

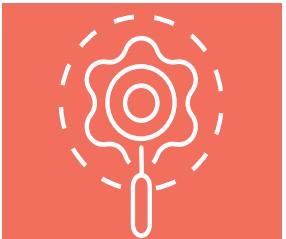


Update on the Evolving E&C Risk Environment

The 2019 AGC/FMI Risk Management Survey



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2019 AGC/FMI Risk Survey: Key Statistics at a Glance

TOP RISKS TODAY

80% Limited supply of skilled craftworkers

Limited supply of field supervisors **44%**

33% Changes in contract language/insurance terms

43% of contractors plan on increasing in-house design. This is **5%** more than in 2018.

TOP RISKS IN THE FUTURE

58% Economic slowdown

Field supervision **46%**

39% Strategic agility

Contractors are **more effective** in managing risk **today** compared to three years ago.

2016 **17%**

2019 **25%**

TOP 3 REASONS TO BRING DESIGN IN-HOUSE

61%

Increase supervision of design firms

66%

Facilitate communication with outside firms

68%

Improve communication with design firms



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All data is based on the 2019 AGC/FMI Risk Survey





Success is not final, failure is not fatal. It is the courage to continue that counts.

Sir Winston Churchill

Executive Summary

The engineering and construction (E&C) industry faced a very different risk environment three years ago, when AGC's Surety Bonding and Risk Management Forum—in collaboration with FMI—conducted its first survey of that environment. E&C firms were having a difficult time adapting to a world where **35% of respondents thought their organizations were ineffective in managing risk**. Since then, the industry has continued to evolve, and today it appears contractors are increasing their emphasis on risk as a strategic priority.

This year's survey indicates that executives are more likely to take a proactive approach to risk management as opposed to viewing it as a defensive exercise. The most proactive firms are seeing a direct correlation between profitability and their success in identifying, assessing, managing and mitigating risk. Our research also shows that firms are using new tools and risk management strategies and leveraging technology in a more sophisticated way in order to adapt to the changing E&C landscape.

These trends are reflected in one study participant's view: "There is a heightened risk consciousness and a heightened emphasis on risk assessment, management and training."

As part of this year's study, we also surveyed contractors' perceptions around current and future risks and investigated how firms are preparing for a possible downturn. We also found that contractors are increasing their in-house design capabilities, in an effort to manage design risk more effectively. Contractors also shared their perceived benefits and challenges of developing such expertise.

Overall, this year's study results indicate changes in the E&C risk environment over the last three years and provide important data points regarding future risk management trends. All information is based on more than 100 responses from best-in-class companies that are active in AGC's Surety Bonding and Construction Risk Management Forum; the data was collected at the end of 2018.

Key findings are grouped into the following four main themes:

- 1) Top Current and Future Risks
- 2) Recession-Proofing Your Organization
- 3) The Rise of In-House Design
- 4) The Changing Risk Environment

For the third year in a row, a lack of qualified talent was the top risk for study participants, with the limited supply of skilled craftworkers being the biggest challenge for 80% of respondents. The limited supply of field supervisors became the second most critical risk (44%) and reflects the ongoing demographic shift of baby boomers cycling out of the industry.

“What other industry turns over hundreds of millions of dollars of work to guys that they do not prepare adequately for the job? Only in construction,” said Mark Breslin, CEO of United Contractors. “More importantly, how much longer can we fool ourselves around the crucial conclusion that field leaders in this critical profit leadership position need new skills, tools and strategies?”

While rumblings about a recession on the horizon are starting to make company leaders a bit nervous, many are too busy keeping up with their current workload to start thinking about contingency planning. In fact, the constrained labor situation, coupled with material price increases, compressed project schedules, increased complexity and ongoing margin compression, is generating more risk for E&C firms today—and right when they find themselves in a market with more opportunities than capacity to perform the work. As we like to say, “Contractors don’t starve to death; they die from gluttony. They get too much work, too fast, with inadequate resources, and then they get into financial trouble and run out of cash.”

As we further explore the survey’s results—and as the E&C industry continues to evolve—AGC’s Surety Bonding and Risk Management Forum and FMI will keep you abreast of developments, while supporting successful strategies and business models for today’s fast-changing and dynamic business environment.



One of the biggest risks today is not leveraging technology or refusing to be an early adopter of the ‘next big thing.’ There will be major technological disrupters in this market, and the company that’s slow to pick up on them is essentially diminishing its position in a very competitive industry.

**Patrick O’Connor, Vice President of
Risk Management and Counsel
The Walsh Group**

Key Findings

This year's report provides fresh insights into contractors' perceptions of current and future risks and reveals how companies are managing risk differently, compared to three years ago, when AGC and FMI first surveyed the industry. In addition, the report sheds more light on the growing interest in in-house design, including perceived benefits and challenges of developing in-house design capabilities.

As we researched the risk environment, we also investigated how firms are preparing for a possible downturn and pulled together the lessons learned that FMI's shareholders surmised from the Great Recession.

In sum, this year's research reveals shifts in the E&C risk environment over the last three years and provides important data points for future assessment of risk management trends. At the heart of our research were 100 responses from best-in-class companies that are active in AGC's Surety Bonding and Construction Risk Management Forum. We collected the data at the end of 2018.

Key findings are grouped into the following four areas:

- 1) Top Current and Future Risks
- 2) Recession-Proofing Your Organization
- 3) The Rise of In-House Design
- 4) The Changing Risk Environment



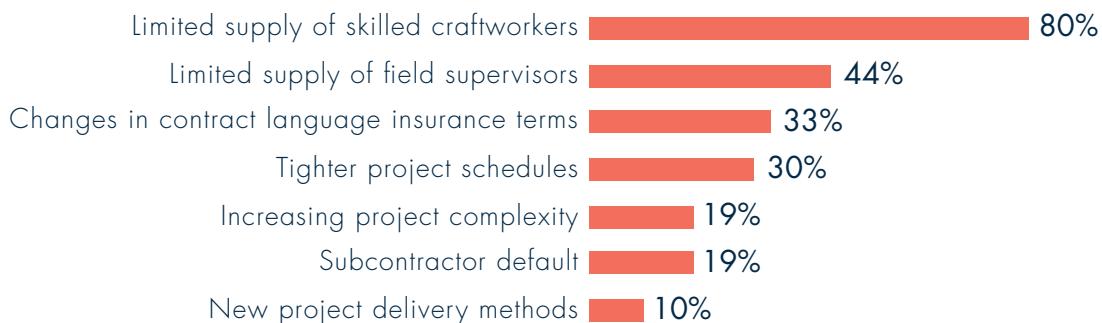
1. Top Current and Future Risks

1.1 Top Risks Today

For the third year in a row, lack of qualified talent was the top risk for study participants, with the limited supply of skilled craftworkers being the biggest challenge for 80% of respondents (**Exhibit 1**). The limited supply of field supervisors became the second most critical risk (44%) and reflects the ongoing demographic shift of baby boomers cycling out of the industry.

While talent is a top concern, some executives are optimistic and feel that a younger generation may be just what the industry needs. Brad Barringer, CEO of B.R.S. Inc., shares the following: “We’ve found that young people are different than they were 20 years ago. Today’s young people want the opportunity to take responsibility and take on new leadership positions. Twenty years ago, you wouldn’t have put a young person in a foreman position until he/she had at least five years of experience. Now we’re putting people in a foreman position with no more than two years’ experience and they’re doing great.”

Exhibit 1. Top risks in 2019



Source: 2019 AGC/FMI Industry Risk Survey

Training and developing professionals have quickly become strategic priorities for many E&C firms, but, unfortunately, many firms still struggle with talent development. According to FMI's most recent [talent development study](#), the overall results of learning and development programs remain mixed (**Exhibit 2**). We believe one apparent reason is that many E&C firms still treat training as an opportunistic or one-off "skills problem" for an individual or group of professionals, when in fact it should be tackled as a systems issue. Said differently, winning the war for talent requires a holistic, long-term planning approach. Learning and development must be integrated into a comprehensive talent management program that purposefully links the organization's vision, strategy, key roles and skills needed to make progress on its business objectives. This approach requires leaders to think strategically about the company's future and to ask questions like these:

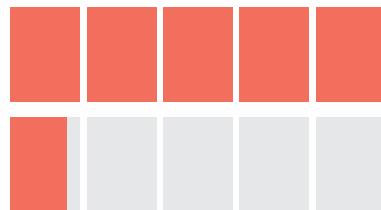
- What do I want my company to look like five or 10 years from now?
- What must our culture, talent processes and systems look like to achieve that vision?
- What skills and competencies will my people (and future hires) need to demonstrate to achieve my talent aspirations?
- Given my talent aspirations, am I investing in the right skills and competency development to create a pipeline of top-tier talent?
- Have I created a culture where feedback and learning are core expectations and a part of everyday work?

Addressing such questions will help industry executives systematically plan for retaining and developing future talent. This is particularly critical as E&C firms face looming losses between 14% and 20% of certain employee groups, including executives, field managers, senior managers and project managers over the next few years due to attrition or retirement.¹

Front-line field leaders are managing thousands of dollars in client work daily and can make or break a construction firm. In a world where construction clients are highly cost-sensitive and risk-averse, skilled front-line leaders are the most essential differentiators. Nevertheless, FMI's observations suggest that very few companies are properly prepared to transition field leadership from one generation to the next.

Exhibit 2. Today's training programs aren't very effective.

5.8 out of 10



Source: 2017 FMI Talent Development Study

¹ 2017 FMI Talent Development Study.

Mark Breslin, CEO of United Contractors, confirms this point: "Most of the crew on every job in the U.S. and Canada are going home soon and they are never coming back. No organization that I know of is fully prepared for this situation. Maybe 25% are actively working on it with a plan of action, 50% are aware of it and talking about it, and 25% are simply doomed and won't know it until it is too late."

Taking a strategic approach to talent development will help ensure that the right people are ready at the right time to enter leadership and/or ownership roles. Risk managers and HR leaders should both have a seat at the executive table to tackle this critical issue in the context of a comprehensive, strategic enterprise risk management program.



What other industry turns over hundreds of millions of dollars of work to guys that they do not prepare adequately for the job? Only in construction. More importantly, how much longer can we fool ourselves around the crucial conclusion that field leaders in this critical profit leadership position need new skills, tools and strategies?

**Mark Breslin, CEO
United Contractors**

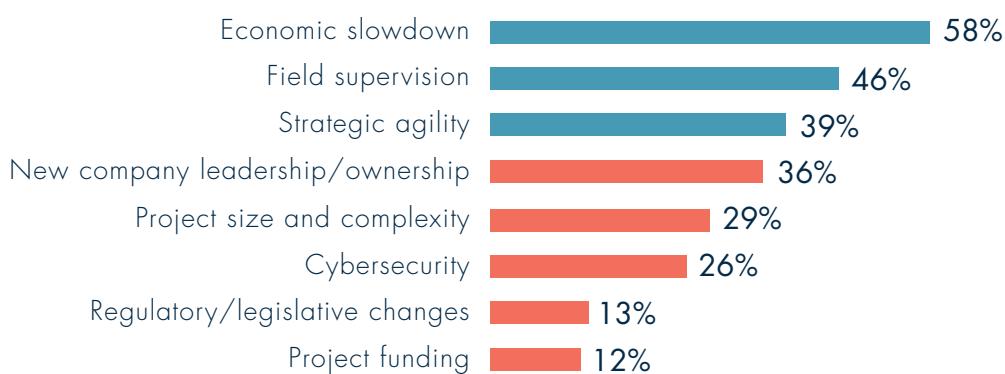
1.2 Future Risks

Rumblings about a recession that may lie on the horizon are starting to make company leaders a bit nervous, but many are too busy keeping up with current work to start thinking about contingency planning. In fact, the constrained labor situation, in conjunction with material price increases, compressed project schedules and ongoing margin compression, is creating more risk for E&C firms today—precisely when they find themselves at the top of a robust market. As we like to say, “Contractors don’t starve to death; they die from gluttony. They take on too much work, too fast, with inadequate resources, resulting in financial trouble when they run out of cash.”

Our research indicates that a potential economic slowdown is top of mind for most contractors. In 2016 just 8% of our survey participants listed an economic slowdown as a perceived risk—today that statistic has jumped up to 58% (**Exhibit 3**). **With growing concerns about the consequences of a potential downturn, some organizations are considering proactive steps to reduce risk and limit exposure.**

Paul James, senior vice president of risk management and general counsel at Bond Brothers, states, “One of the ways we mitigate a downturn is through business line and geographic diversity. One of our very purposeful initiatives in recent years has been to follow what we think is a good and deep vein of work, and [we] continue to expand geographically to help resist some of the implications of one market sector slowing down due to economic forces. We plan over multiple years, and we also have a five-year plan, which is a subset of the multiyear plan. Our growth is intended to be very controlled and very planned, and that helps at least to some degree with a potential downturn.”

Exhibit 3. Top future risks



Source: 2019 AGC/FMI Industry Risk Survey

Looking to the future, executives remain very concerned about field supervision (46%) as well as their organization's "readiness" (39%) to adapt to a fast-changing business environment (**Exhibit 3**). **With the continued influx of information technology into the E&C industry and the rapid development of new technologies and innovations, contractors struggle to identify the tools that will help them stay relevant.** To make matters worse, most contractors invest only 1% or less of their revenue in research and development (R&D), trailing most other industries.

While strategic agility is a rising concern for many, there is also a growing comfort with the implementation of new technologies and processes within organizations. According to a [recent study](#) conducted by AGC and Sage,² "Firms are adopting a variety of approaches to replace workers or allow for use of workers with less training than before. Nearly a third of respondents (32%) report their firms are using methods to reduce on-site work time, including lean construction, BIM and other virtual construction techniques, or off-site fabrication. Twenty eight percent of firms are investing in labor-saving equipment, including drones, robots, 3D printers and laser- or GPS-guided equipment. And 18% of respondents report adding specialists, such as architects, BIM or lean construction personnel, drone or other equipment operators, data insights or IT personnel. Two-fifths (41%) of firms utilize lean construction principles on their projects and/or in their operation, while one-fifth (20%) of respondents expect an increase in the number of their firm's operations that involve BIM."

Patrick O'Connor, vice president of risk management and counsel at the Walsh Group, takes this new perspective: "One of the biggest risks today is not leveraging technology or refusing to be an early adopter of the 'next big thing.' There will be major technological disrupters in this market, and the company that's slow to pick up on them is essentially diminishing its position in a very competitive industry."

Today's fast-paced E&C environment is pushing firms to reinvent themselves in order to keep up with the competition and remain relevant in the future. Status quo productivity will not suffice. The demand is for a better approach to designing, manufacturing and constructing projects, and it requires a tight focus on the present while also keeping an eye on long-term positioning.

And while technology and innovation are clearly industry disruptors, the most important thing to remember is that the core success of a business—its people—remains its greatest asset. **In order to remain relevant and win in the future, E&C firms must prioritize technology strategies to create innovative corporate cultures and change antiquated mindsets.**

² "Contractors Remain Confident About Demand, Worried About Labor Supply: The 2019 Construction Hiring and Business Outlook." AGC of America and Sage. January 2019.



One of the things we do for the board is to create and discuss an enterprise risk matrix, where we periodically review all of our risk priorities. This engages the board and keeps directors up-to-date on what is going on in the organization and facilitates deeper discussions around risk mitigation.

**Casey Halsey, Chief Legal Officer
JE Dunn**



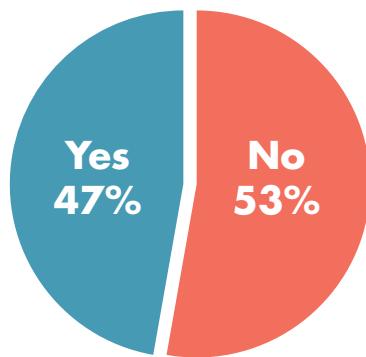
2. Recession-Proofing Your Organization

During the last economic boom, Caterpillar's CEO told division heads to start planning for a possible recession. Challenged by a full-order pipeline, those division heads thought their CEO was out of his mind. After all, demand was high, production capacity was strained, and the entire organization was focused on increasing production.

The same lessons can apply today: Now is the time to "recession-proof" your company and get proactive with conversations and planning around lessons learned from the last downturn. The last recession was historic in scale and duration, and the next downturn will likely look very different. Still, through good preparation, companies can take the lessons that they (or their predecessors) learned from the last recession and use them to avoid repeating costly mistakes.

Our study indicates that **the majority (53%) of organizations do not have a formal plan for weathering an economic downturn, even though the majority (58%) also rate a downturn as a top future risk (Exhibit 4)**. Three-quarters (75%) of our study participants do involve their boards of directors in strategic risk planning, and that is an encouraging sign. Our research shows that **organizations with board involvement are significantly more likely to have a formal contingency plan in place**, compared to firms that do not leverage their boards' expertise.

Exhibit 4. Does your organization have a formal plan in place for addressing the next economic downturn?



Source: 2019 AGC/FMI Industry Risk Survey

For Choate Construction, formal planning is part of its regular risk management strategy—and not just in preparation for a downturn. Brian Record, director of risk management for Choate Construction Company, explains, “We’re always planning for the downside. I think the most prudent construction companies do this. We’re always looking at what may happen and asking each of our regional managers to go through a scenario at least once a year with the premise, ‘If tomorrow you lost 30% to 40% of your business, what would you do? And would you be prepared for it?’ We just constantly prepare for the unexpected.” This exercise provides Choate’s leadership team with an action plan to manage any unexpected project or market losses.

In addition to formal planning, companies are implementing other strategies to solidify their positions ahead of a downturn. Here’s the top three that were discussed in our interviews:

- 1) Watch the market and be aware of your blind spots.** The day-to-day demands of being an E&C executive can consume the lion’s share of your precious time. The problem is that when your nose is to the grindstone, you can miss important economic cues. Several study participants mentioned that they are generally more aware of economic and market/industry conditions thanks to advancements in technology, better access to relevant information, and a greater ability to share and communicate such information. This global awareness allows organizations to be proactive rather than just reactive.

Casey Halsey, chief risk officer and executive vice president of JE Dunn, states, “Last time the recession hit, I think everybody was caught a little off guard, and contractors tried to cut general and administrative expenses as fast as they could. We’re in a different setting today than we were back in 2008: Our inboxes are constantly inundated with financial data and expert opinions. I don’t think a recession would be a surprise to anyone.”

- 2) Don’t put all your eggs in one basket.** Diversification—both geographically and by market sector—is another way many firms are getting ahead of a slowdown. Patrick O’Connor, risk manager for the Walsh Group, explains, “Our work profile is significantly diverse, which has been our growth strategy during other recessions... the diversity of both our work and our geographical profile should help mitigate any significant downturn.”

Similarly, Dirk Elsperman, COO and executive vice president of Tarlton, states, “We have a diverse book of business, so each of our clients has a different business model. The theory is that if there’s a downturn, maybe retail will go down, but offices will go up, and so you’ve got something to balance things out.”

- 3) Be strategic about selecting the right partners and clients.** Interviewees said they’re more rigorous about screening and selecting project partners—including owners, designers and subcontractors. Companies are implementing comprehensive screening processes to protect themselves against potentially bad or litigious relationships that could lead to issues further down the road.

Brian Record adds, “It’s all about doing something well, doing it safely and making sure it’s completed on time. But to achieve that, we’re very cautious about who we do business with. From a risk management point of view, it’s all about protocols. It’s making sure that you know the people who are providing services, or that they’ve proven to others that they can do what they’re supposed to be doing.”

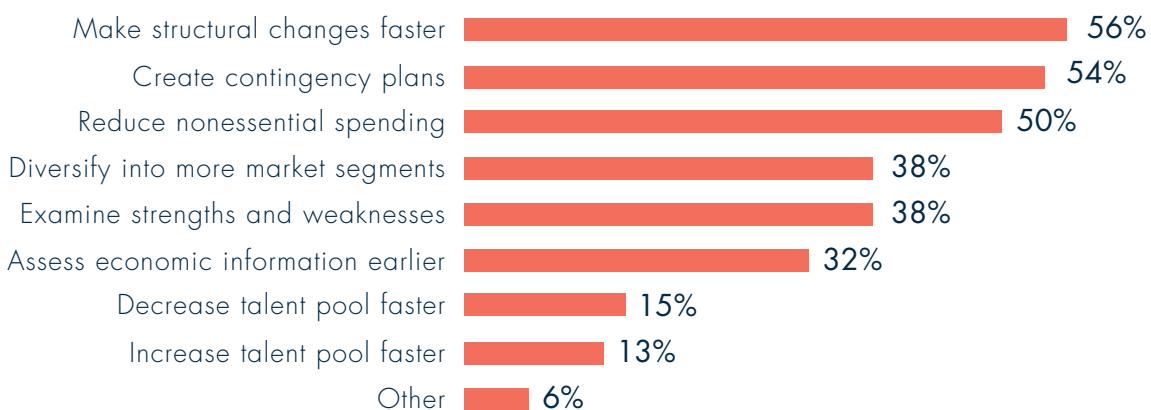
Ron Stuff, senior vice president and general counsel for Sundt, explains, "We're working harder today at identifying the jobs that we want and where we can bring a competitive advantage. We're also looking harder at the mix of work that we take on. Maintaining a diverse mix of work is important to mitigating risk. Sundt has cultivated expertise in a variety of business segments and regions. Finally, we're looking at how we can engage in more negotiated price work with both public and private clients. Together, we think these efforts will have a positive effect of mitigating some of the risk—if and when the slowdown occurs."

2.1 Getting Ready to Adjust and Adapt

Since the Great Recession hit the construction industry, many companies have taken a hard look at themselves, re-evaluating their services, clients and markets as well as their vision and strategic goals. As a result, companies have started to redefine themselves, looking at new and innovative ways to deliver projects, interact with clients and pursue work. Select companies have successfully made these transitions and have evolved into lean, innovative and very competitive players.

With an uncertain future ahead, executives are now considering organizational changes to protect their companies during a potential slowdown. According to our research, general contractors are making structural changes faster and conducting contingency planning earlier, compared to the last downturn. However, specialty contractors were more likely to reduce nonessential spending as a top priority. Construction managers, on the other hand, are diversifying into alternate market sectors and focusing on structural changes (**Exhibit 5**).

Exhibit 5. Given your experience with the last economic downturn, what would you do differently during the next downturn?



Source: 2019 AGC/FMI Industry Risk Survey

Regardless of your business or market sector, one thing is clear: Firms are starting to think about how to manage their organizations during the next downturn—whenever that may happen. Interviews with study participants gave us specific insights into key lessons learned from the Great Recession. Not surprisingly, many discussions revolved around people and how to prepare them ahead of slower times.

Dirk Elsperman explained, “We really pay attention to making sure that our folks are well-rounded in their skills so that if you’re not building a project, you can be working on the bidding side of things. We want to find quality people, but we also want to have the right quality management tools in place to make sure our front-line workers have the tools to execute their work well. We scrutinize everyone we hire to make sure we’re not getting overstaffed.”

Brad Barringer suggests that the best approach to getting through a downturn is to make sure you keep the talent you have—no matter what. “You stay busy as long as you can,” he adds. “You hold onto your very best people, and when you have to start letting people go, you still hold on to your best people and keep them on the payroll and keep them happy, because you know that it’s going to pick up again and you’re going to need those folks to rebuild.”

With signs beginning to point to a possible recession sometime in the next 12 to 18 months, it’s time for E&C firms to shore up the business and talent pipelines that they’ll need to ride out the storm—no matter how monumental or insignificant this “blip” may be.



Getting Back to the Basics

Instead of grasping for straws once the downturn hits, FMI tells companies to go back to the basics and focus on building the best organization possible now. Make sure you have:

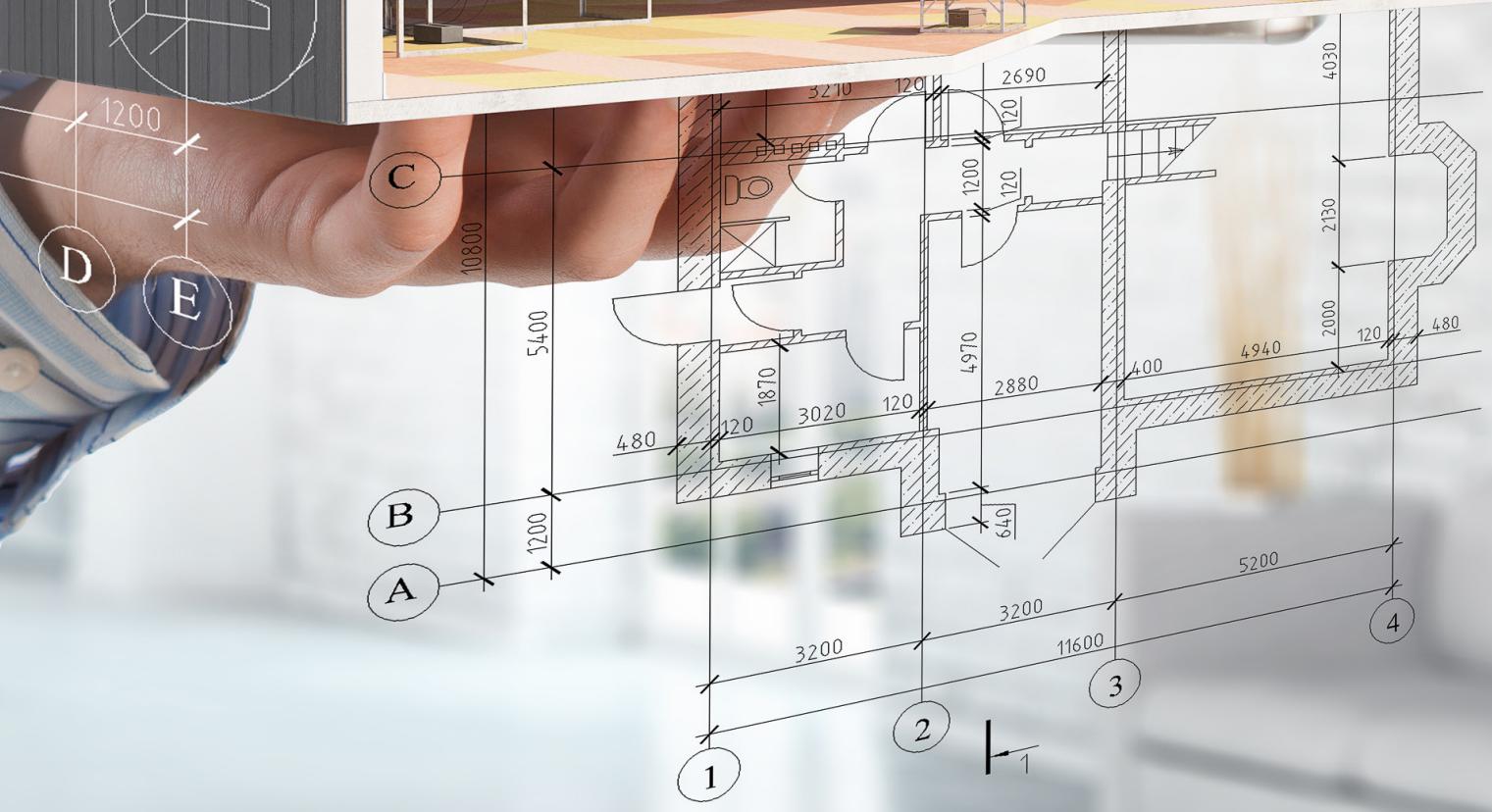
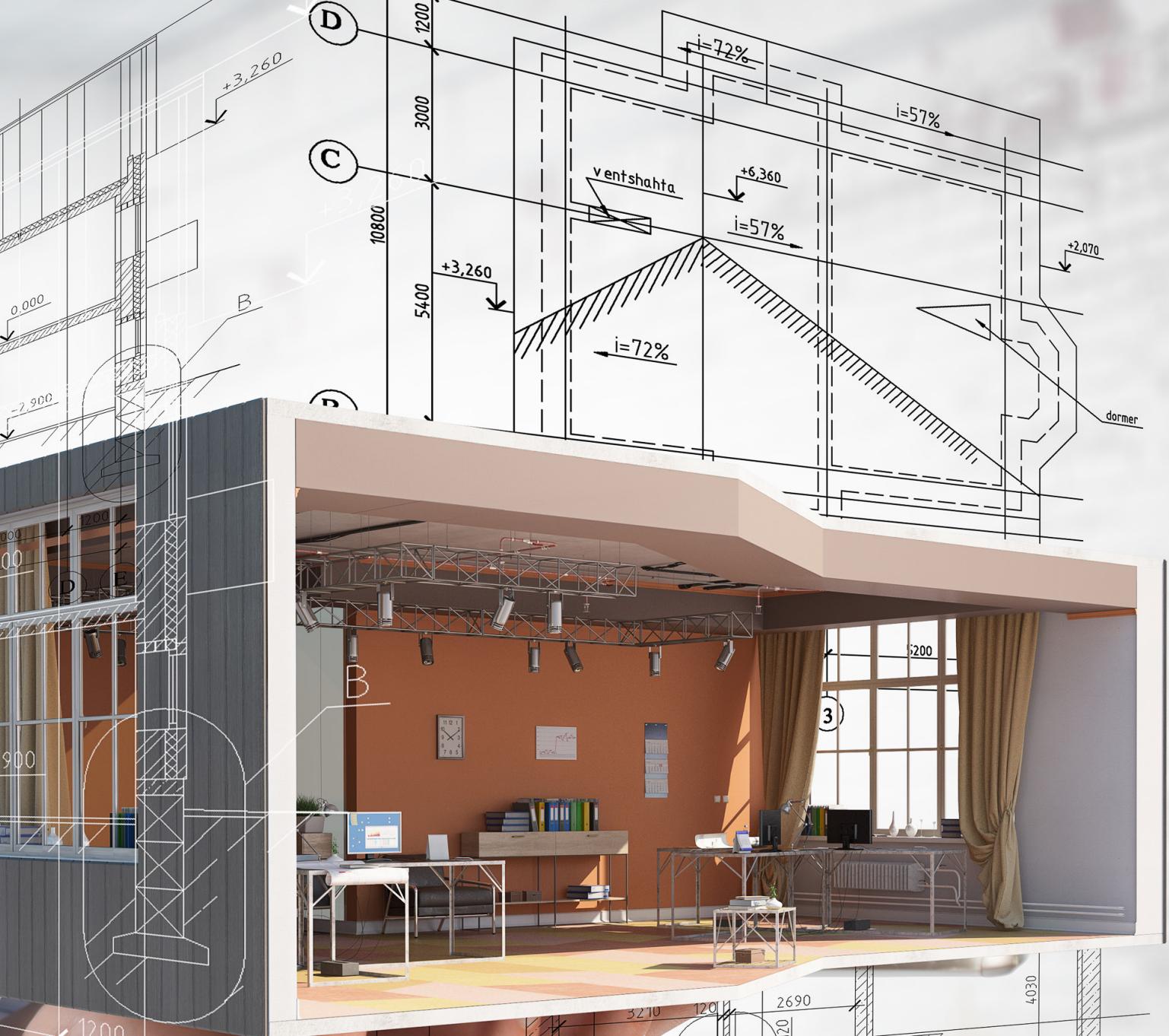
- Great disciplines around communication, feedback and planning.
- Great people who can embrace the organization, negotiate well and understand what the owners want.
- The right support structures and systems.
- The right financial mechanisms in place.
- The right technologies fully integrated to support your company's vision and strategies.

As the industry continues to climb toward the market peak, it's time to unabashedly build out your equity base. That way, when you transition into the next downturn, you'll have the cash resources to do whatever it takes to survive (even if that's "no work" because the money's not there). Skip this step and you'll wind up overextended going into the slowdown; historically, that's where companies have run into trouble.

Here are six more "back to the basics" strategies that E&C companies can use to offset the negative impacts of the next recession:

- 1) Clearly define purpose in your values and the goals/milestones that are in front of you.
- 2) Use data analytics to evaluate these goals against the current context of your business activities.
- 3) Be an agile and flexible leader.
- 4) Explore the market, your peers and other benchmark industries and business builders that you can learn from.
- 5) Be intellectually curious and use your mental flexibility and intuition to come up with new, creative business plans and successfully execute on them.
- 6) Have a plan in place for developing key talent. What people do you need to have on your team 10 years from now in order to sustain the business for the next 30 years?

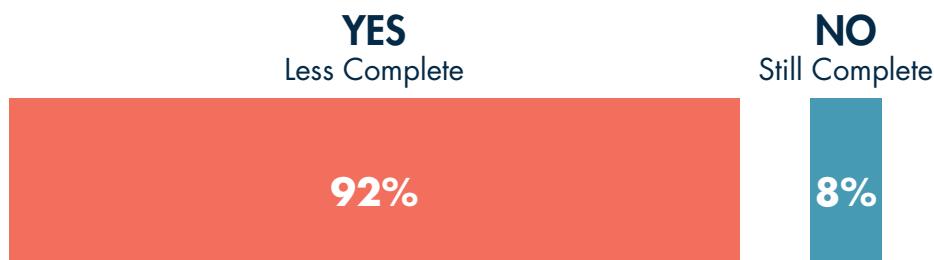
You have the most options at your disposal when the market is healthy and your company performance is strong. All E&C firms should be identifying opportunities that allow them to succeed and putting a work pipeline in place that allows them to win during a future downturn. The companies that understand the current trends and future direction of markets and economic climate will outperform the competition, while the chase group that maintains the status quo may get left behind.



3. The Rise of In-House Design

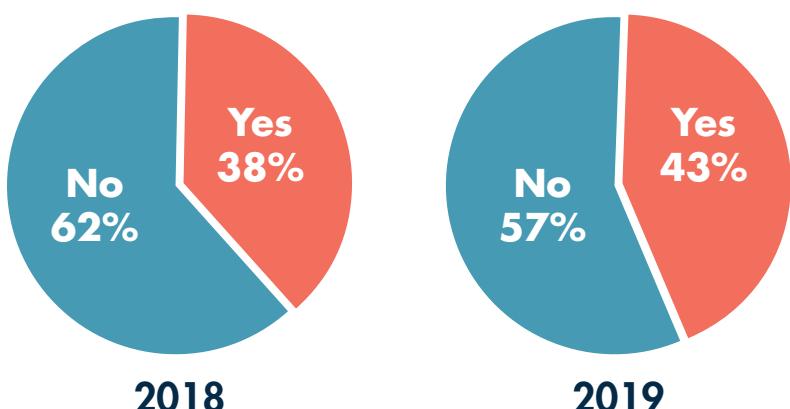
In 2018 construction firms reported that design documents were less complete than they had been in the past. Indeed, a stunning **92% of our survey respondents indicated that such documents were incomplete (Exhibit 6)**. At the same time, 38% reported that they were increasing their in-house design capabilities. This year, the number reporting an interest in increasing such capabilities went even higher, with **43% of our respondents indicating they are preparing to do more in-house design (Exhibit 7)**. Another 25% revealed that they were thinking about increasing their design capabilities in the near future.

Exhibit 6. Have the design documents provided to your firm been less complete than in the past?



Source: 2018 AGC/FMI Risk Management Study

Exhibit 7. Is your organization considering an increase in its in-house design capabilities?



Source: 2019 AGC/FMI Risk Management Survey

Russ Johnson, vice president of Insurance Surety at Skanska, states: “If there’s anybody who tells you they’re not having a problem with more incomplete designs, then they’re lying. It’s one of the reasons I think a lot of firms have gone to—or have started—developing their in-house design capabilities.”

Many contractors are trying to determine whether they want to move past the lower end of the design spectrum and handle the actual design of permanent structures, including design coordination. Here are some key descriptions to keep in mind:

- In-house design capabilities come in many forms that range from the typical design elements done by contractors (e.g., formwork, falsework, means and methods) to those normally handled by a designer (e.g., pen to paper design of permanent structures).
- At one end of the design spectrum are contractors that have in-house architects and engineers on staff. These professionals merely assist in the design coordination with external designers who work for the owner.
- At the other end of the spectrum are the contractors that retain full-time, dedicated teams of designers and expertise to fully design the permanent structure.

When contractors don’t have an avenue to pass down the risk to subcontractors—whether they are design firms or construction subcontractors—it can erode both profitability and margin. No contractor wants to take on unlimited design liability for current margins. But more and more contractors seem to believe that they need to get more control over project design in order to reduce other risks.

3.1 Why Firms Are Making the Shift Toward In-House Design

Today’s construction firms are using various methods to develop their in-house design capabilities. **Our research shows that most firms take an organic approach to building such expertise** by hiring in-house engineers or architects to enable better communication with outside firms or adding individuals to their existing complement of in-house designers (**Exhibit 8**). Only one-fifth (18%) of respondents merged with or acquired design firms.

Greg Powell, managing director with FMI Capital Advisors, Inc., confirms, “While most construction companies continue to take an organic approach to building design capabilities, we do see a growing number of such companies pursue architecture and engineering firm acquisitions as a more expedient path to building integrated services. Cultural differences between construction and design can be significant. So it’s important for firms on both sides of an acquisition to choose their partner carefully and also follow a thoughtful integration strategy to maximize chances for a successful transaction.”

Whatever the strategy, the trend toward in-house design is accelerating: Among the firms that are developing in-house design capabilities, **89% expect to have this process completed within the next three years**. That said, organizations plan to keep design teams relatively modest in size, with only 38% of respondents expecting to grow their in-house design teams beyond 10 people.

Exhibit 8. How is your firm developing in-house design capabilities?

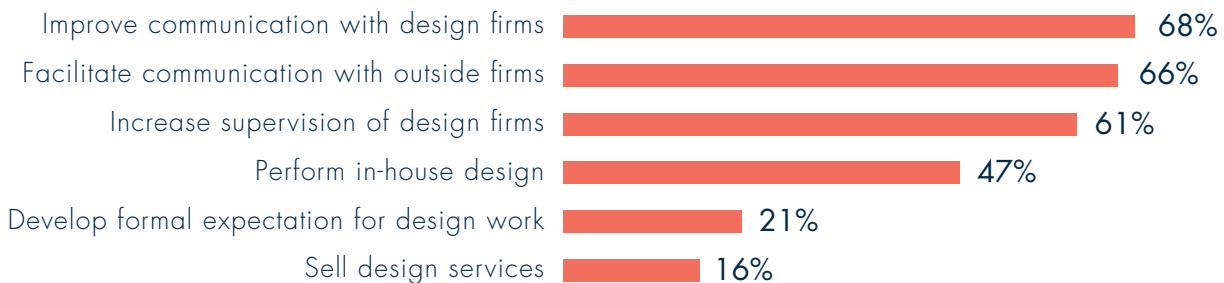


Source: 2019 AGC/FMI Risk Management Survey

While there are many reasons for developing in-house design capabilities, the top three listed by participants are all associated with improving and facilitating communication with design firms and increasing design supervision (Exhibit 9). On the other hand, almost half (47%) of respondents also want to perform in-house design independently from outside design firms.

Almost half (45%) of respondents are increasing in-house design capabilities to reduce other design-related challenges.

Exhibit 9. What are the top reasons for bringing design in-house?



Source: 2019 AGC/FMI Risk Management Survey

Paul James, general counsel for Bond Brothers, explains: “First of all, they [architects and engineers] understand the language, which is very unique and different. They also understand the contractual structures and the relationships on the design side that are radically different from those in construction. Having someone who can talk the talk and walk the walk is very helpful. I also think it helps us manage their work more effectively, and, by definition, that’s risk management. We’re ultimately contractually responsible for the end product, but for many construction firms it’s a very mysterious dynamic. What happens in the design phase and who’s doing what and who’s accountable to whom. I do think from a contractual risk management standpoint, it [bringing on architects and engineers] has been effective, and I see more of that in the future.”

Many contractors remain leery of design liability and would rather count on the expertise of architects and engineering firms to address design needs—instead of enhancing their in-house design capabilities. After all, in an industry where outsourcing design has been the norm for decades, making the major shift to a more vertically integrated business model comes with new risks and challenges. Here are four key challenges that companies may face in the transition to in-house design:

- 1) Culture and behaviors.** There are organizational friction points involved in having a designer in-house, including the need to provide adequate support for financial resources, technology tools and the continuing education required to build designers’ expertise. Technology can also help overcome some of the cultural differences. For example, building information modeling (BIM) forces everyone to collaborate with one another and inherently increases communication among the project team.
- 2) Not understanding how design teams work.** In-house design can range from the typical design elements completed by contractors (e.g., formwork, falsework, means and methods) to those normally done by a designer (e.g., pen to paper design of permanent structures)—with construction engineering and engineering services for design and construction falling somewhere between those two extremes. The contractor that stands up an in-house engineering and design group faces a steeper learning curve than the one who simply changes the way it engages with an engineer. This is compounded by the cultural and behavioral differences as well. Construction firms must decide where they want to fall on this spectrum, based on their comfort level with design liability.
- 3) Lack of clarity around your vision.** Do you simply want to have some level of in-house design understanding and capability to coordinate design better in the design-build model, or do you want to go further into the design of permanent structures? What is your long-term vision for the company? What people do you need to have on your team 10 years from now in order to sustain the business for the next 30 years? The answers to these questions are important because they relate to your long-term strategy and your understanding of the insurable risks and corresponding risk tolerance level to engage in design activities.

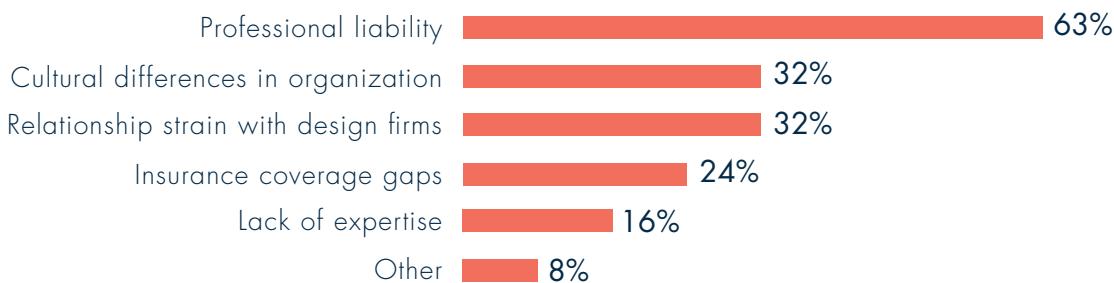
4) **Unfamiliarity with liability issues.** If your firm is involved in a design-build project, then you'll have design liability whether you've subcontracted the design or not. A few key considerations will include:

- Owning cost/quantity growth.
- Acting as the engineer of record.
- Understanding how insurance programs are structured. Will the contractor's Protective Professional Indemnity and Liability Insurance provide primary coverage for the contractors' own design liabilities or be in excess of all other insurances?
- Having enough professional liability insurance to provide adequate coverage.
- Licensing requirement for contractors: At what point do you cross the line into design to the point where licensure is required?
- Understanding operational risk and design risk.

The good news is that integrated joint ventures can circumvent this challenge with a project-specific professional liability approach (if the insurance is not too expensive), provided that all parties' corporate programs will respond in excess of the project-specific professional owners' liability requirements (see Ryan Howsam's FMI Quarterly article, "[The Rise of In-House Design](#)," for more details).

In our research, **respondents listed professional liability as the biggest risk and concern associated with in-house design (63%)**, followed by issues related to cultural differences (32%) and strained relationships with outside design firms (32%) (**Exhibit 10**). As mentioned above, understanding the impacts of professional liability or insurance coverage when bringing design in-house is critical.

Exhibit 10. What risks do you expect to increase as a result of expanding in-house design capabilities?



Source: 2019 AGC/FMI Risk Management Survey

To manage the risks associated with in-house design, some companies are separating design and construction into two different companies, but under one parent company. Jim Scott, general counsel for CRB, describes how that company's engineering firm and construction groups work together: "We organize into teams to deliver integrated design and construction solutions to our clients on what we call a ONEsolution basis. That permits better alignment of our capabilities with client expectations. We work together in the same space, collaborate continuously and follow LEAN principles to deliver fast and effective solutions. The leadership of our groups operates in a similar manner. The emphasis is on project success. We come together regularly, plan and review project performance, and emphasize integrated delivery. Both groups share the risks and rewards associated with the outcome." According to Scott, this limits the liabilities for each organization, while still allowing them to work collaboratively to create a more effective delivery of projects.

Other reasons to keep design and construction separate include professional design and licensing requirements. Kevin Freeman, general counsel for ECI and EPS Services, explains, "Our parent company's an engineering firm and then we have a construction management subsidiary. The engineering work is usually what's initiated and then construction is brought on as a part of that effort. It's two different companies though. But the engineering folks and the construction folks really work hand in glove with each other, from the proposal phase all the way through project closeout. So that is definitely something that helps us, and our construction teams manage risk, while also having the engineering expertise in-house to respond quickly to issues."

As more E&C firms find ways to integrate design into their overall operations, it opens the doors to more risk and challenges while also allowing contractors to take advantage of opportunities that were previously out of reach. To leverage these opportunities, contractors should take the time to figure out whether they want to move past the lower end of the design spectrum and handle the actual design of permanent structures—including design coordination—as a way to become more “vertically integrated” in today’s competitive industry.





4. The Changing Risk Environment

The E&C industry faced a very different risk environment three years ago, when AGC and FMI conducted their first survey of the risk environment. E&C firms were having a difficult time adapting to a world where **35% of respondents thought their organizations were ineffective in managing risk (Exhibit 11)**. Since then, the industry has continued to evolve, and today it appears contractors are increasing their emphasis on risk as a strategic priority. Executives are more likely to take a proactive approach to risk management as opposed to viewing it as a defensive exercise. The most proactive firms see a direct correlation between profitability and their success in identifying, assessing, managing and mitigating risk. This is a direct result of many firms having baked risk management into their overall operational strategies. Our research shows that firms are using new tools and risk management strategies and leveraging technology in a more sophisticated way in order to adapt to the changing E&C landscape.



Source: 2019 AGC/FMI Risk Management Survey

Greater awareness of 21st century risks, combined with new tools, more sophisticated risk management techniques and the adoption of technology and business analytics, is positively changing the risk profile for E&C firms around the world. In fact, **companies consider “strategic agility” to be a top risk for the future, in conjunction with the ability to keep up with technological advancements.**

This year, survey respondents identified several new risks—most of which weren’t even on a majority of contractors’ radar screen three years ago—that are top of mind:

- Increased project complexity
- Cybersecurity
- Software interoperability
- Robotics/automation addressing labor shortages
- Artificial intelligence integration

An increased steady flow of new technological tools and capabilities into the E&C industry has enabled many organizations to make data-driven risk management decisions. **Data collection and management software are now being used by 37% of respondents for everything from project management to job site connectivity to data analytics (Exhibit 12).**

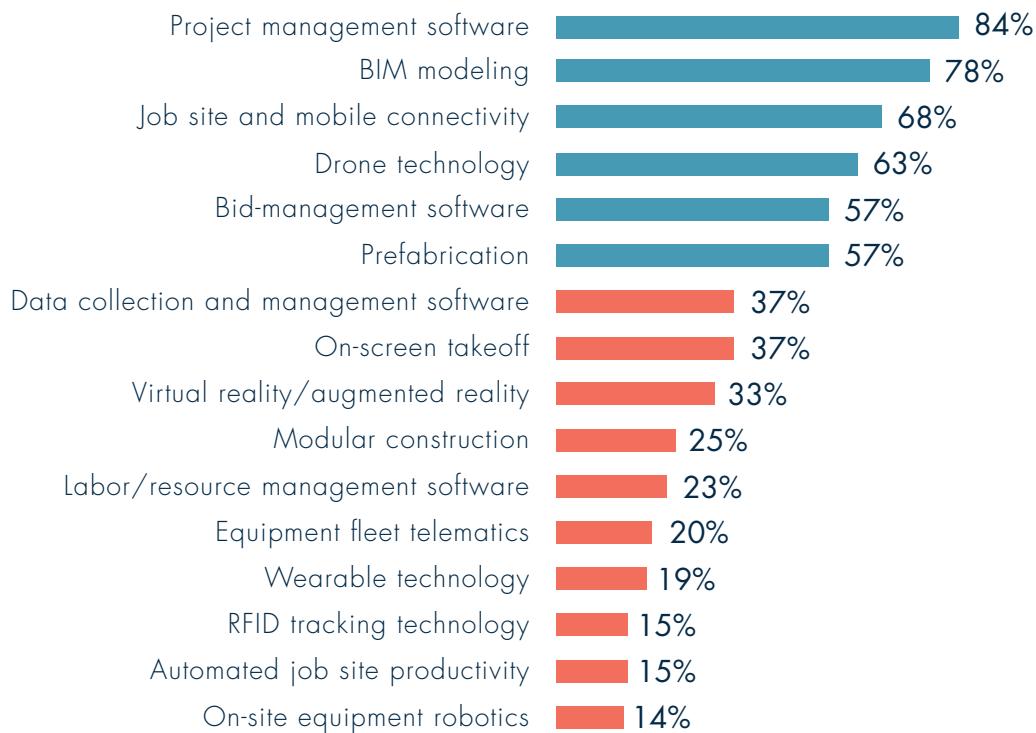
Our research found across all firms that project management software was the most commonly implemented type of technology solution for contractors. However, variation was noted across company type: Specialty contractors are more focused on tools that provide job site and mobile connectivity, while general contractors, not surprisingly, are most likely to utilize project management software. Construction managers are the biggest users of BIM.

Some contractors find that current organizational structures and processes simply cannot accommodate advancements in technology and data analytics. In an industry that historically lags in technology adoption, we find some firms struggling with front-line managers and field staff who do not possess the tech savvy to implement analytical tools effectively. This can make it difficult to get companywide buy-in and leverage new data-driven processes, effectively slowing down the industry’s absorption of analytical tools. While the root causes of this historical lag may be a cultural fear of change reflected in relatively rigid processes and procedures, long-standing cultures and leadership that fail to develop a formal technology vision and strategy may also be to blame.

“Poor communication among team members and incorrect or inaccessible information that workers need to do their job are costing the construction industry tens of billions of dollars annually,” explains Jay Snyder, FMI technology practice lead. “The majority of industry stakeholders seem to be at a loss for how to remedy these systemic and expensive problems. While construction firms continue to invest in technology, the business-critical issues of communication and data management need more strategic attention than they currently receive.”

Furthermore, with the increased adoption of digital tools, cybersecurity is demanding an increased risk management focus. This growing trend is supported by our survey findings, with **26% of respondents pinpointing cybersecurity as a necessary tool for managing risk.**

Exhibit 12. Please identify the technologies and innovations that your organization regularly uses to manage organizational risk.



Source: 2019 AGC/FMI Risk Management Survey

CRB's General Counsel Jim Scott adds, "Many of our large clients are including extensive data security provisions in our contracts. We've assessed and modified some of our practices to assure compliance with those requirements and the regulations imposed abroad by the EU and a growing number of states. Like most firms, cyber insurance coverage is now an important part of our insurance program."

E&C companies are realizing that they are prime targets for data breaches because they not only have valuable project data (e.g., building plans, bids and customer data) but also possess employees' personal protected information (PPI). The increased use of connected devices on construction sites and across departments and functions exposes vulnerabilities; any device that is connected to the internet can fall victim to a cyberattack. Moreover, 33% of crimeware incidents across all business sectors occur within the E&C industry, according to [Verizon's 2018 Data Breach Investigations Report](#).

According to Forrester, more than three-quarters of engineering, construction and infrastructure firms reported a cyber incident during the prior 12 months. More than half (60%) of attacks on construction firms are aimed at small businesses, which are easy targets.³

The impact of cyberattacks can be costly—both financially and to the firm's reputation and brand. The last thing any firm wants is a data breach due to preventable employee behaviors/actions or mismanaged network settings. Security awareness training, formalized cyber risk management and a robust incident response plan are three places to start when developing an informative and thorough information security strategy (see "[Information Security in Engineering and Construction: The Big Blind Spot](#)" for more details).

4.1 New Risk Management Practices

This year, **70% of respondents said that they are “implementing risk management-specific training”** (**Exhibit 13**). Another 63% of survey respondents said that their organizations have been “implementing new risk management tools over the last three years to become more effective at mitigating risks.”

Scott suggests that in the current risk environment, firms are more prepared than they have been in the past. “There is a heightened risk consciousness,” he said, “and a heightened emphasis on risk assessment, management and training.”

Relationships Matter

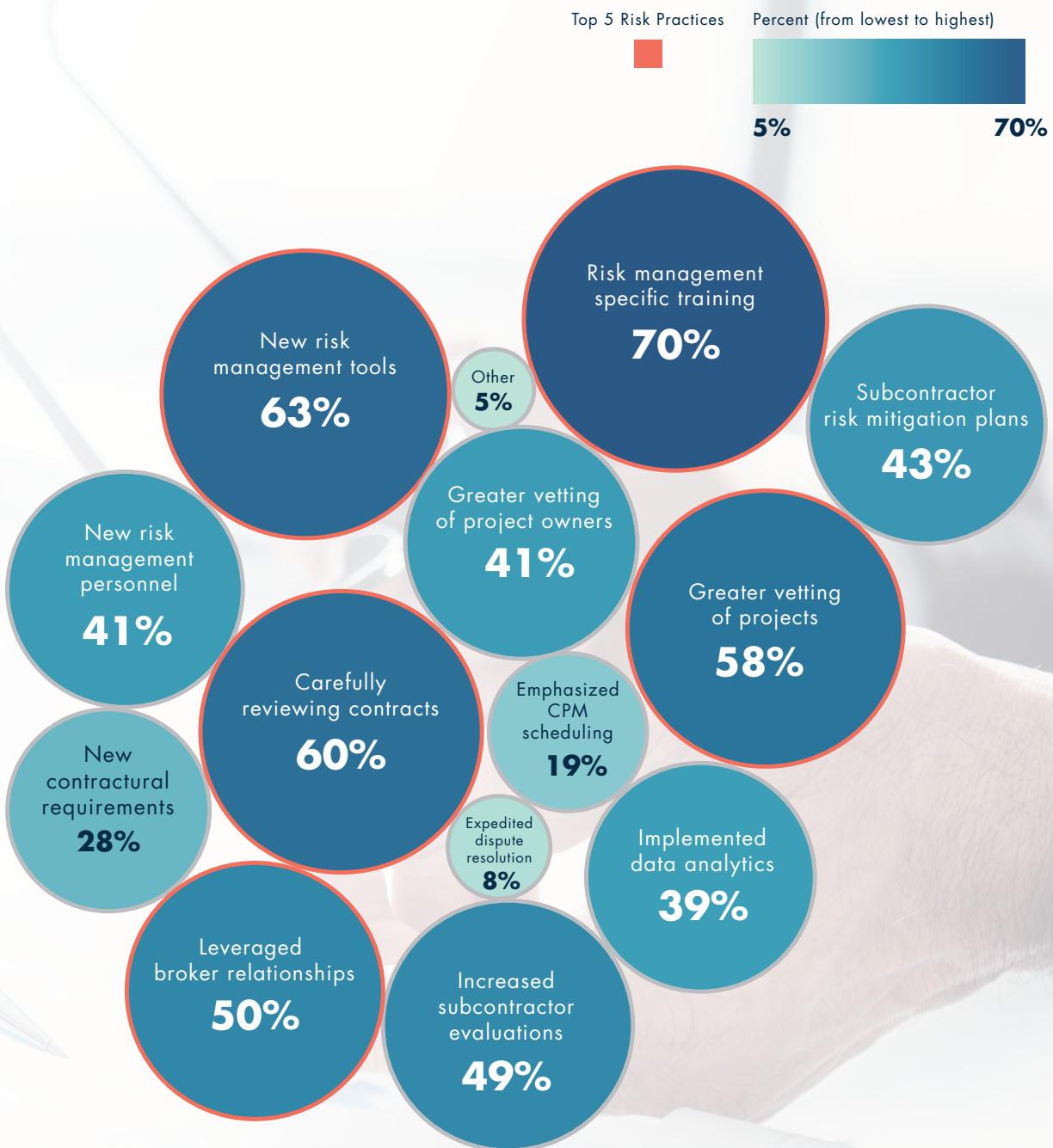
To effectively manage risk in this ever-changing landscape, **more contractors are taking a proactive risk management stance by screening project partners and vetting projects at a deeper level**. Along with the wave of digital tools that contractors are leveraging to identify and mitigate risk, organizations are also utilizing, to a greater extent, formal project risk assessments (56%) and completing formal subcontractor performance evaluations (38%). Additionally, 32% of respondents have started implementing Captive insurance programs in the past three years (**Exhibit 14**).

Several interviewees explicitly noted the importance of choosing the right partners and procuring insurance products that effectively protect the organization against inherent risks they own. “We do feel that the design exposure has put us in a different position than it used to, and we’re making sure the designers that work for us are carrying appropriate amounts of insurance,” said one respondent.

Brian Record, director of risk management and compliance at Choate Construction, explains, “We’re being very conservative in the new work we take on and who we do business with. Also, we’re doing very close vetting of who we’re doing business with, making sure that we’re not going to have any problems.”

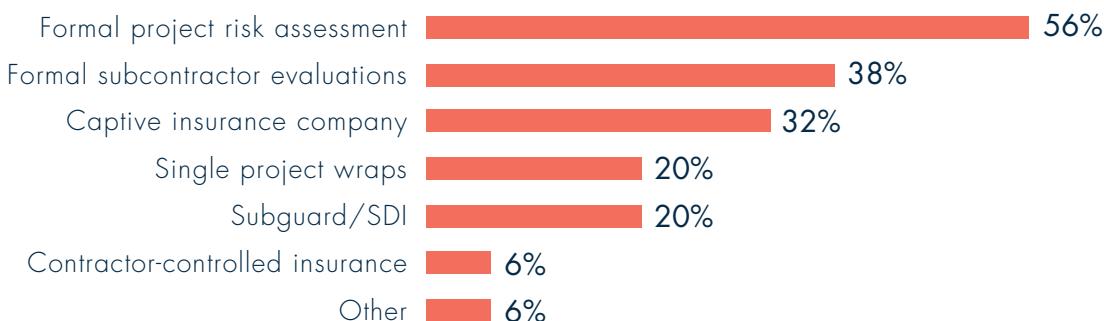
³ “The Case for Cyber Coverage in the Construction Industry.” Allied World. Risk and Insurance. 2018.

Exhibit 13. Please identify any new risk management practices that your organization has implemented in the last three years.



Source: 2019 AGC/FMI Risk Management Survey

**Exhibit 14. Please describe any new risk management tools
that you have started to use in the last three years.**



Source: 2019 AGC/FMI Risk Management Survey

With construction work depending so heavily on relationships, Records reiterates, “Some of the best projects are the projects you **didn’t do**.” Similarly, Walsh Group’s O’Connor explains, “We’ve significantly advanced our subcontractor qualification process. It is now a more robust process with financial statements and a WIP review. On the owner side, during the pursuit process, we generate a memo that outlines any problematic contract terms and based on certain processes or protocols we have in place. We require any project sponsor to seek ownership approval—and approval of the executive committees and the named officers committee—before going forward with a job that might include an onerous term.”

4.2 Formalizing Risk Management

Contractors work in an inherently risky business. Tight project schedules and increased complexity, multiple stakeholders up and down the value chain, and potentially dangerous working conditions are all “just part of the job” for contractors. Risks are so commonplace in the day-to-day activities; in fact, many contractors can become numb to the wide range of issues that they face (or could face) on an ongoing basis.

In today’s ever-changing construction environment, managing risk is no longer a defensive exercise. It’s not enough to sit back and hope that a problem will not occur or that insurance policies will cover all risk-related issues. The more sophisticated and formalized a company’s risk management strategies (and associated processes and procedures), the more opportunity the company has to minimize margin fade and maximize profit. Add to their risk profile the avalanche of new technologies being introduced on a weekly basis, which can help enable data-driven insights, and we find that organizations have more opportunity to effectively identify, manage and mitigate risk than at any time in history.

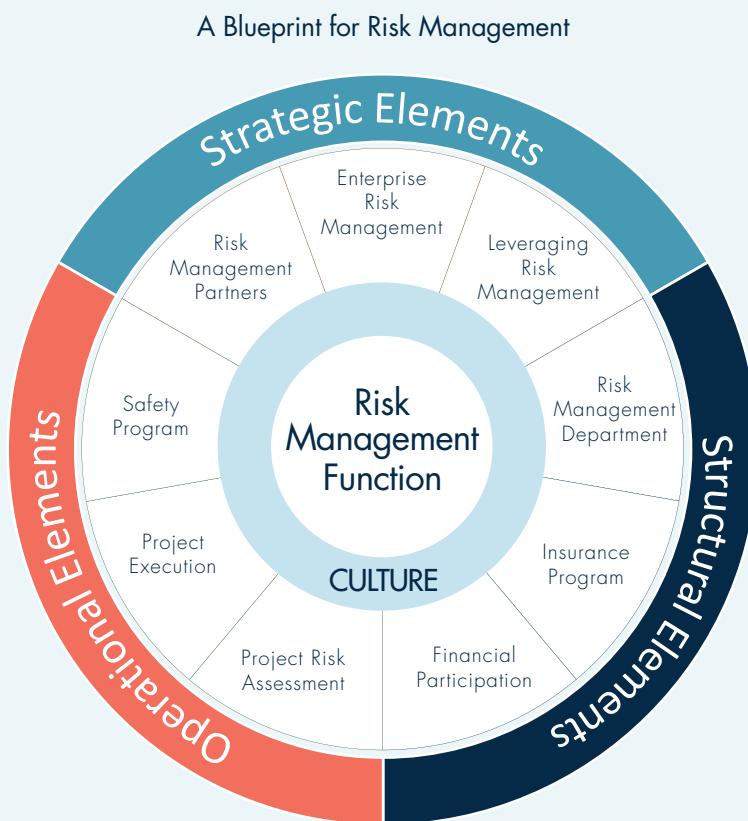
A Blueprint for Risk Management in Construction

Many firms are taking an enterprisewide approach to risk management with two overarching objectives: offense and defense. Here's the difference between the two:

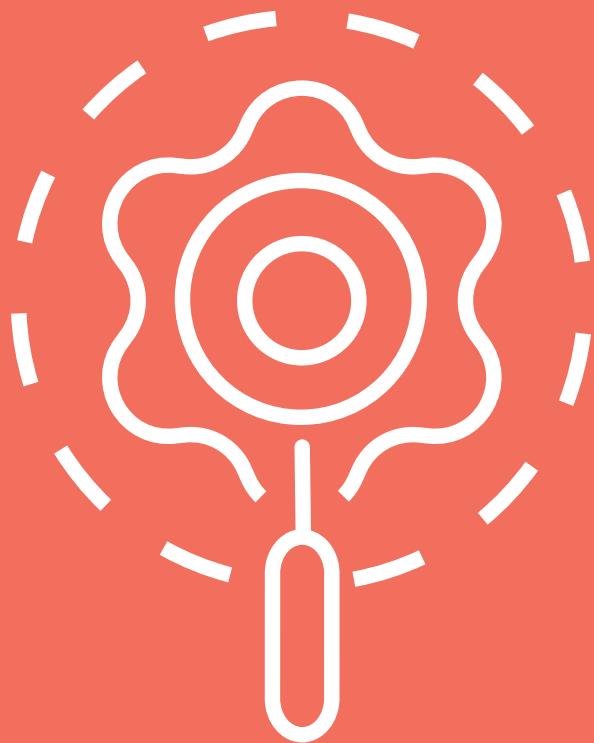
Offensively, risk management aims to increase the value of the business by formalizing risk tolerance, potentially increasing profit margins and stabilizing earnings.

Defensively, risk management protects the business by guarding the balance sheet, profits and legacy of an organization.

Firms that want to do a better job of managing risk—or launch an entirely new, formal program—must incorporate a mix of offense and defense. Digging down to deeper levels of understanding, FMI has identified nine elements that should be included in a formal risk management strategy. By incorporating these elements and taking a more holistic approach to risk management that goes beyond just insurance or safety programs, firms can begin to realize the positive impacts of their efforts (see “[A Blueprint for Risk Management in Construction](#)” for more details).



Source: Model developed by FMI.
Concept is based on in-depth industry research.



Looking Ahead

Almost every industry finds itself operating in a riskier business environment. No exception to the rule, the E&C industry faces an array of challenges this year, some specific to the built environment and others common to many industries. Our research shows that contractors are responding by taking a more proactive approach to risk management. For example, they are screening project partners and vetting projects more thoroughly and carefully. They are also trying to catch the wave of digital tools that promise to help them identify and mitigate risk, while formalizing their project risk assessments and evaluations of subcontractor performance.

Today's construction firms are also ramping up their in-house design capabilities. Our research shows that most firms take an organic approach to building such expertise by hiring in-house engineers or architects to enable better communication with outside firms. They're also adding individuals to their existing pool of in-house designers.

In the coming years, we expect this trend to continue and even accelerate. However, as mentioned in our report, the shift toward in-house design opens the doors to more risks and challenges, even as it allows contractors to take advantage of opportunities that were previously out of reach. To leverage these opportunities, contractors should take the time to figure out whether they want to move past the lower end of the design spectrum and handle the actual design of permanent structures—including design coordination—as a way to become more “vertically integrated” in today's competitive industry.

And then there is the continuing “war for talent.” For the third year in a row, a lack of qualified talent was the top risk for study participants, with the **limited supply of skilled craftworkers being the biggest challenge for 80% of respondents**. The limited supply of field supervisors has become one of the top future risks, with firms struggling to replace talent and expertise lost due to retiring baby boomers. In a world where construction clients are highly cost-sensitive and risk-averse, **skilled front-line leaders have become the most essential differentiators**. However, based on FMI's observations, very few companies are properly prepared to transition field leadership from one generation to the next.

Add a possible slowdown to the mix, and the result is a business environment where E&C companies have to stay on their toes, pay attention to trends and cater to the fast-changing demands of their customers. In fact, our study indicates that a potential **economic slowdown is top of mind for 58% of contractors right now (versus just 8% in 2016)**. With growing concerns surrounding the consequences of a potential downturn, some organizations are considering next steps to reduce risk and limit exposure.

Now would be a particularly good time for E&C firms to conduct an honest assessment of their overall operations, recommit themselves to the business basics—including cash flow management, balance sheet health and operational discipline—and develop and implement proactive strategies for managing the rate of change in technology and people. As Warren Buffett famously reflected on the financial institutions that left themselves exposed to the 2007-08 drop in the housing market: “Only when the tide goes out do you discover who has been swimming naked.” Put simply, many Wall Street firms appeared to be financially strong, but lacked internal discipline and operational control below the surface.

This is not a foreboding prediction of the next recession. Rather, it is a challenge to E&C firms to take a shrewd, introspective account of the efficacy of their business practices today—including risk management. Ask yourself:

- Are your current results symptomatic of operational excellence or just a good market?
- As your business has grown, have you added the right infrastructure and people required to run a larger operation?
- Have your margins grown as a result of operational innovation, or are they simply rising with the flood tide?

Concurrently, contractors must address some of the risks that are unique to the construction industry, including the costs and benefits of implementing a design-build strategy, what type of technology to procure, and how to best work together with trade partners and owners.

Looking ahead, given all the indicators in today's global economic environment, contractors should remain focused and cautious. The fact that so many businesses have survived and even thrived since the Great Recession reflects positively on the industry and its participants. But we firmly believe that no firm operating with the same approach as it did five years ago will thrive in the rapidly changing new economy. Those that have prospered have rebuilt, retooled and refitted their companies for a new business model, aimed at seizing the opportunities that have arisen with immense change.

The next downturn will probably look very different than the last one; now is the time to think strategically and build a company fit to face the new challenges. As AGC and FMI continue to monitor industry trends on a year-over-year basis, we'll keep company leaders informed of the key pieces of knowledge that will help them prepare for the future, no matter what that may look like. Now is the time to be ready and in control of your own destiny, not the victim of fate.



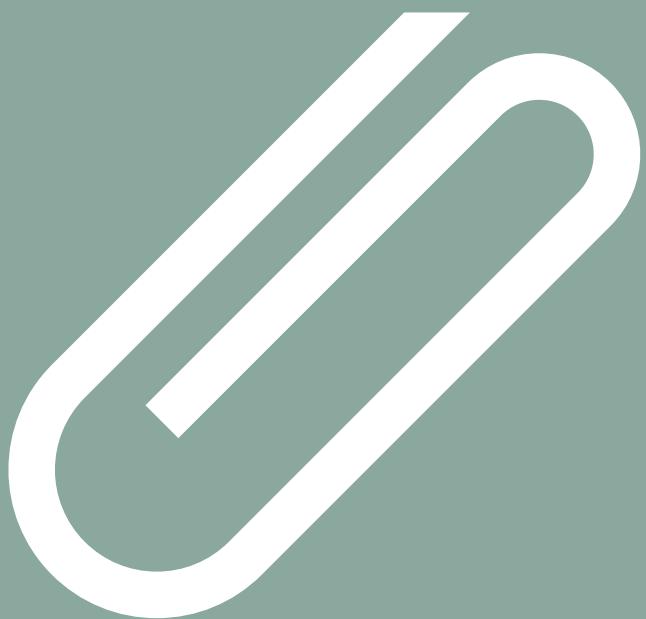
The Team

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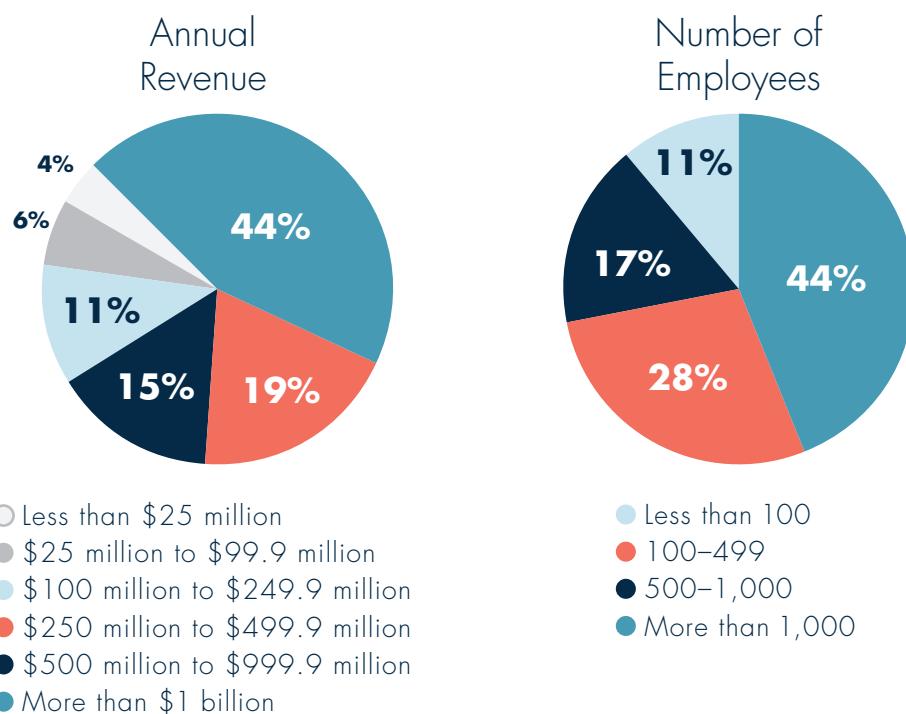
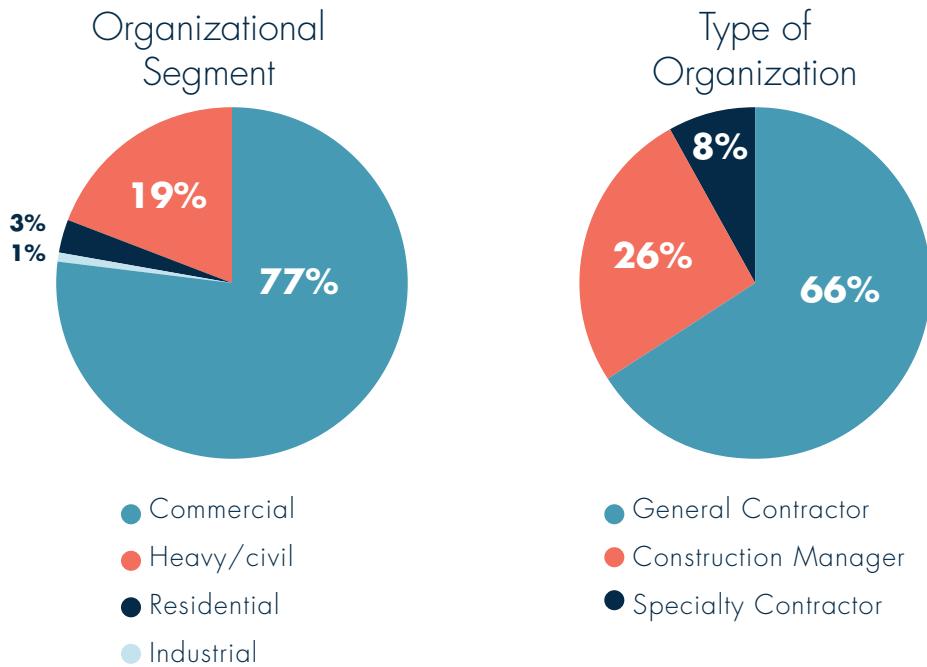
Alyssa Menard is a market research associate with FMI. Alyssa is responsible for conducting primary and secondary research around market trends within the AEC industry and built environment. Her primary objective is to ensure best practices in the collection, management, analysis and interpretation of data for content development within the organization. She can be reached at 303.398.7260 or via email at amenard@fminet.com.



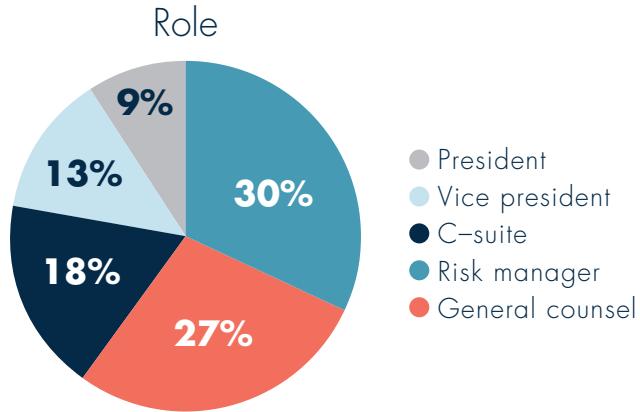
Appendix

Survey Demographics

Numbers may not add up to 100% due to rounding.

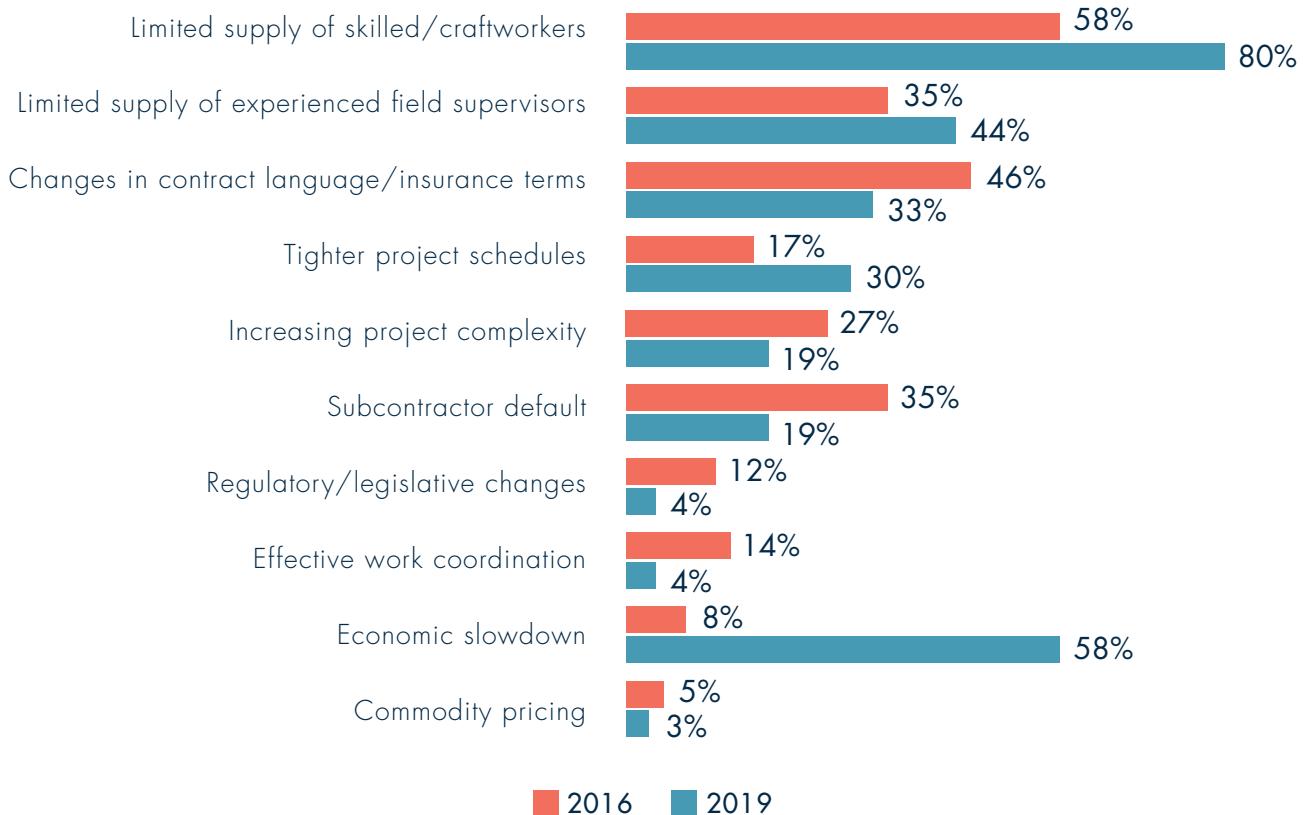


Source: 2019 AGC/FMI Risk Management Survey



Please identify the top three risks that you are encountering today:

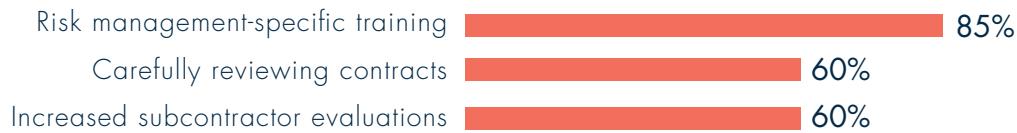
Top Risks in 2016 and 2019



Source: 2019 AGC/FMI Risk Management Survey

Top risk strategies by organization type

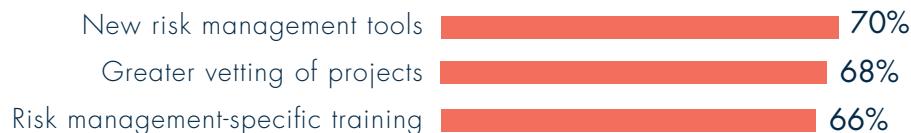
Construction Manager



Specialty Trade Contractor



General Contractor



Source: 2019 AGC/FMI Risk Management Survey

About FMI

For over 65 years, FMI has been the leading **management consulting and investment banking** firm dedicated exclusively to **engineering and construction, infrastructure and the built environment**.

FMI serves all sectors of the industry as a trusted advisor. More than six decades of context, connections and insights lead to transformational outcomes for our clients and the industry.

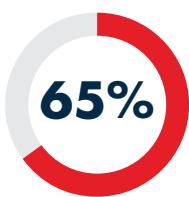
Sector Expertise

- A/E and Environmental
- Building Products
- Construction Materials
- General Contractors/CM
- Energy Service & Equipment
- Energy Solutions & Cleantech
- Heavy Civil
- Industrial
- Owners
- Private Equity
- Specialty Trades
- Utility T&D

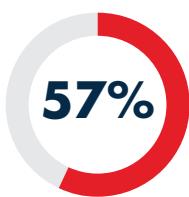
FMI Client Highlights



of the ENR
**Top 400
LARGEST
CONTRACTORS**



of the ENR
**Top 200
SPECIALTY
CONTRACTORS**



of the ENR
**Top 100
DESIGN
FIRMS**



of the ENR
**Top 200
ENVIRONMENTAL
FIRMS**



of the ENR
**Top 100
CM FOR
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