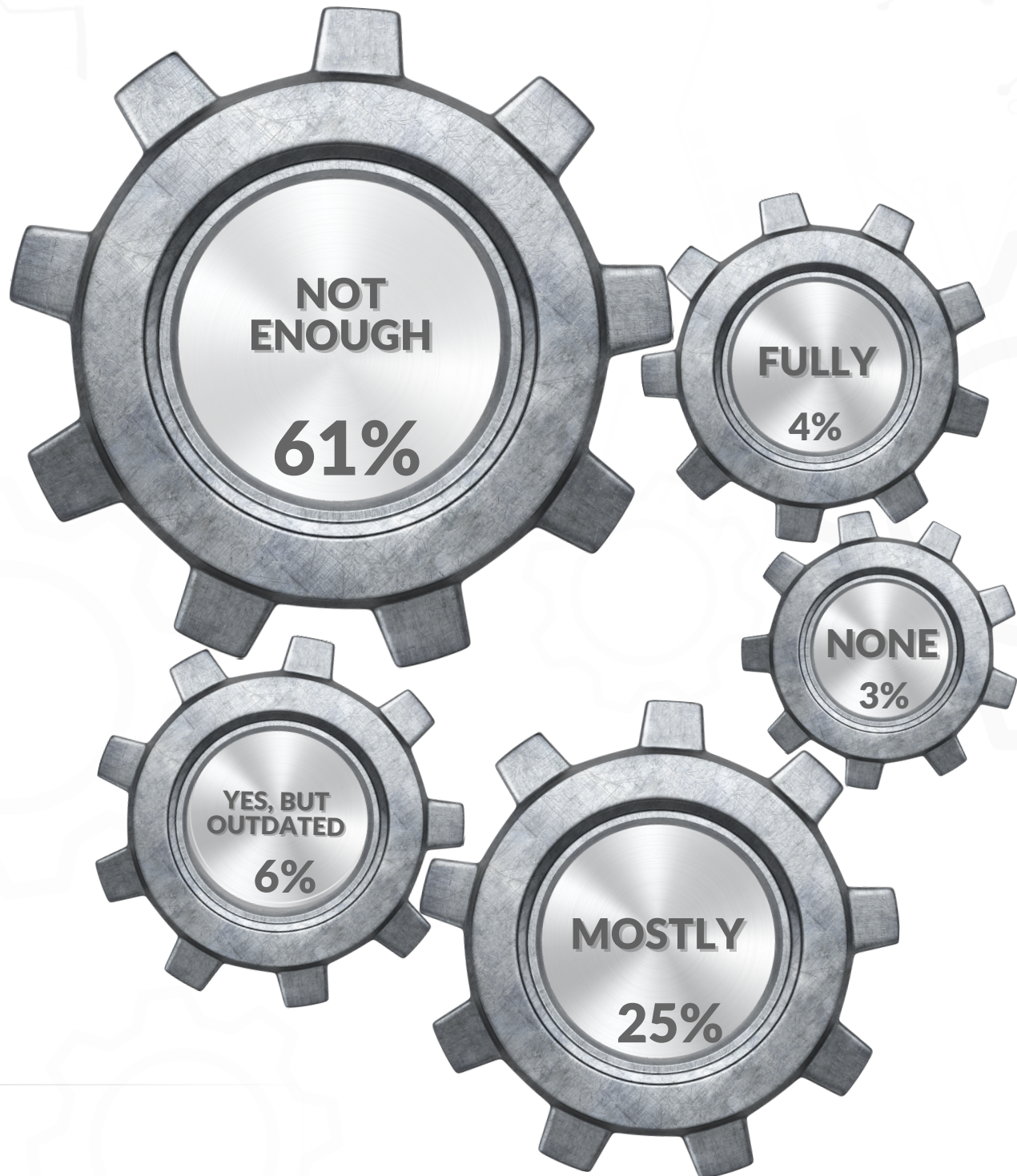
Business Processes

4%

of contractors say that their company business processes are fully documented.

HOW STRONG ARE DOCUMENTED BUSINESS PROCESSES?

61% of contractors say their companies don't have enough documented processes and Standard Operating Procedures (SOPs). Meanwhile, 4% report having fully documented their processes. Proper management of company processes and SOPs is crucial for streamlining business and improving project quality, significantly influencing a firm's growth and efficiency.



The background features a vibrant orange-to-purple gradient. Large, semi-transparent gears are scattered across the upper half, with some containing faint circuit-like patterns. A thin yellow horizontal line is positioned below the main title.

ConTech Survey Part 2: Detailed Insights

OVERVIEW

Part 2 of the 2024 Pulse of Innovation survey, distributed as a take-home questionnaire to contractors following the conclusion of Part 1, delves deeper into their practices and preferences. Given that many participants completed both surveys, we have analyzed them separately to maintain clarity. With responses from 320 contractors, Part 2 focuses on key areas such as workforce development, technology adoption, prefabrication, project management tools, and business processes.



Demographics

54%

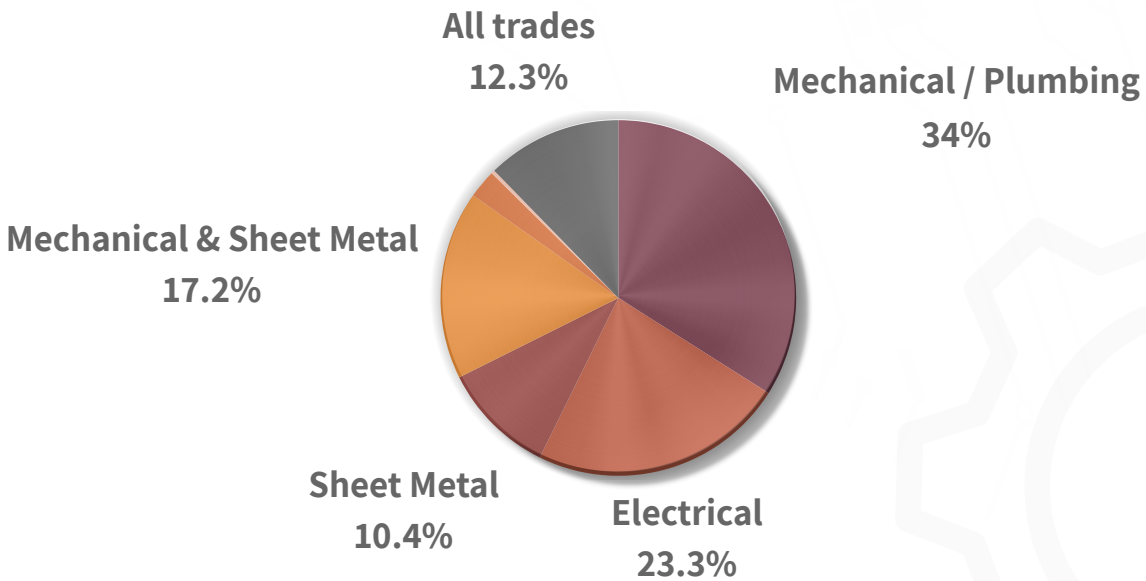
of Survey Part 2
respondents are in the
mechanical trades.

THE DEMOGRAPHICS

We have evaluated each survey independently to maintain clarity. Part 2 of the 2024 Pulse of Innovation Survey begins with an analysis of participant demographics, offering insights into the industry sectors represented.

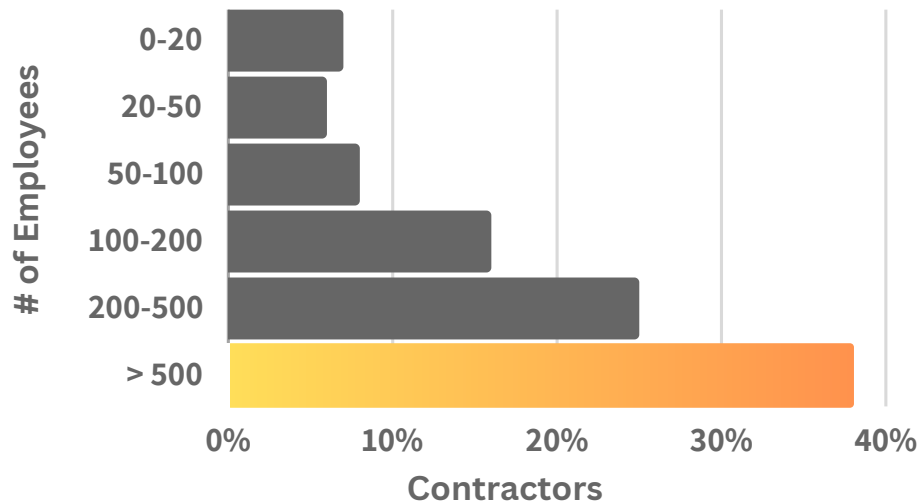
TRADE DISTRIBUTION OF RESPONDENTS

Of the 320 participating contractors, 34% represent Mechanical/Plumbing, 23.3% Electrical and 10.4% are in the Sheet Metal trades. Multi-trade representation includes 17.2% represented Mechanical and Sheet Metal, 3% represented Mechanical and Electrical.



NUMBER OF EMPLOYEES INCLUDING FIELD AND OFFICE

We asked contractors how many employees they had including field technicians and branch office employees, 38% of contractors have more than 500 employees, and a collective 21% of contractors operate with fewer than 100 employees.





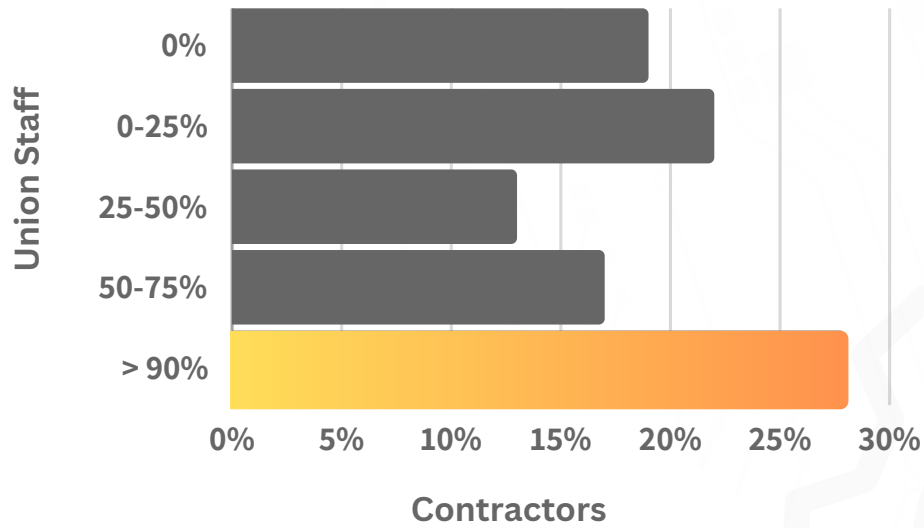
BIM and VDC

25%

of sheet metal contractors use union labor for 90% or more of their VDC / BIM.

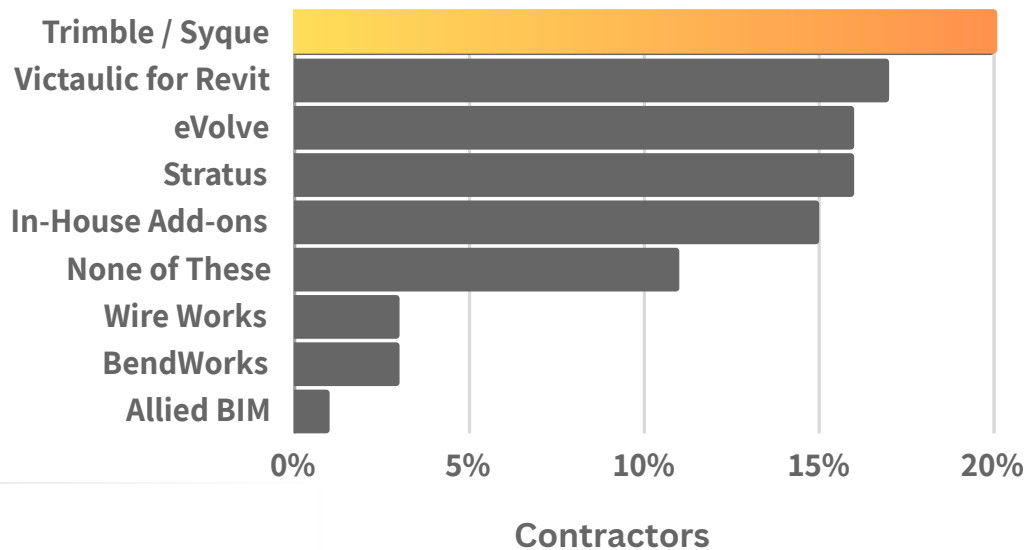
WHAT PERCENTAGE OF BIM/VDC STAFF ARE UNION EMPLOYEES?

The data reveals a balanced use of Union and non-Union labor for BIM and VDC tasks among contractors. Notably, 28% heavily rely on Union labor (90% or more), while 19% do not use Union labor at all for their BIM and VDC operations.



WHAT IS BEING USED TO SUPPORT BIM CREATION?

Contractors reported on their preferred BIM support tools, with multiple tools being utilized by many, indicating diverse tool adoption. Key tools include Trimble/Syque (used by 20% of contractors), Victaulic for Revit (17%), and eVolve and Stratu (16%).



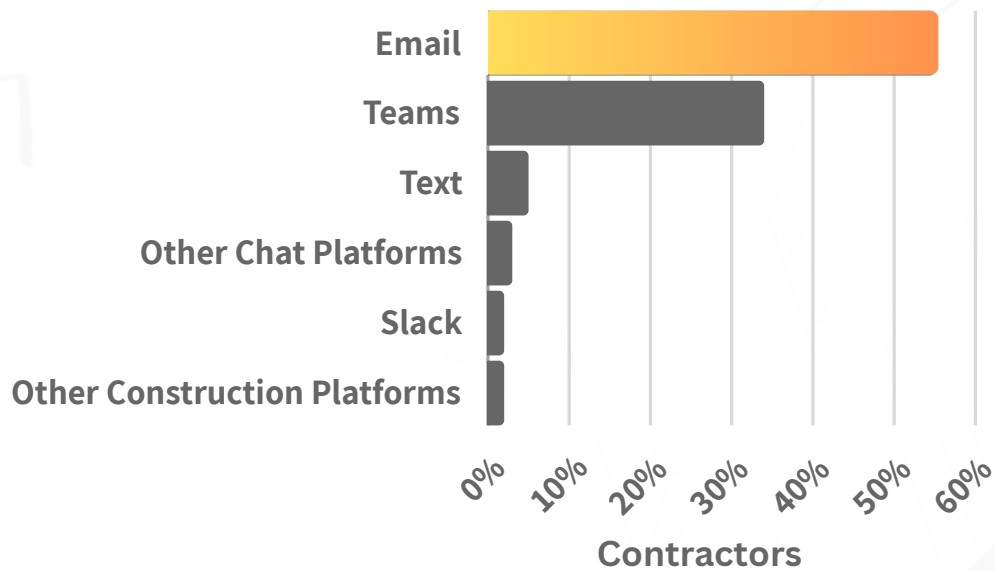


Digital and Data

55%

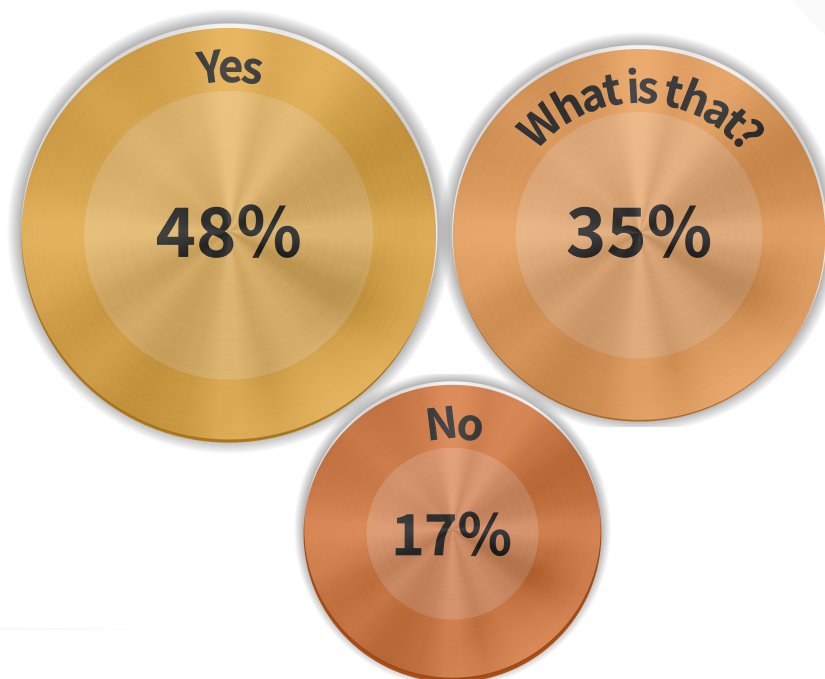
contractors use email as
their preferred means of
communication.

PREFERRED MEANS OF DIGITAL COMMUNICATION



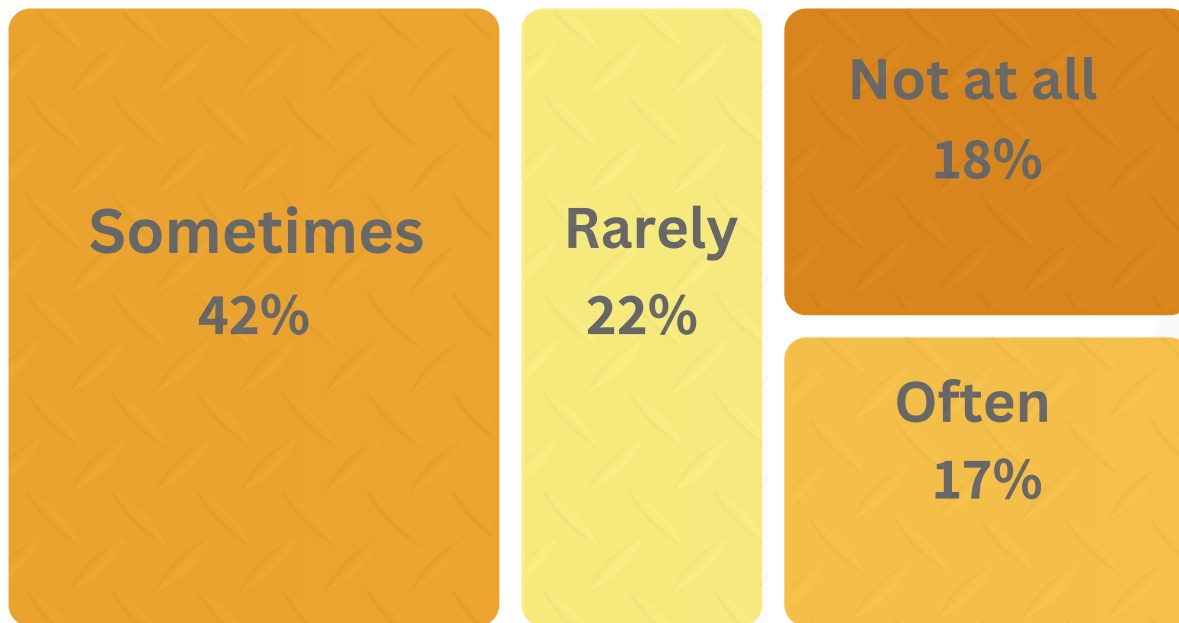
ARE YOU USING AN ERP SYSTEM?

An Enterprise Resource Planning (ERP) system integrates various business functions like project and asset management, procurement, inventory, and accounting. Among 186 surveyed contractors, 48% utilize an ERP or similar system, 17% do not use one, and 35% lack familiarity with ERP technologies, suggesting a significant gap in adoption or understanding of these systems in the industry.



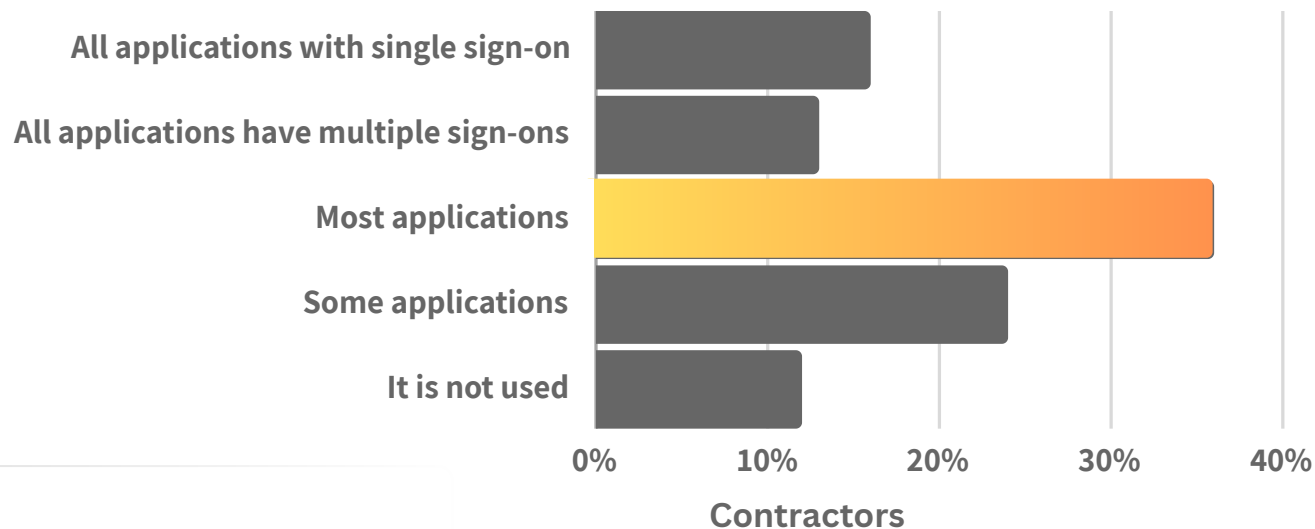
HOW OFTEN ARE DATA VISUALIZATION AND DASHBOARDS USED?

Data visualization refers to the practice of translating complex data sets into graphical formats like charts and graphs. Visualizing data is beneficial to see and understand trends, outliers, and patterns in data. 18% of contractors are frequently using data visualization tools, 42.4% sometimes use them, 22.3% rarely use them, and 17.9% do not use them at all.



USE OF TWO-STEP VERIFICATION

Two-step verification is a security measure requiring two types of identification before granting access, it is crucial in construction for protecting sensitive project data. In our survey 16% of contractors enable single sign in for all applications, 13% of contractors use multiple sign-ons for all applications, 36% use two-step verification for most applications, 24% use it partially, and 12% do not use it at all.





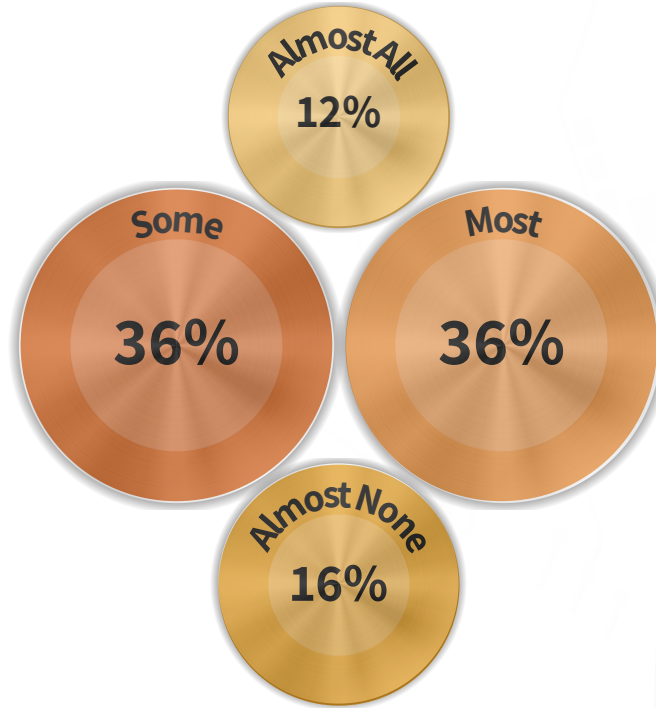
Tools and Project Management

98%

of contractors report
having tablets available for
field staff use on job sites.

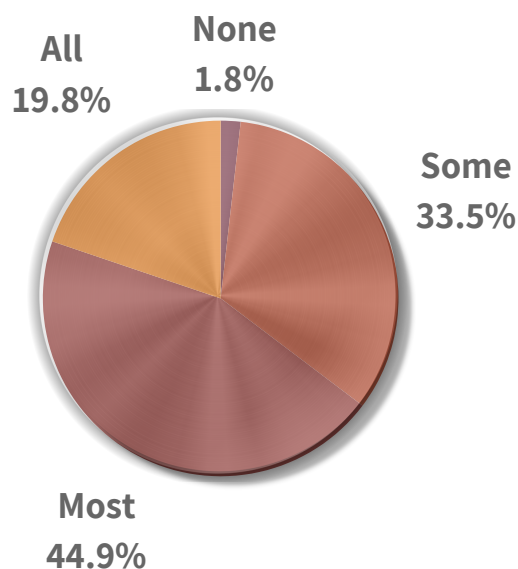
HOW MANY JOB SITES HAVE INTERNET ACCESS?

12% of contractors report having reliable access on almost all sites. While 36% have access on most sites, another 36% only on some, and 16% on almost none, indicating widespread challenges in achieving stable internet connectivity in the field.



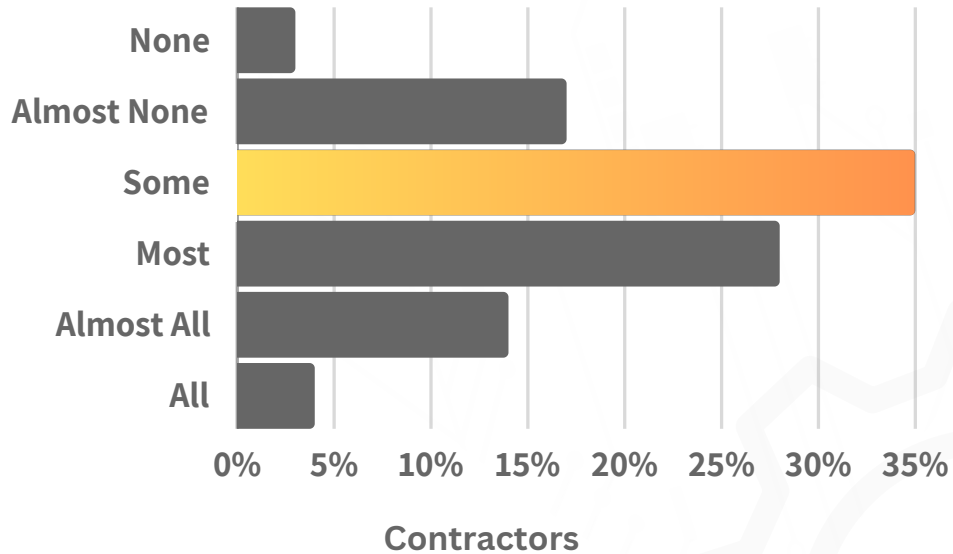
TABLET USAGE ON JOBSITES

Tablet use on job sites is significant, with 45% of contractors reporting most field staff are equipped, 34% having some staff with tablets, and 20% are fully outfitted. Only 2% have no tablet usage, showing a strong trend towards integration of digital tools on job sites.



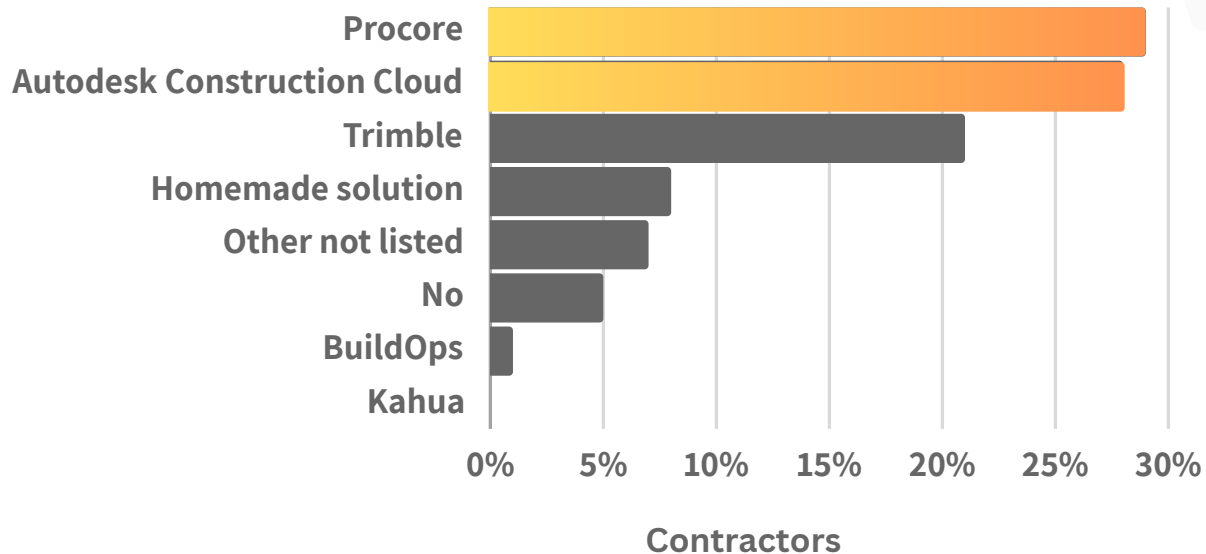
ARE JOB SITES RELYING ON PAPER DRAWINGS?

Dependency on paper drawings varies, with 3% of sites not using them at all, 17% almost none, 35% some, 28% most, and 18% almost all or all, reflecting a mixed progress towards digital adoption.

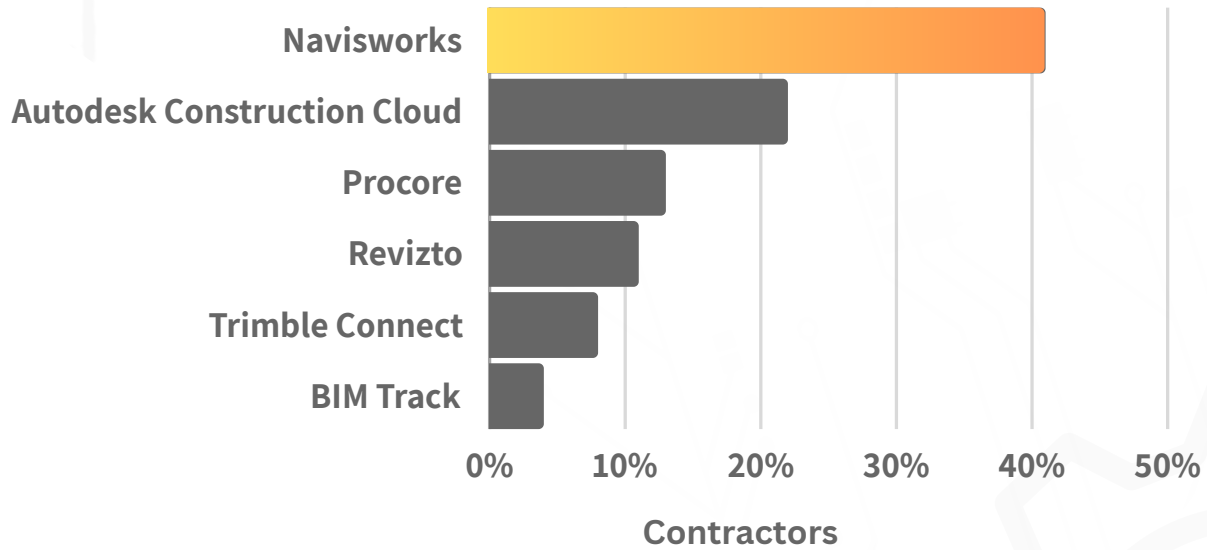


WHAT PROJECT MANAGEMENT PLATFORMS ARE USED?

Project management platforms are systems that help manage projects from planning to completion, integrating various functions like scheduling, resource allocation, and communication. When choosing platforms the focus should be on finding a solution that fits the unique needs of your company. When asked what contractors are using, many are using more than one. 29% use Procore, 28% use Autodesk, and 8% use in-house solutions.

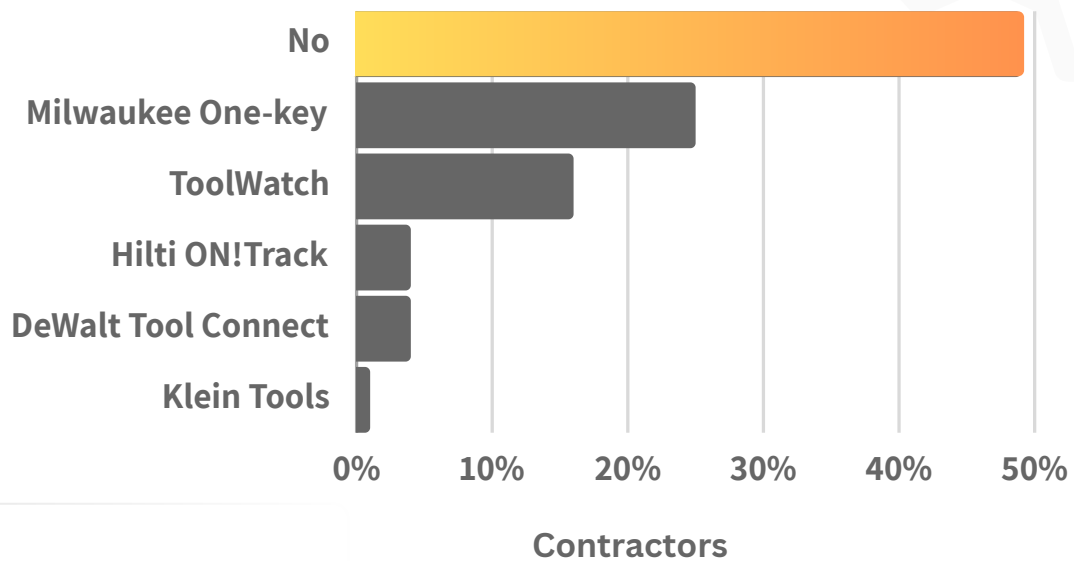


PREFERRED COORDINATION PLATFORMS



DO YOU USE TOOL TRACKERS?

Tool tracking systems are designed to monitor and manage equipment and tools on job sites. Nearly half of the contractors (49%) don't use them. Among those who do, 25% prefer Milwaukee One-key, 16% use ToolWatch, 4% Hilti ON!Track, another 4% DeWalt Tool Connect, and 1% Klein Tools.





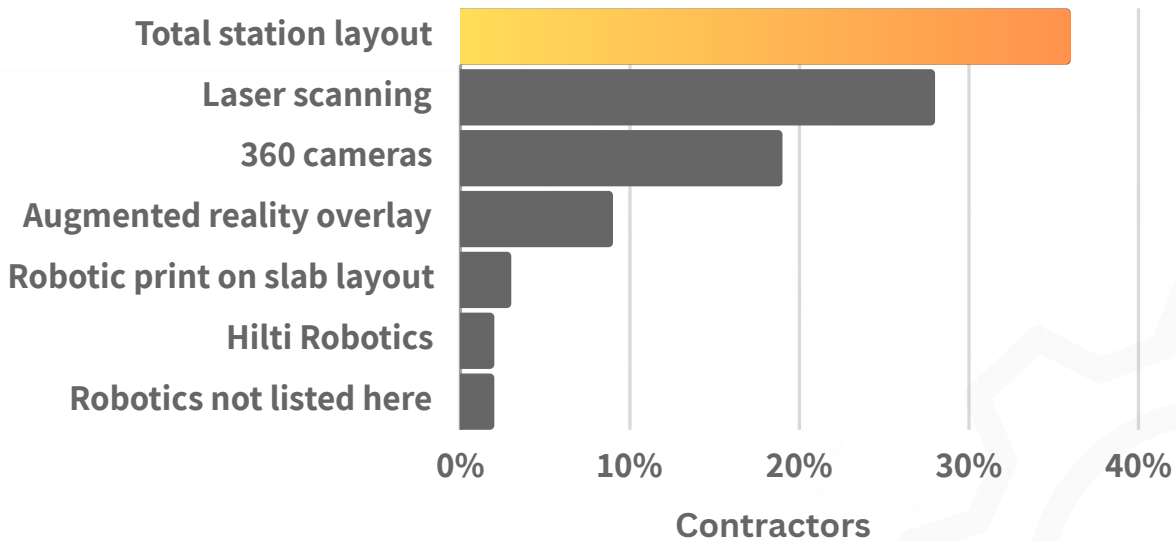
Technology

56%

of contractors are not using artificial intelligence in their current positions.

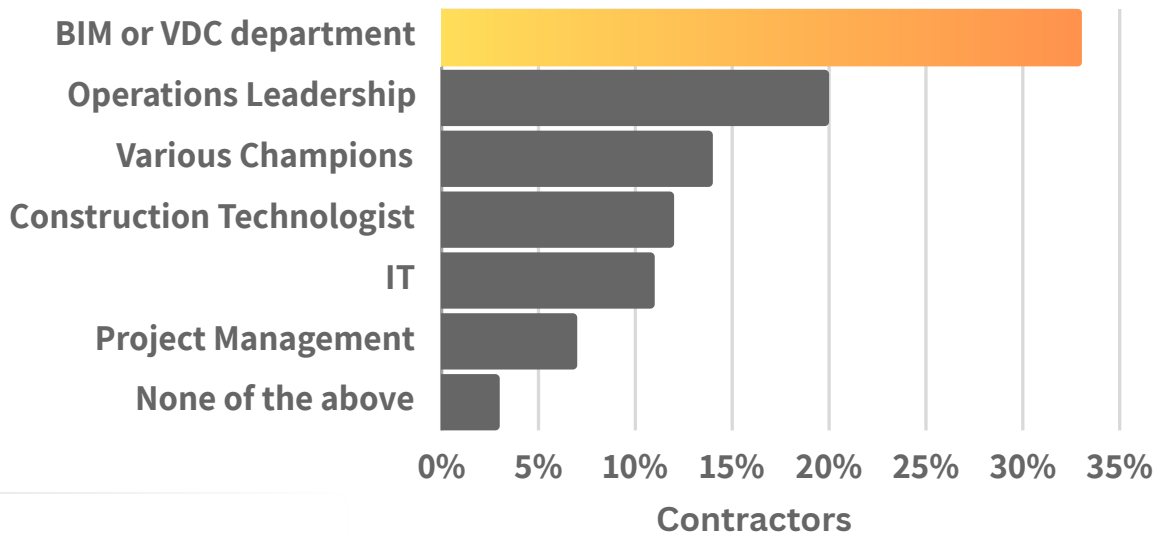
WHAT TECHNOLOGY IS BEING USED IN THE FIELD?

Field technology is widely adopted among contractors, with a notable 86% utilizing total station layout. Laser scanning is also prevalent at 67%, and 45% of contractors are capturing their sites in 360 degrees with cameras. While only a few are using advanced robotics for layout at 6%, and Hilti Robotics or other unlisted robotics at 5% each, 22% are exploring augmented reality overlays, signaling an embrace of innovative tools in construction.



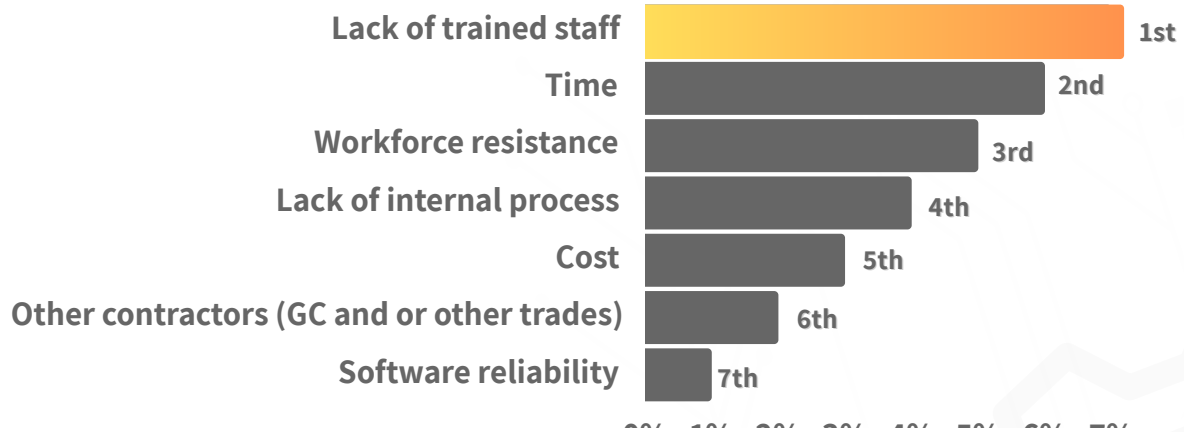
WHO OVERSEES CONSTRUCTION TECHNOLOGY?

Responsibility for overseeing construction technology is shared across various roles. BIM or VDC departments are frequently in charge, with Operations Leadership and Various Champions also playing significant parts. Construction Technologists and IT departments contribute as well, though to a lesser extent, and a small number have no specific overseer for this area.



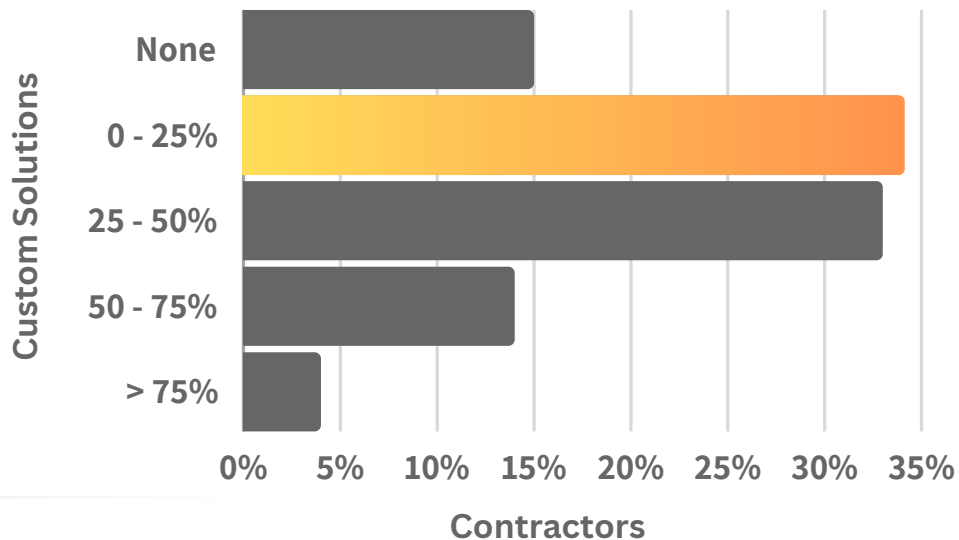
WHAT ARE THE BIGGEST HURDLES TO IMPLEMENTING TECHNOLOGY?

Ranking

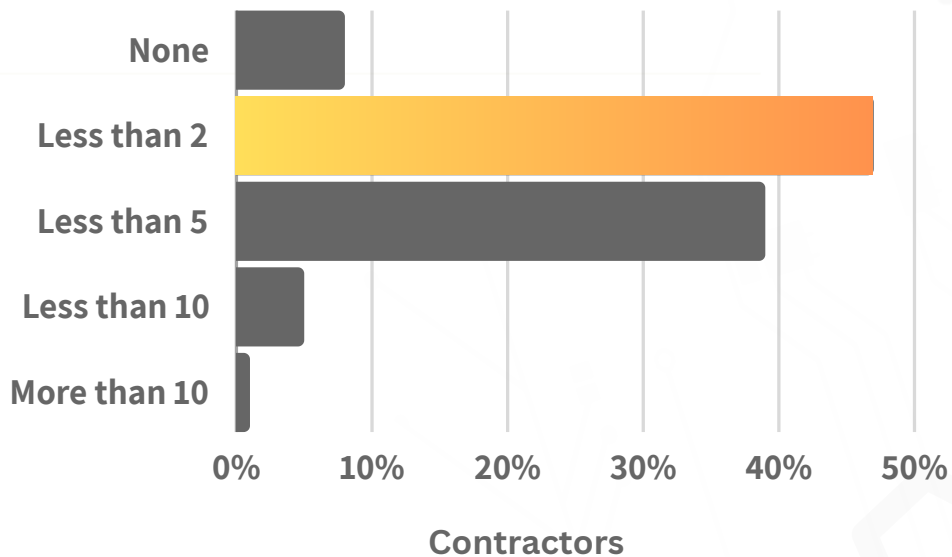


CUSTOM-BUILT SOFTWARE

Some contractors invest in custom software workflows and integrations. 34% of contractors said that 25% of their workflows and integrations are custom, 4% of contractors report that more than 75% of their software and integrations are custom. Meanwhile 15% of contractors report having no custom-built solutions.

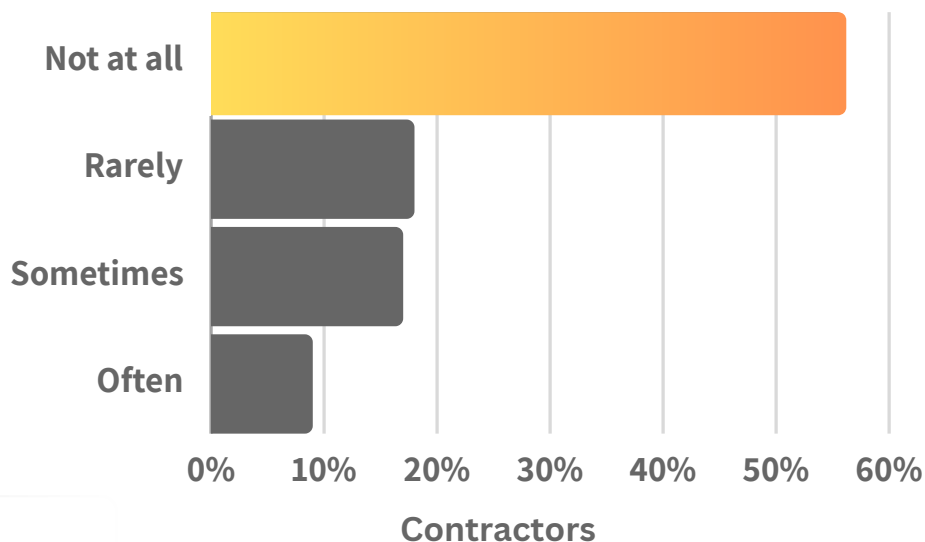


HOW MANY DIGITAL SOLUTIONS HAS YOUR COMPANY BOUGHT IN THE PAST 12 MONTHS?



HOW OFTEN ARE YOU USING AN AI DIGITAL ASSISTANT TO HELP YOU IN YOUR CURRENT POSITION?

Digital tools including AI (Artificial Intelligence) such as CHATGPT, Bard, Gemini continue to advance at rapid paces. What does that mean for the construction industry? Currently AI offers potential benefits for the construction industry by enhancing data analysis, decision-making, and automating routine tasks, increasing efficiency and reducing errors on projects. How often is it being used?





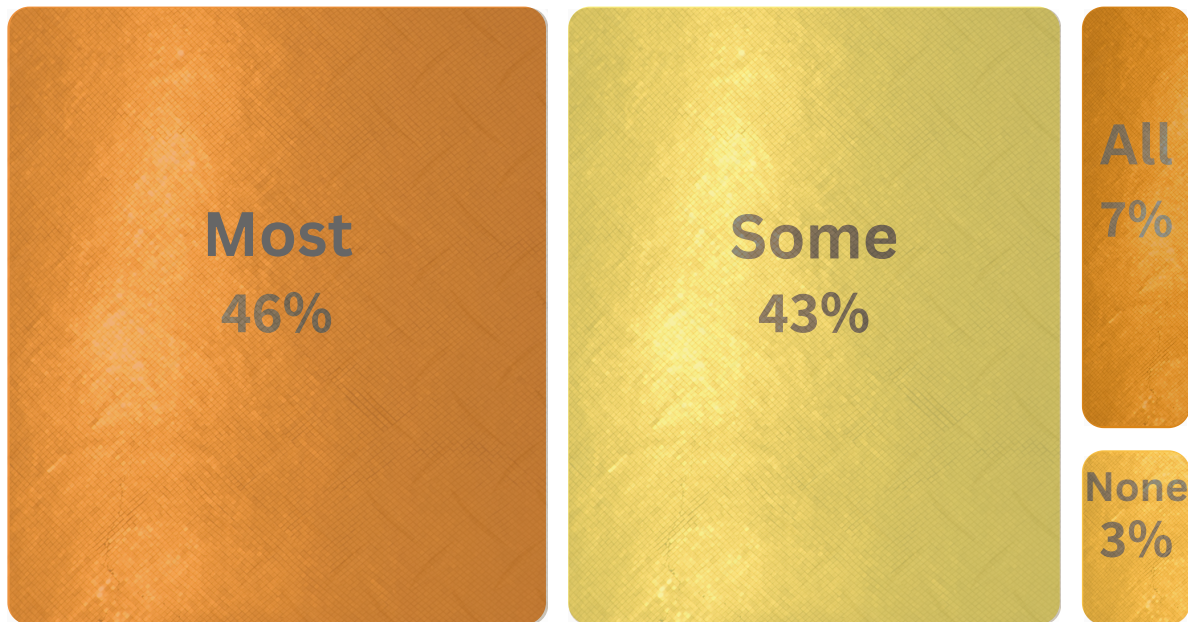
Material Management

96%

of contractors are using manual purchasing processes.

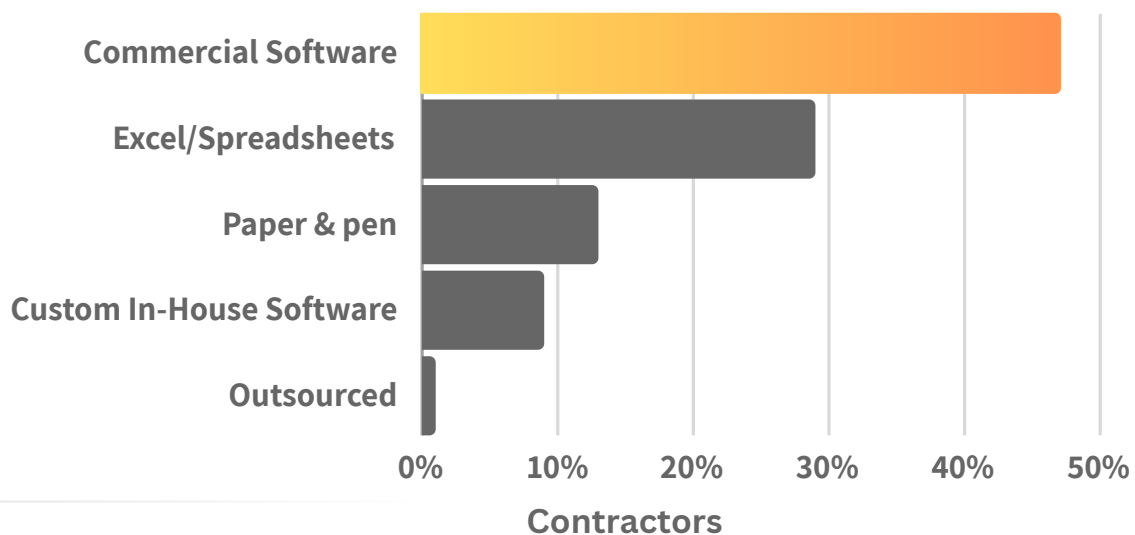
HOW MUCH OF PURCHASING PROCESSES ARE MANUAL?

Survey results reveal that only 3.5% of contractors avoid manual purchasing processes entirely. A significant 89% engage in mostly or partially manual purchasing, while 7% rely entirely on manual methods, indicating a wide reliance on traditional processes.



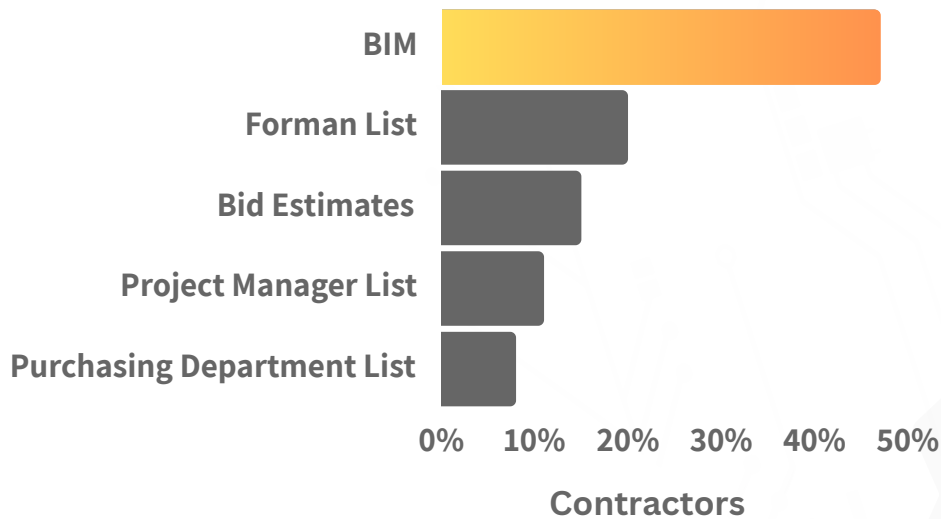
WHAT METHODS DO YOU USE FOR ESTIMATING?

Contractors widely prefer commercial software for estimating, with 47% adoption, followed by 29% using Excel or similar spreadsheets. Despite the move towards digital, 13% still use paper and pen, 9% rely on custom in-house software, and a mere 1% outsource their estimating tasks.



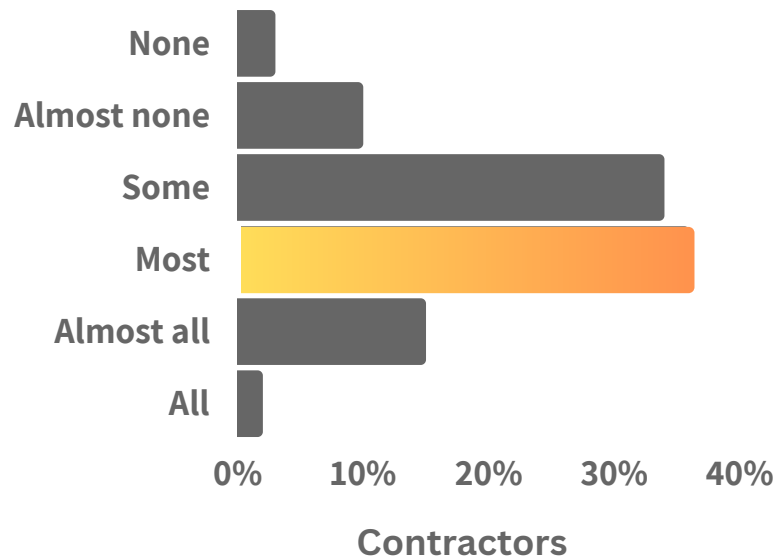
WHAT DO YOU USE TO CREATE BOMS?

When asked which of the following contractors were using to produce bills of material (BOMs), 47% of contractors utilize Building Information Modeling (BIM), Foreman Lists are used by 20% of contractors, Bid Estimates are used by 15%, and the Project Manager List and the Purchasing Department List are less commonly used, at 11% and 8% respectively.



IS PURCHASED MATERIAL GOING TO THE SHOP FIRST?

Half of the surveyed contractors report that most purchased materials are initially sent to a shop, factory, or staging area, highlighting a common practice of pre-site processing or storage.



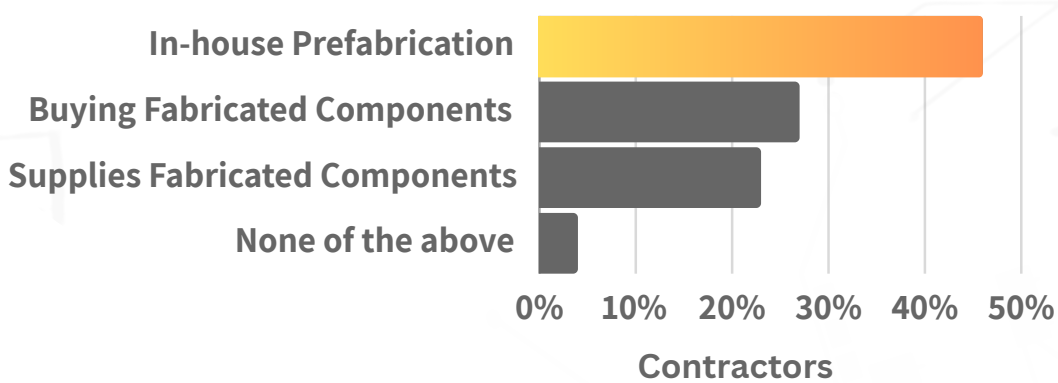


Prefabrication

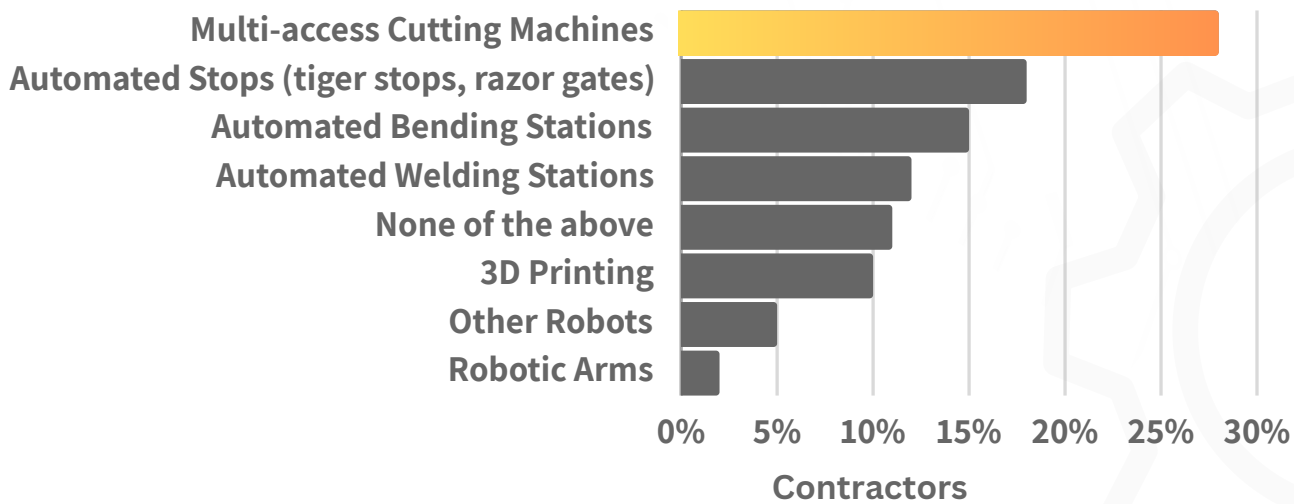
46%

of contractors engage in
in-house prefabrication.

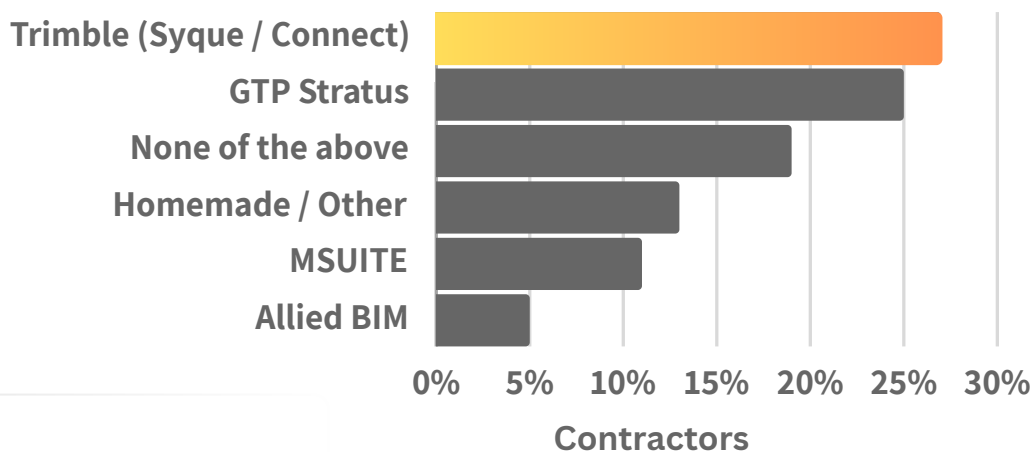
DO YOU ENGAGE IN ANY OF THESE?



DO YOU USE ANY OF THE FOLLOWING EQUIPMENT?



WHAT FABRICATION MANAGEMENT PLATFORM DO YOU USE OR PLAN TO USE?





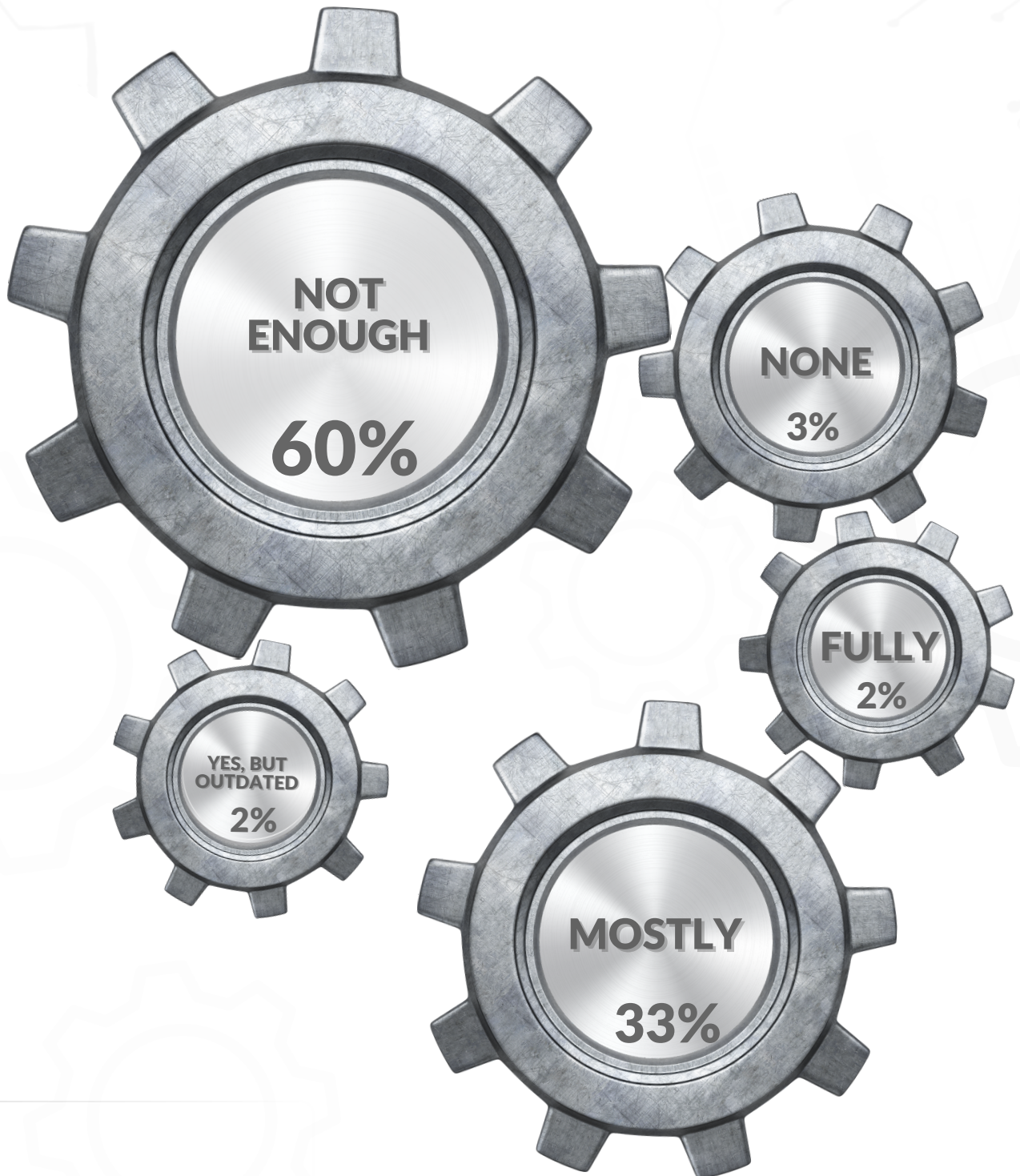
Business Processes

60%

of contractors agree that they do not have enough documented business processes.

HOW DOCUMENTED ARE THE BUSINESS PROCESSES WITHIN YOUR COMPANY?

We asked th participants whether they had strong documented processes withing their company, meaning standard operating procedures (SOPs). 60% of contractors agree that they do not have enough documented business processes within their company, while 33% of contractors say they are mostly documented.



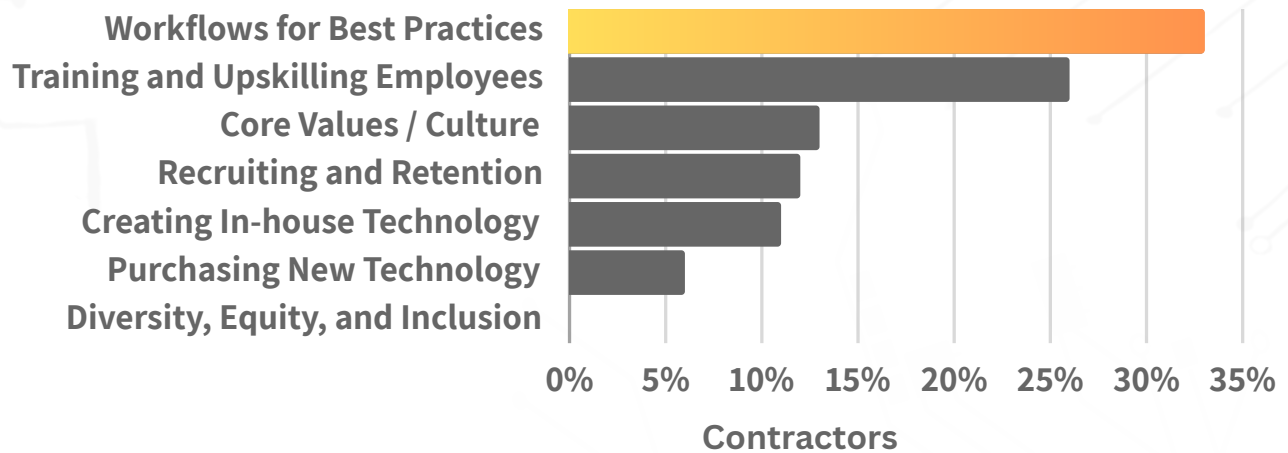


Workforce Development and Education

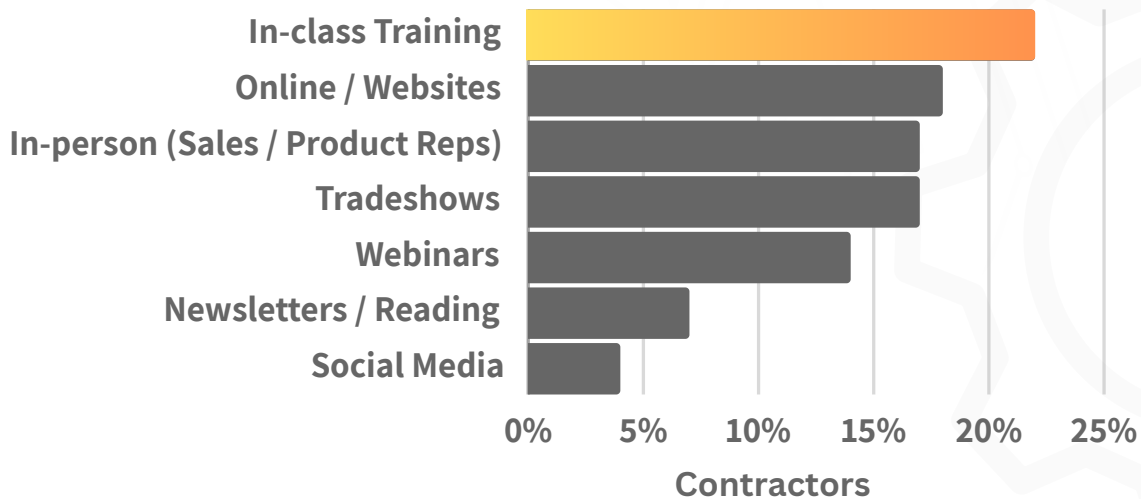
66%

of contractors prefer in-class training to learn about products, technology and regulatory information.

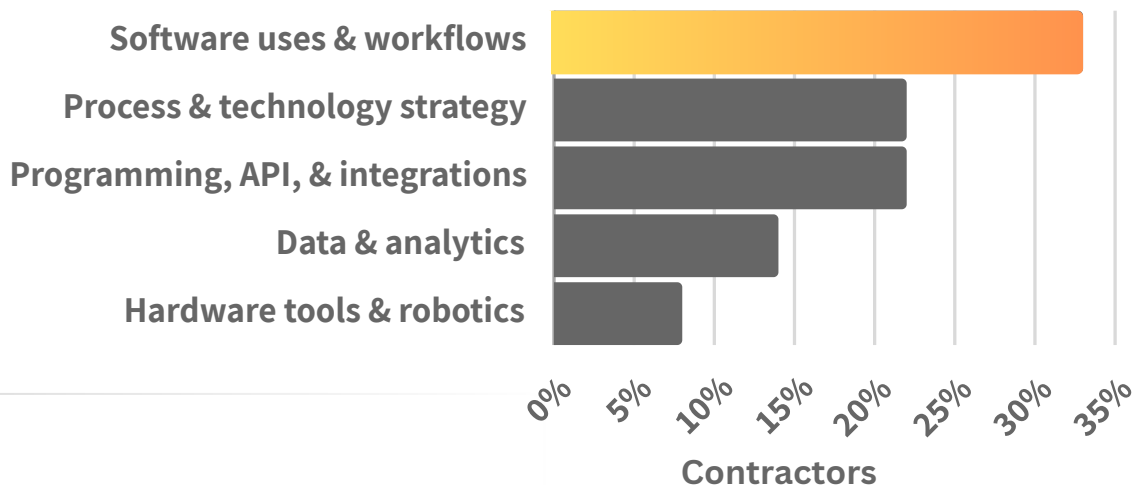
WHAT IS PRIORITY OVER THE NEXT 12 MONTHS



HOW DO YOU PREFER TO LEARN ABOUT PRODUCTS, TECHNOLOGY, AND REGULATORY INFORMATION?



WHICH AREAS WOULD YOU LIKE TO SEE MORE EDUCATION CONTENT OFFERED?



The 2024 Construction Technology Report Team

DENISE DEVINE

Analyst, Design and Writer

CHATGPT 4

Asst. Editor

JONATHAN MARSH

Chief Editor

TEAM OVERVIEW

The 2024 Construction Technology Report was crafted by Denise Devine, responsible for the analytics, design, and writing. Due credit given to ChatGPT 4 for its editing contributions. Jonathan Marsh, of Steel Toe Consulting LLC, oversaw final edits and completion of the report, managed the survey platform, and developed the survey questions with contributions from NECA, MCAA, SMACNA, and ASC Engineered Solutions.

The Part 1 survey results were dynamically unveiled through a live interactive poll at the MEP Innovation Conference's General Session, aptly named "The Pulse of Innovation." This engaging presentation was collaboratively conducted by Denise Devine, Jonathan Marsh, and Amanda Comunale, offering attendees a firsthand look at the latest industry insights. ASC Engineered Solutions was a sponsor for General Session.

ABOUT STEEL TOE CONSULTING

Steel Toe Consulting (STC) specializes in technology consulting that bridges the gap between virtual design and the realities of manufacturing and construction. Specializing in MEP trades STC draws upon industry experts and years of experience to both select and implement the construction technology's that best fit the way you want to build and reflect the best practices for the types of projects you take on. We also work with your shop and field teams to leverage technology and data to enhance efficiency.

ASC ENGINEERED SOLUTIONS

ASC Engineered Solutions is recognized for its comprehensive range of pipe joining systems, fire protection products, flow control solutions, and support systems. The company stands out for its commitment to quality in every connection, offering a robust BIM/CAD content library and a wide array of fittings, hangers, and supports. Following a strategic merger with Smith-Cooper International, ASC has enhanced its ability to deliver superior solutions for diverse piping needs.

About our Partners

ABOUT MCAA



Mechanical Contractors Association of America

The Mechanical Contractors Association of America (MCAA) supports the needs of around 2,600 firms in heating, air conditioning, refrigeration, plumbing, piping, and mechanical service. MCAA enhances its members' managerial and technical expertise through high-quality educational materials and programs, including a variety of conferences and training opportunities to ensure the industry remains productive and profitable.

ABOUT NECA



The National Electrical Contractors Association (NECA) represents the interests of the electrical contracting industry, comprising over 70,000 electrical contracting firms and employing more than 650,000 electrical workers. NECA members work across all aspects of electrical construction, advocating for the industry through education, research, and standards development, thereby ensuring high standards of quality, safety, and efficiency.

ABOUT SMACNA



The Sheet Metal and Air Conditioning Contractors' National Association (SMACNA) is a prominent international trade association, championing quality and excellence in the sheet metal and air conditioning industry. With a robust membership of over 3,500 contracting firms and more than 100 chapters globally, SMACNA sets the standard for technical guidelines, industry practices, and workforce training across the United States, Canada, Australia, and Brazil.

Thank You

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