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Case Study: Connecting Design and Construction with BIM 360

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Learning Objectives

- Learn how to standardize project delivery processes to save thousands of dollars on every job and increase worker productivity
- Learn how to increase visibility on projects and eliminate the inconsistencies tearing at profit margins on every project
- Learn how to digitize field operations to keep all your information current in real time
- Learn how to improve communication and remove teams from your silos to promote a culture of collaboration

Description

Who says trades and subcontractors are technologically averse? On the contrary, the usage of technology is relatively common among many subcontractors and proven to deliver high value to a project. Capitalizing on the BIM 360 platform with other technology such as field data collection and labor productivity tools increases information flow to facilitate better collaboration and transparency on the project. When subcontractors utilize construction technology, there is a decrease in RFIs, waste, schedule, and final construction costs. This presentation will take a deep dive into the subcontractor-based workflow of several MEP contractors including GCATS, Dynalectric, and Pacific Rim Mechanical. We'll explore how a subcontractor's use of BIM 360 Docs software and eSUB has improved collaboration between the field and the office and provided a single source of truth into field productivity for transparency and communication between specialty trades, general contractors, and other key stakeholders in the design-build process.

Speaker(s)

Benny is the Chief Strategy Officer of eSUB Construction Software, a cloud based project management solution for subcontractors. Benny's knowledge of mobile technology gives him a unique perspective on the future of construction technology.

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How to Integrate Virtual Design and Construction into Your Business

Overview

Virtual Design and Construction (VDC) is a growing area of focus throughout the global construction industry. It entails the management and integration of high-performance construction design software that allows architects and other professionals to model the facilities, work processes, and organization associated with a new construction project.

The strength of VDC as a tool for construction companies and as an emerging paradigm for design in construction comes from its multi-disciplinary nature. VDC is not a single tool that construction companies can use, it is an idea about how a set of tools can be combined to create transparency around the construction and design process, produce more accurate estimates for project costing and material quantities, and deliver other key business benefits.The core components of VDC are engineering modeling methods that capture the product, organization and process, analysis methods that use modeling to assess quantities, schedules and cost on projects (BIM tools), visualization techniques and software, business metrics that support strategic management and tools for economic analysis of the project.

This guide explains the what, how, and why of VDC in 2018. In part one, we'll get a better understanding of what exactly VDC is and what benefits it can be expected to provide. In part two, we'll explore some of the cutting-edge software applications that construction companies are already using to implement VDC throughout their operations. Finally, in part three, we'll review some strategic advice and best practices for integrating VDC into your contracting business or Construction Company.

Part One:
How Virtual Design and Construction Could Benefit Your Construction Business

Answered in this guide:

- What is virtual design and construction?
- What are the benefits of implementing virtual design at my construction company?
- When should I use BIM or virtual design for construction?
- How are construction companies benefiting from virtual design and construction?

In this part of our guide, we're going to help you develop a deeper understanding of all things related to BIM and VDC. Like all new technologies, a successful integration of VDC into your business begins with a concrete understanding of what the technology is and what business benefits it is expected to deliver. With those benefits in mind, construction managers will be able to clearly communicate with their teams about why it is important to follow best practices and successfully integrate VDC.

What is Virtual Design and Construction, and how is it different from BIM?

Building Information Modeling, or BIM, has two important aspects that construction managers should be aware of. The first aspect is the geometrical component – BIM software allows engineers or architects to construct 3D models of a construction project that are useful for planning the project itself and communicating about the project, either between collaborating professionals or between the construction companies and project stakeholders. The second important aspect is the actual object data, such as manufacturer specifications, object size, and the location of an object within the overall model. This is what makes BIM special – it combines object modeling and attribution and feeds this data into other outputs that construction companies can use to make their lives easier.

VDC allows project teams to develop a virtual prototype of the project that enhances certainty of design, catches design clashes before they become errors, provides a roadmap for completing the project, and generates outputs for what materials are needed, how project scheduling can be optimized, and more. In a sense, BIM is the technology itself and VDC is the application of technology – the process of using BIM to improve project outcomes.

What are the Business Benefits Associated with Integrating VDC?

Building company Clark Pacific has identified numerous ways that companies can derive value from the implementation of VDC. Digital prefabrication, supply chain integration, production coordination, cost projections & tracking, and project management were identified among the top value-adds created by the implementation of virtual design and construction – but they represent just a few of many potential benefits.

The first step to a successful VDC implementation is helping your team understand the intended benefits of adopting visual management and BIM as core processes for your business. Check out all the ways that VDC can help you get the job done better!

Schedule Optimization

Construction projects are typically built using a construction schedule, where project managers must identify and delineate hundreds or even thousands of tasks. Working from spreadsheets can be time-consuming, but with BIM, construction companies can construct an evolving model of the project that changes over time, visually depicting each step of the construction process. Visual management of project scheduling also helps with schedule optimization – coordinating the production and shipping of materials to the job site and shortening the critical path to project completion.

Reduced Project Costs and More Accurate Costing

When construction companies bid on large projects, it can be difficult to accurately estimate the quantities of material needed to finish the job – drywall, cement, paint, wood, and steel are all purchased by the ton, and wasted materials can seriously cut into profits on any project. A 3-dimensional BIM model of a new construction project accurately captures data for the quantity and cost of materials used, helping to reduce and eliminate wasted materials (and time) throughout the construction process.

Trade Coordination and Clash Detection

Large projects typically involve many different types of workers on the job site at once, including an array of subcontractors of different disciplines. While it is important to have several types of subcontractors working at once to shorten project timelines, it is important to plan carefully and prevent subcontractors from interfering with each other. Collaboration between VDC coordinators, contractors, and subcontractors can prevent issues with trade interference and help ensure that subcontractors aren't stepping on each other's toes at the job site. Visual modeling also helps identify clashes in design before they happen, ensuring that a plumber and HVAC technician aren't trying to install pipes and ventilation in the same space.

Enhanced Site Logistics and Safety Planning

Safety has always been a major issue in the construction industry, but a growing number of safety experts at construction companies are using BIM/VDC to help mitigate safety risks on the job site. Safety managers can access the VDC models to assist them with inspections and validate that safety provisions are being followed. Construction managers and engineers can even use software tools to search VDC models for problem areas – design features that may lead to injuries during the construction or maintenance phase – and address them before disaster strikes.

Compelling Project Presentations and Proposals

VDC modeling creates a significant competitive advantage for construction firms looking to win new business in 2018, especially in the public sector. The construction proposal process is highly competitive, but many firms are beginning to augment their bids by creating 3D BIM models that show how a completed construction project might look before it even starts. This allows the customer to visualize and connect with the finished project more meaningfully, potentially increasing the likelihood of winning the proposal. Companies that have implemented best practices for VDC have an additional edge as well – they can promise that they will keep using VDC to maintain project transparency, manage schedules, and create cost savings that pass on to the customer – everyone wins!

Still not sold on the benefits of VDC? Here's some feedback from the collaborators at one of VDC's earliest adopters:

"Everyone is working on the right tasks at the right time, all the time."

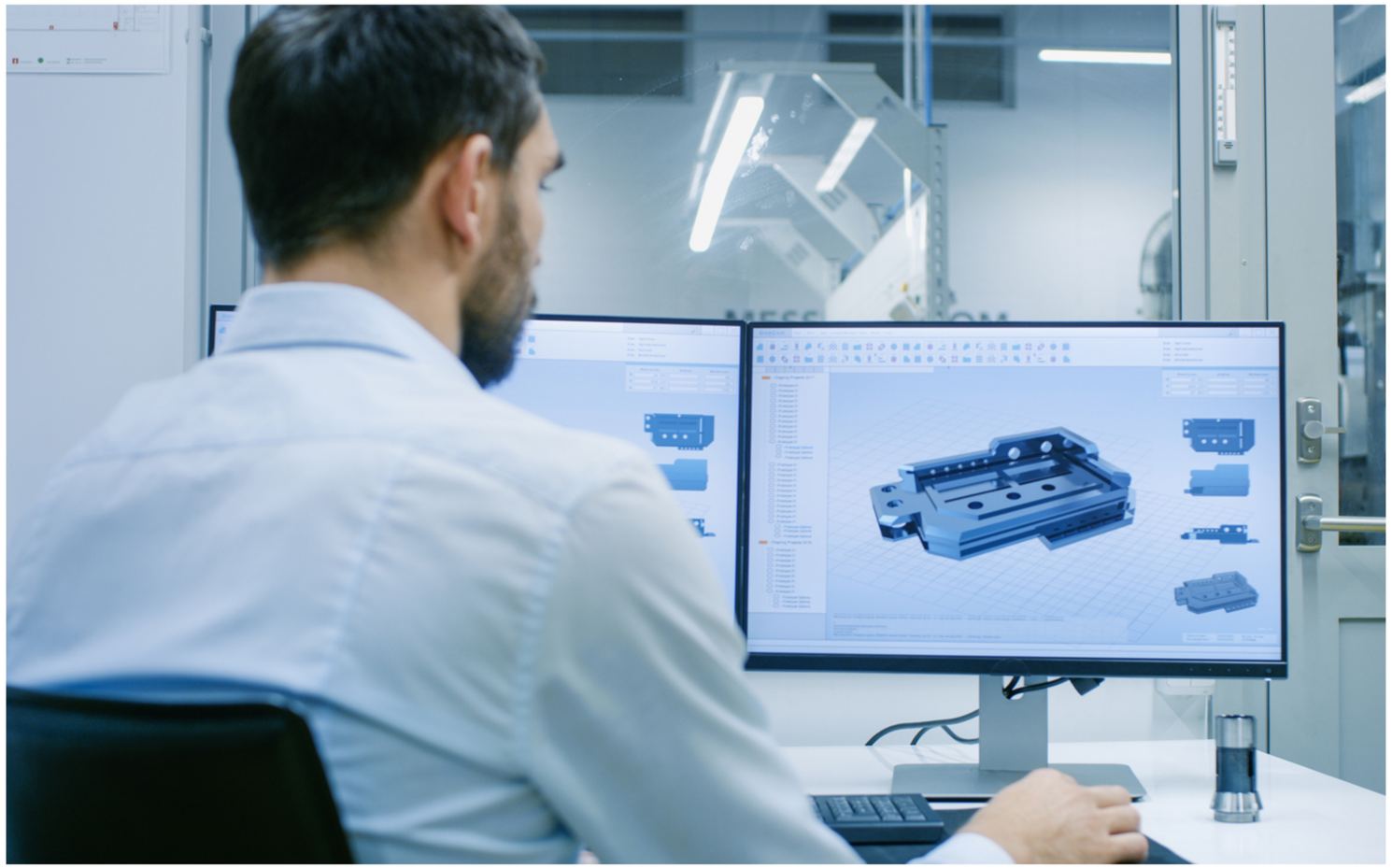
"We are certain that everything fits."

"We are installing everything accurately based on the latest, correct information. Paper-free."

"We are installing everything fast and right the first time."

Conclusion

It should be clear by now that the benefits of integrating and applying VDC for construction companies are very real and tangible. 3D modeling of projects facilitates communication and collaboration between construction companies, subcontractors, and other stakeholders, helping to optimize the project schedule, avoid design clashes and scheduling conflicts, and even improve safety outcomes. In our next section, we'll review some of the BIM software and other applications that are making these outcomes possible.

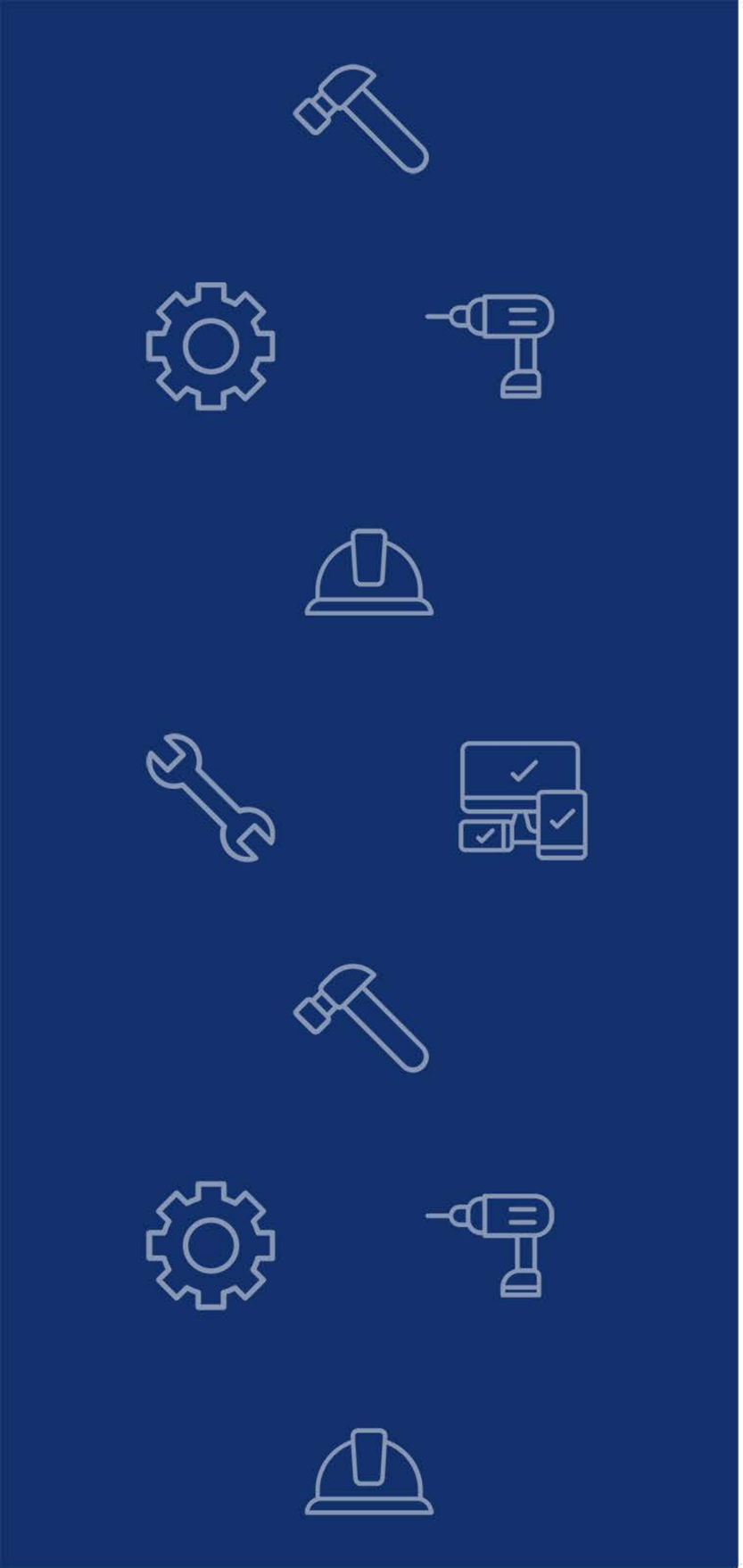


Part Two:
Optimizing Your Construction Site with BIM and Virtual Design

Answered in this part:

- How can I implement virtual design at my construction company?
- How do virtual design applications integrate to deliver the best results?
- Why is integration an important aspect of implementing BIM and virtual design?
- What are some best practices for integrating virtual design and construction into my business?

Now that we've identified the benefits that VDC has to offer and the ideal BIM software suite for construction companies to use, it's time to start optimizing your construction site with virtual design for construction! In this guide, we're advocating an approach to VDC integration that focuses on the benefits – how construction companies can combine the functionalities of their BIM software to start realizing the business benefits associated with VDC as quickly as possible. We'll also include some tips and best practices for integrating VDC, and what to expect as you get started. Enjoy!



Setting Business Objectives for VDC Integration

Successful software implementation should begin by defining the criteria for successful integration. After all, merely purchasing BIM software does not guarantee that the benefits of VDC will be realized throughout your organization – you need to get your project teams to start using it for its intended purpose and taking advantage of the information and modeling tools to improve decision-making and results.

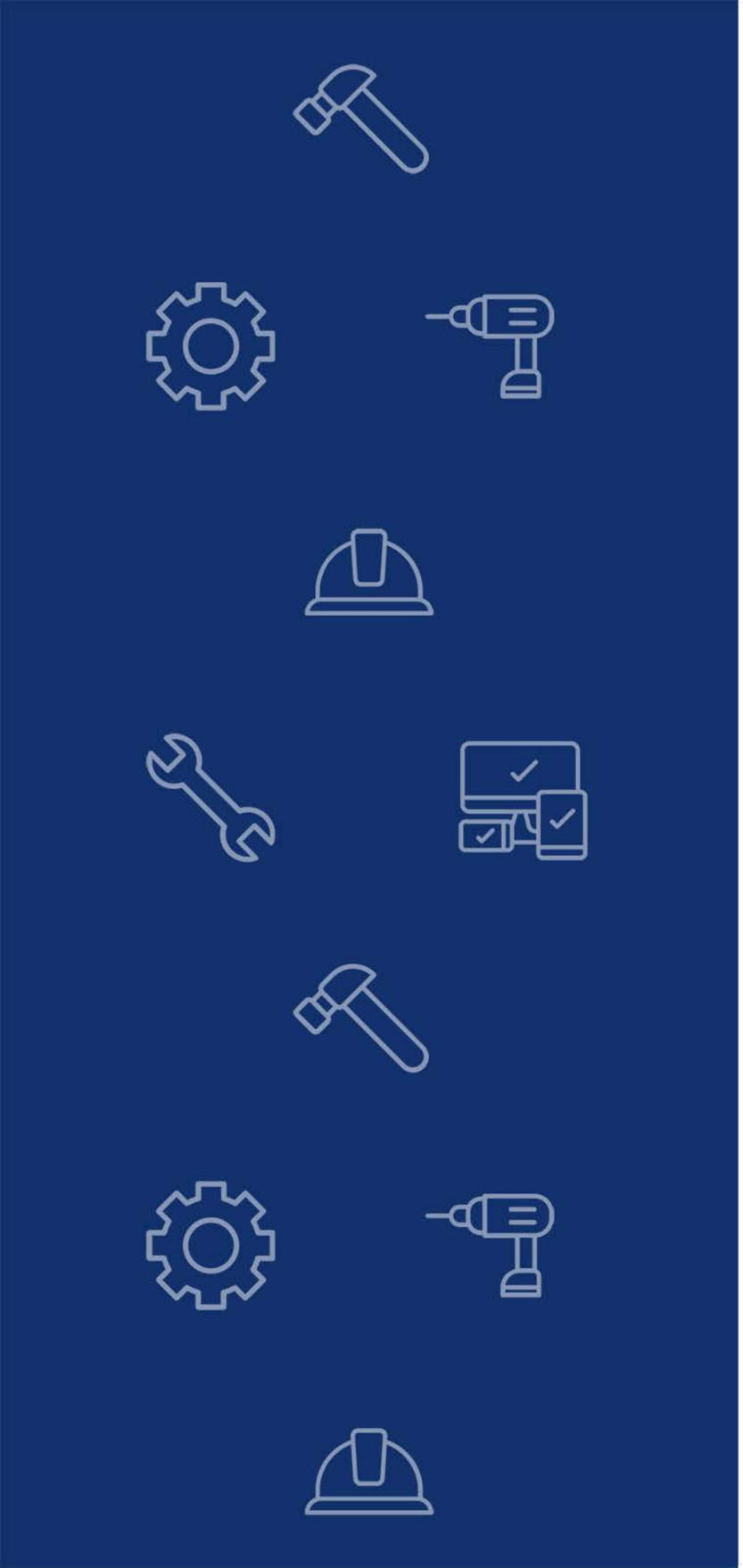
Each project presents unique demands for the application of BIM technology. For example, if you're planning to use BIM tools to set up a prefabrication run and save time on installing specific materials as part of a project, you may not need 3DS Max for this project, as its core functionality is creating high-quality 3D renderings.

On the other hand, if you are building out a project from the proposal phase to the final construction design and documentation, you'll need to take advantage of every VDC tool in your arsenal to achieve the best results.

You might start with AutoCAD, leveraging its design functionalities to create 3D models of the objects and materials needed for the project and combining them into a single building design. Next, you could import those models into 3DS Max, Autodesk's tool that lets you render a 3-dimensional virtual reality environment featuring your newly designed building and share it with collaborators and other stakeholders. Finally, you can import your design to BIM 360 and begin working out the cost of labor, materials and other inputs necessary to complete the project.

If your firm has adopted Integrated Labor Delivery (ILD), you'll want to involve your major sub-contractors in the planning process at this stage (or earlier). The work of subcontractors is critical to the timely completion of construction projects, and involving your biggest subcontractors in the planning, budget and scheduling process makes them more accountable for their labor delivery and can help you reduce costs and stay on schedule.

To increase efficiency and productivity on your projects, eSUB has integrated its project management platform with Autodesk's BIM 360, allowing subcontractors to directly access 2D and 3D BIM 360 plans from the eSUB interface or attach BIM 360 files to any eSUB document, facilitating easier communication and collaboration between subcontractors and other project stakeholders.



Incorporate Trade Partners into the Design Process in an Integrated Labor Delivery Model

The General Contractor serves an important role in construction projects, however your trade partners and major subcontractors are the experts in constructability. Participation by your trade partners in your virtual design process is critical to ensure the design— that the team is spending lots of time on and the owner has a grand vision for— is actually constructible. Additionally, they can deliver insight into planning, budget, and scheduling process to bring into line the expectations of the owners accordingly. An integrated labor delivery model incorporates labor into the design phase to facilitate easier communication and collaboration between subcontractors and other project stakeholders.

More importantly, once construction projects get underway, subcontractors serve a critical role in delivering field data information directly into BIM 360 common data platform. Subcontractors who utilize eSUB as their project management solution can enter jobsite information including labor hours to deliver real-time labor productivity information on the project.

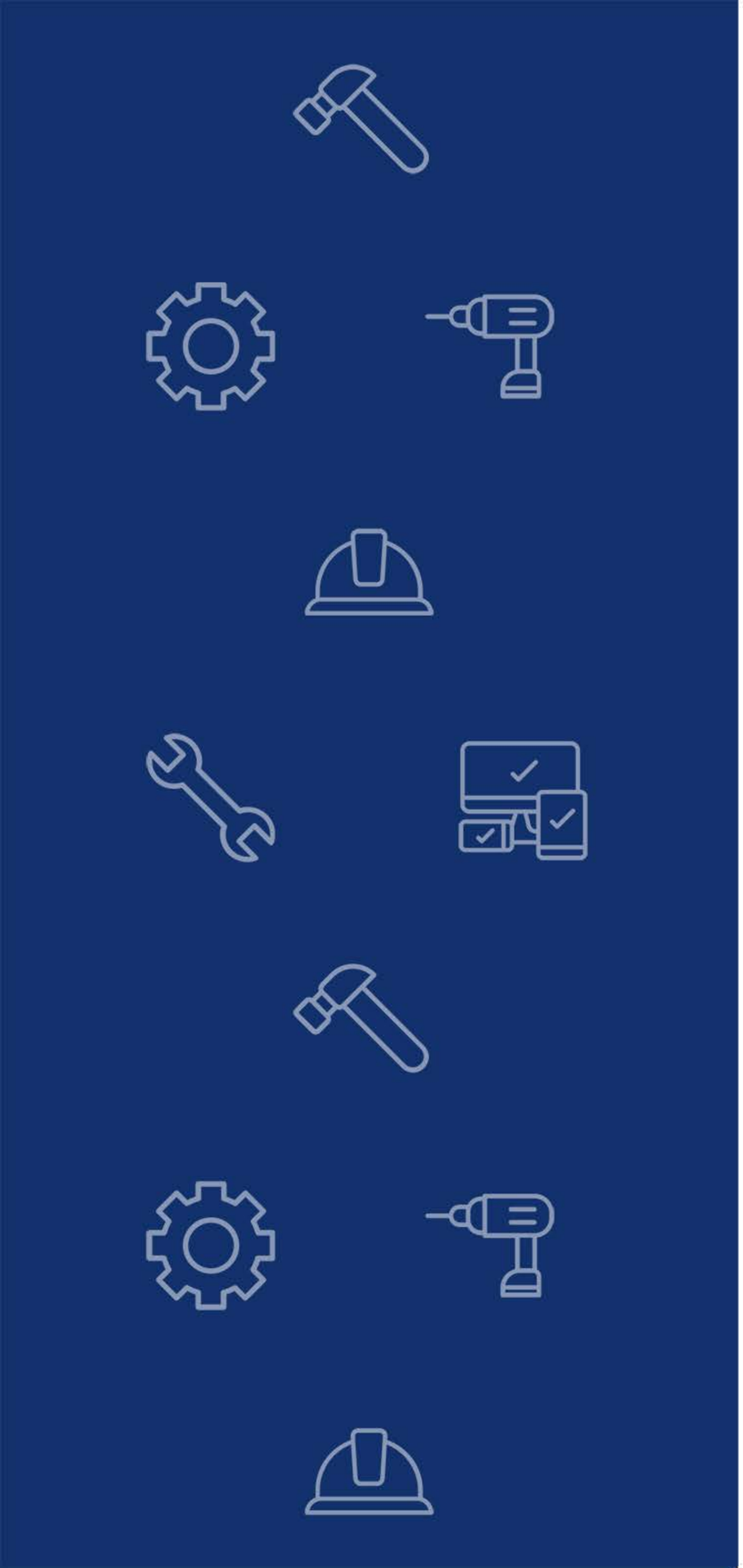
Best Practices for Integrating VDC at Your Construction Company

Be Transparent with Project Stakeholders

If you're planning to use VDC to support a project proposal, it is important to be up-front with stakeholders about the fact that you are planning their project with a new implementation. VDC provides a lot of value-adds for stakeholders. They will be able to track project progress more efficiently, and your implementation of VDC show that you are committed to transparency and communication throughout the project lifecycle. When you inform stakeholders that you are using a newly adopted technology to carry out their project, they are more forgiving of any minor errors or delays that happen while implementing the new technology.

Allow Time for Ramp-up and Learning

Every construction company has expert architects, engineers and project managers that design and carry out projects, but there's a difference between being a master of your profession and a software expert. Some professionals are more comfortable than others adapting to new technologies, while others will want to do things as they have always done. Getting buy-in from your project team requires a thorough discussion of the benefits, but you'll still need to allow time for team members to familiarize themselves with software features that enable them to do their jobs.



Create a “VDC Coordinator” Role

Strong software integration initiatives need a strong champion – someone whose role is to continually push the objectives of the implementation and help organize other team members to actualize the expected benefits. Creating a position for a VDC coordinator whose responsibilities include overseeing collaboration on VDC initiatives and supporting team members on learning and leveraging the new technology goes a long way.

Track KPIs

A successful implementation has not happened until your construction company can track the difference that VDC is making to your bottom line. This means using key performance indicators to measure how projects are working with and without VDC. You may already have project performance data on hand for your previous projects that can act as a baseline for measuring cost savings, time savings, or improved safety performance due to implementing BIM. Making your VDC coordinator responsible for VDC KPIs and giving them the latitude to direct projects in a way that satisfies KPIs is a useful mechanism of pushing forward organizational adoption of BIM technology.

Strengthen Your Collaborative Culture

Construction companies need to collaborate effectively to make the most out of VDC, as the software allows for professionals with varying expertise to contribute to the same models. While a project planner or structural engineer could quickly model the exterior of a building, getting insight from your trade partners will ensure the constructability and ensure the appropriate codes are adhered to. The success of VDC relies on connecting the designers with the implementers of the design to work on the model together.

Summary

Virtual design is one of the most promising technological changes in the construction industry over the past decade. Intelligent modeling software is making it easier than ever for construction companies to accurately plan projects in a collaborative environment, helping to optimize work schedules, minimize waste and achieve greater profitability and customer satisfaction.

Like all technologies, however, VDC has its limitations, and like we've mentioned before, simply purchasing the software components of an effective VDC system does not guarantee that your company will become more efficient. Construction companies must rely on their people to effectively implement VDC to realize the benefits, and that means using the available software and technologies to their fullest extent and acting on the results.

Revit may be able to produce accurate job costing models that estimate quantities of materials needed based on 3D modeling, but your construction company still needs architects, engineers and project managers to collaborate on those models effectively before the data can be used to ensure cost savings on your next project. Revit may provide you with assembly plans for steel rebar but coordinating the ordering and delivery of prefabricated materials to realize cost savings is the work of a great project manager. Like so many other technologies, successful integration relies on great people as much as it relies on great tools. With industry-leading tools and great people in the right roles, you're ready to integrate VDC into your construction company's routine operations successfully.

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