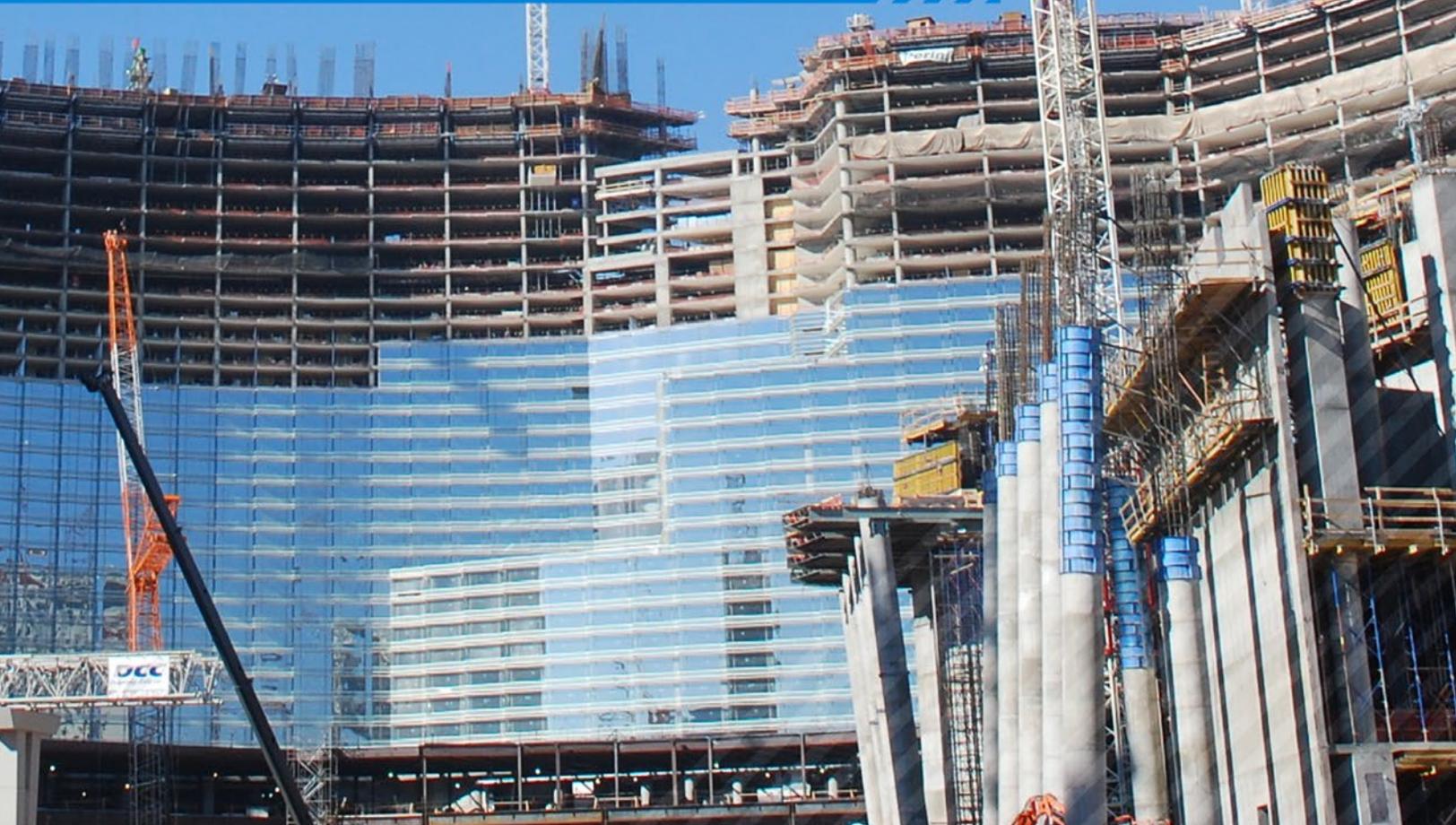


Tomorrow's Construction Technology

A deep dive into the tech available to better manage complex construction projects



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Introduction

No matter your position within a construction company, you have likely recently encountered exciting new technology. From field management software chosen by executives to the drones and sensors workers interact with daily, the latest advances in construction technology are finally being embraced by the industry.

Decision-makers need to understand today's cutting-edge technology to prepare for what is rolling out tomorrow. With over 50% of construction firms reporting the use of drones as part of current construction design processes, 2018 clearly represents a tipping point for embracing new technologies.¹



Current Acceptance of Construction Technology

Construction has historically been one of the slowest industries to adapt to new technologies. Even as many other manufacturing and industrial firms embraced the Internet and cloud storage, for years construction companies resisted many of these innovations. Since 2016, however, the biggest firms in commercial and residential construction have pursued rapid expansion into new forms of construction technology.

Slow to Adapt

It is a mistake to lay the blame for the slow acceptance of new technology on individual workers and managers on the job site. Lack of available budget is the second most highly reported limitation on implementing construction technology, with 40% of firms reporting that budgeting issues hold them back. Clearly, the support for new software and automation systems must come from the executive and financial level down to the rest of the company.²

Growing Interest

Interest in advanced construction technology is growing, with 74% of contractors claiming an intent to adopt at least one cutting-edge product in the next three years.¹ However, choosing the wrong systems wastes a limited budget. Selecting the right technology depends on understanding your company's real needs for connecting field teams or managing complex bid processes.

Exploding Opportunities

Thankfully, the growth demand for construction technologies is matched by a proliferation of products and services. Well over 2,000 apps alone are now available for tracking or managing construction tasks and there are hundreds of drone, sensor and security equipment options to match.³ Developing assessment skills remains essential for all IT professionals employed by construction firms and their C-level executives who make the final decisions.



Some Risks Come With Technology

Poor use of technology can yield results worse than not using the tools at all, which is why many construction companies have avoided software solutions for so long. However, careful integration and some timely employee training addresses many of the risks.

Lack of Training

Almost every safety and liability issue posed by new construction technology is best addressed with more employee training. Lack of familiarity with operating drones, GPS systems, automated demolition tools and other advanced technology is a primary cause of accidents, leading to injuries and costly structural damage. Simply providing more hours of general safety training isn't the solution. Your company's education program must focus on the specific products and scenarios your workers are likely to face. The use of wearable safety technologies, such as balance sensors to prevent falls, shouldn't replace standard safety training either. Employees must still train on the basics of preventing injuries and accidents even when they're backed up with advanced safety technology.

Expanded Liability

The use of construction technology may create new liability risks for your firm. One typo in an important work order can lead to thousands—or even millions—of dollars in loss. Fortunately, this is one of the easiest risks to protect against, thanks to the combination of technology errors and omissions insurance (Tech E&O) and expanded general liability insurance policies. Tech E&O insurance also helps if a security breach or data theft occurs, making it doubly valuable for any construction firm storing client data.⁴

Data Loss

The biggest risk posed by new construction technologies is potential data loss. Thousands of systems are breached each year across all the major industries and cybercriminals are increasingly targeting the construction industry. Even a simple accounting app or 3-D modeling software package can create the risk of a loss of sensitive customer data. Practically every construction company and firm stores some type of customer data, and the biggest industry leaders often handle hundreds of different medical and government projects per year, all with different data protection standards. Failing to meet a specified data protocol will not just cost you a contract; it can also incur high fees and penalties if sensitive material is lost or released to the public.

Even when it's only your own firm's data that is stolen, there is still risk present. Reduction of competitiveness, identify theft and even direct financial loss can result from a data breach. Check the security standards and support for various public protocols when choosing new software for managing or controlling construction technology. High standards of data security are important for all-in-one construction management suites that handle everything from client communication to project file storage.





Today's Construction Technology

Before you can appreciate what is coming next in construction technology, let's look at what is already available.

GPS

Equipment enabled with a global positioning system (GPS) is one of the most widely integrated forms of construction technology. Because over 30% of all construction workers use at least one GPS-integrated device daily, it is not surprising that this technology is credited with improving both the productivity and safety of the construction industry.⁵ GPS units are used for everything from tracking vehicles and equipment to orientating automated construction machinery and drones. It is also essential for site imaging, engineering and design work and accurate measurements for easements and setbacks. Advanced digital surveying techniques integrate with GPS servers to verify the accuracy of all measurements by providing landscape landmarks. Finally, GPS tracking also increases job site security and may help reduce the US\$1 billion lost per year to workplace theft.⁹

Drones

Drones are one of the most highly accepted forms of construction technology today and their value continues to evolve. While drones were originally brought onto construction sites for overhead photography and mapping purposes, they are now capable of making full 3-D models, moving materials and equipment, capturing valuable marketing material, monitoring sites remotely and even working in tandem with other surveying and engineering equipment.⁶ Construction companies have plenty of options for adding drones to the workflow. From purchasing equipment outright and hiring an operator to subcontracting the service to an experienced professional, there's an option for drone integration for every firm.

3-D Modeling

Business information modeling (BIM) is one of the biggest buzzwords in the construction and engineering industries today, but it is far from the only type of 3-D modeling valuable to them. While BIM models contain dozens of layers of architectural and service data, construction companies can benefit from far simpler 3-D models for surveying, permitting and planning purposes.

Laser scanning is the premier technique available for creating 3-D models of construction sites. Unfortunately, the scanners required are very expensive to purchase outright and require you to hire a highly trained operator. When you hire a subcontractor that provides their own equipment instead, expect to pay thousands of dollars per project to generate even the most basic model.

Drone scanning is often more affordable, but is also far more limited in its ability to generate in-depth models. Finally, the creation of 3-D modeling point clouds from nothing more than a set of photos is still developing and will take a few years to reach the industries that need this technology the most.

High-Quality Photography

You do not necessarily need to hire a professional photographer to create valuable marketing and internal photos for your construction firm. Thanks to affordable 360° cameras, construction

companies can capture interactive walk-through tours and time-lapse building footage, with minimal training.⁷ Even today's smartphones produce images of high enough quality to use for informing a client how construction is progressing. Services like EarthCam allow you to set up worksite cameras through subcontractors, with practically no extra effort on your team's part.

Construction Management Software

Document management, field collaboration, resource planning and contract management remained some of the highest needs of construction firms in 2018, according to research from McKinsey & Co.⁸ All these needs are addressed at once with the right construction management software. Tools like PlanGrid help firms of all sizes track individual teams, manage job sites from any distance and have more control over their work. Project management tools are essential for sustaining efficient and productive work across many remote offices. For higher acceptance rates of the new construction technology, choose software that integrates as many different functions as possible into one app. You may be setting yourself up for failure if you expect team members to use multiple unintegrated apps and programs on a daily basis.



What Is Next in Construction Technology?

Automation and Robotics

Automation represents one of the biggest improvements to safety and productivity within the construction industry. While human-like construction robots are still a thing of the future, small assistant bots and fully automated drones are expected to arrive on the job site within the next few years. For example, Japan's Advanced Industrial Science and Technology Institute recently demonstrated a humanoid robot capable of lifting and manipulating sheets of drywall.¹⁰

Prefabrication

As the shortage in skilled labor continues to limit the growth of the construction industry, interest in prefabrication techniques grows. Assembling a structure off-site as much as possible minimizes the crew necessary for construction. Combine prefabricated structural units and even entire rooms with artificial intelligence-powered robotic assembly and you will one day be able to keep your most valuable human labor on more important tasks.

Artificial Intelligence and Construction

Speaking of artificial intelligence, the earliest AI tools for managing construction technology are just entering the market. Within the next decade, AI will increasingly handle work from designing layouts to controlling robotic construction equipment. Right now, applications are primarily limited to scheduling and other number-crunching tasks, but combining BIM modeling with the right AI product will eventually lead to buildings that are safer and easier to keep within budget than current projects.¹⁰



Conclusions

With the construction industry in the US projected to reach a total value of over \$800 billion in 2019 and the global construction market projected to reach \$13 trillion by 2022, this is a prime time for investing in the right technology.^{11,12} Start by identifying your company's biggest bottlenecks and shortages to choose the right equipment, services and software for your particular needs.



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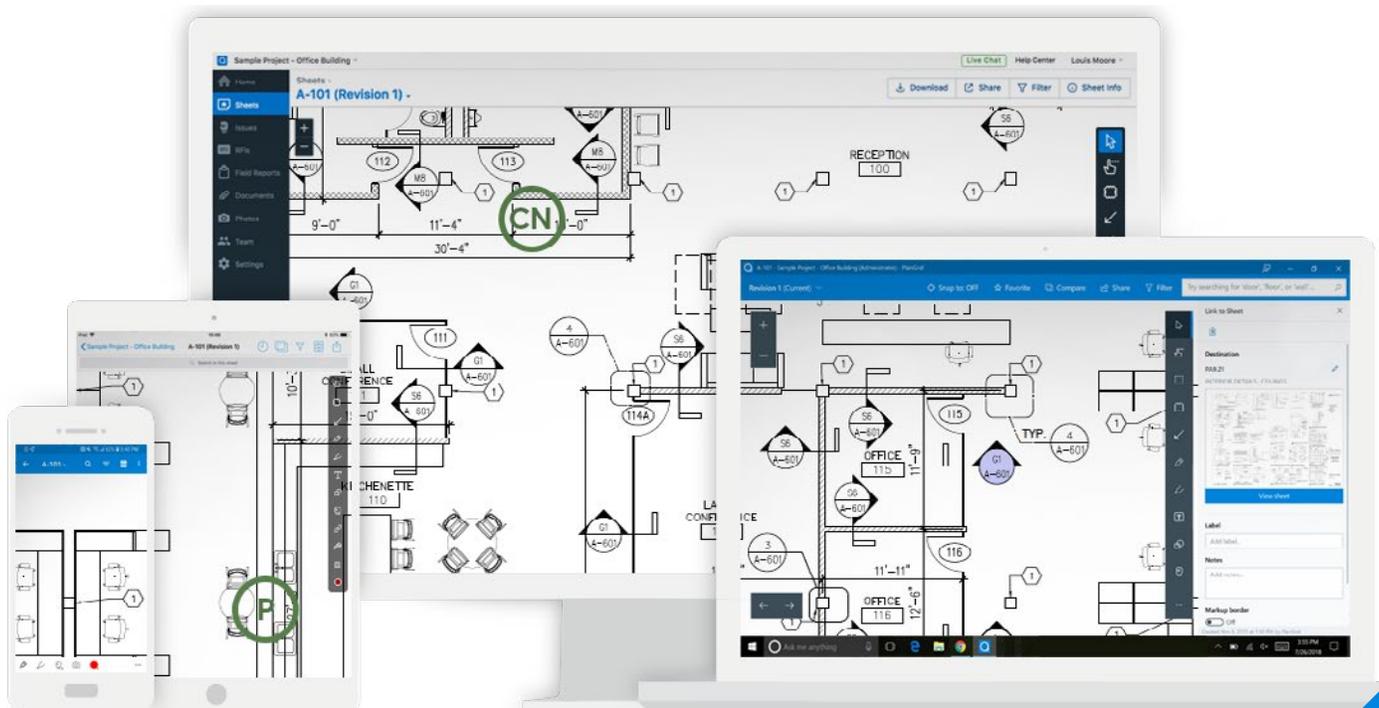
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PlanGrid's Construction Productivity Software is the easiest and most cost-effective way to get substantial return on your investment in construction mobile apps. By using PlanGrid you will:

- **Complete projects faster:** 90% of project costs occur in the field and not in the office. This includes wasted time and project delays. With PlanGrid, you can reduce wasteful trips to the trailer and time delays, while eliminating costly rework. PlanGrid also allows for faster collaboration and communication.
- **Reduce costs:** PlanGrid allows you to optimize productivity in the field, which eliminates time waste that causes project overruns. By completing projects early or on time with PlanGrid, contractors will benefit from reduced costs.
- **Win more bids:** The best way to bid more competitively is not just to track costs so you can provide more accurate estimates — it's to improve your overall productivity. PlanGrid's Construction Productivity Software will allow you to increase productivity so you can reduce costs and win more bids.



PlanGrid is construction productivity software used on more than 1 million projects across 90 countries. Our software helps teams collaborate more efficiently with access to an intelligent record set on any device.





Used on more than 1,000,000 projects around the world, PlanGrid is the first construction productivity software that allows contractors and owners in commercial, heavy civil, and other industries to collaborate, collect, and share project information from any desktop or mobile device through the entire project lifecycle.

PlanGrid increases project efficiency by streamlining document management, providing construction teams with easy access to all project information from any device, and enabling seamless collaboration within teams.

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