



DIGITAL RESILIENCE IN CONSTRUCTION

Industry Leaders and Analysts Explain
How to Thrive in the New Economy

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INTRODUCTION

In the days following the realization that 2020's COVID-19 pandemic would affect the future of construction for years to come, Trimble decided to chat with project managers, engineers, BIM experts, IT and systems directors, and others in both private and public construction, as well as several industry analysts. We asked them about their recent experiences and thoughts about what it takes to be successful during a crisis and the residual economic fallout.

We heard stories of the scramble to buy laptops en masse, staggered lunch truck runs, meeting co-workers' newborns and pets for the first time during video meetings, and logistics nightmares like driving 45 minutes out of the way to get around closed county borders on the way to a project site.

But mostly, we heard about the strength, ingenuity and determination of our customers and the construction industry as a whole.

Keep reading for insights and practical tips that will help your construction company navigate the new future and emerge into it better and stronger.

OUR PANELISTS

- Scott Ackerman, Executive Manager for PMO, NJDOT
- Julia Bolte, Practice Lead, Enterprise Program Management at AECOM
- Mark Blumkin, Managing Director, Infrastructure and Capital Projects at Deloitte
- Benjamin Crosby, Director of BIM at Yates Construction
- Matt DeMarco, Project Controls Manager, HDR
- David Dwyer, Senior Construction Manager at Parsons
- Nasser Fakh, Assistant City Engineer, City of Sunnyvale
- Michael Krabacher, VP, Program Controls Manager, CDM Smith
- Donna Laquidara-Carr, Industry Insights Research Director, Dodge Data & Analytics
- Barry P. LePatner, Esq., Hon. AIA, LePartner & Associates, and CEO and Founder of Insights + LLC
- Matt Perll, Assistant Public Works Director, City of Shawnee, Kansas
- Angela Ringer, Contract Administrator/e-Builder Administrator at Yakima County, Washington
- Andrea Rutledge, President and CEO, CMAA
- Gregg Shoppman, Principal, FMI
- Jeremy Sibert, Director of Technology at Hensel Phelps
- Andreea Ursu, Systems Administrator, City of Boston

HOW ARE COVID-19 DISRUPTIONS CHANGING THE AEC INDUSTRY NOW AND INTO THE FUTURE?

“On the public side as well as the commercial side, there’s going to be a **bigger push towards public private partnerships, design-build, anything that gets the projects done faster or brings in third-party capital,**” says Mark Blumkin. Increased safety requirements will shift production towards prefabrication. We’ll see advancements such as faster steel erection and more automation. “I saw a video yesterday,” Blumkin adds, “of a fully automated backhoe and spreader basically building a foundation of one of the wing’s towers without a body in any machine, fully using GPS technology. I think we’re going to see more of those innovations going forward.”

Barry P. LePatner maintains that, “just like the last recession, small- to mid-size firms are going to find themselves facing greater competition from larger companies going after smaller projects.” He also predicts that owners will be demanding BIM as the basis of their design and construction projects. “This will enable teams to design, complete, and coordinate design documents that allow owners to secure a fixed price for all elements of the design.”

Get projects done faster by upgrading your 7-step workflow

The Building Workflow

The Constructible workflow can be broken down into different steps. For the sake of this guide, we've decided to use seven distinct stages to illustrate the key benefit that BIM and the Constructible Process bring to all of it: the layering of more and better data as each stage is completed.

The table below outlines which "traditional" job titles and/or company departments are involved in each stage, along with what kind of data is being generated and shared. In many cases, the resulting data can be federated or coordinated with a federated digital 3D model that's being passed from one to the next.

STAGE	DATA	Architect	Structural Engineer	Mechanical/Electrical/HVAC Engineer	Plumbing/MEP Engineer	General Contractor	Construction Manager	Subcontractor
Plan	Initial needs assessment, building envelope	X						X
Concept	Conceptual drawings and design	X	X					X
Engineering and Design	Designs, specs, measurements, job numbers, fabrication requirements	X	X	X	X	X		X
Bid/Award	Supplier and material requests, materials and concrete notes	X	X	X	X	X	X	X
Construct	Real-time adjustments to needs, materials, equipment, layout, drawings, field data and photos	X	X			X	X	X
Operate and Manage	Digitizing performance metrics for future model updates							X
Utilize and Optimize	Reports on energy usage, safety compliance, etc. for all construction phases and data							X

The Constructible Process

The Constructible Process is made up of three central concepts:

1. All players and trades are **Connected**
2. Models and workflows are **Content Enabled**
3. **Constructible** models drive smarter workflows

Get The Guide



WHAT HAVE YOU LEARNED ABOUT CONTINUITY AND WHAT IT TAKES TO KEEP PROJECTS GOING DURING THIS CRISIS?

LEARN TO LOVE THE CAMERA

Several contractors mentioned web conferencing apps as essential in replacing face-to-face meetings. “You have to be more persistent in your check-ins,” says Benjamin Crosby. “That trickles down to our trade contractors, so you have to be more deliberate about it than you would in the past.” Nasser Fakh, echoes Yates. “By 8:15 a.m, know where everyone is and who’s working and not working.”

SEND LINKS, NOT ATTACHMENTS

Firms that invested cloud-based project management and information management systems are really seeing that capital pay off. “There’s too much going on to deal with attachments,” says Matt DeMarco. “One of the main core tenants of our systems is that the information resides in those systems. If we need to make a comment, we’re making comments in the system. If there is a marked up drawing, we point to the system where it’s housed.”

“It’s a cliché, but we’re really trying to make sure we use a single source of truth. I’m on a project with 500 people. How do you have a 500-person email conversation?” asks DeMarco.

Evaluating project viability during a recession



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IN LIGHT OF THE NEW HEALTH AND SAFETY PRACTICES, HOW ARE FIELD TEAMS STAYING PRODUCTIVE?

David Dwyer, Benjamin Crosby, and Angela Ringer all shared tips and tricks that are working for them:

- Use video and photo documentation to verify inspections.
- Enforce social distancing guidelines and make isolation or notifications easier with crew work.
- Assign additional PPE when multiple workers are assigned to areas where they can't stay 6 feet apart.
- Have more targeted conversations: What used to be important maybe isn't so important now.
- Emphasize lean planning so each trade can finish before the next one starts.
- Assign one person to track changing rules in every state, county, and city so you can take on each unique situation with confidence.
- Get off spreadsheets and move to a project management system for visual scheduling so you can see instantly how delays will affect schedules.
- Invest in accountable, cloud-based systems that help office and field teams work together to move projects forward.
- Now is the time to be creative.

8 ways extended reality improves remote collaboration and worker safety



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WHAT RECOMMENDATIONS DO YOU HAVE FOR FIRMS THAT HAVE NOT INVESTED IN DIGITAL PROCESSES YET?

All our panelists agreed that starting with processes that are both essential and low-hanging fruit is key. For example: Jeremy Sibert talked about the digital distribution of drawings; Matt Perll mentioned ACH payments to subs and real-time group plan reviews; and Scott Ackerman discussed using software to submit and advertise plans, specs, and estimates.

Sibert also talked about evaluating current workflows with the question ‘why?’ and putting together a work team to ask those hard questions and recommend cuts to processes that don’t make sense anymore. **The goal should be to think beyond digitizing a document to digitizing information.**

“Don’t try to squeeze analog into digital just for the sake of it. Think about online versus cashing a check at the counter, doing taxes with TurboTax instead of a 1040, using Grubhub to order takeout. Think about how consumer digital experiences have tweaked traditional processes and realize how much money there is to be made by doing the same in your business,” Sibert explained.

Ultimately, our panelists agreed that firms should take what they’ve learned from the workarounds they’ve had to come up with and turn those into scalable solutions. “Don’t just go back to the way things used to be,” as Sibert puts it.

"Think about how consumer digital experiences have tweaked traditional processes and realize how much money there is to be made by doing the same in your business."

Jeremy Sibert
Director of Technology
Hensel Phelps



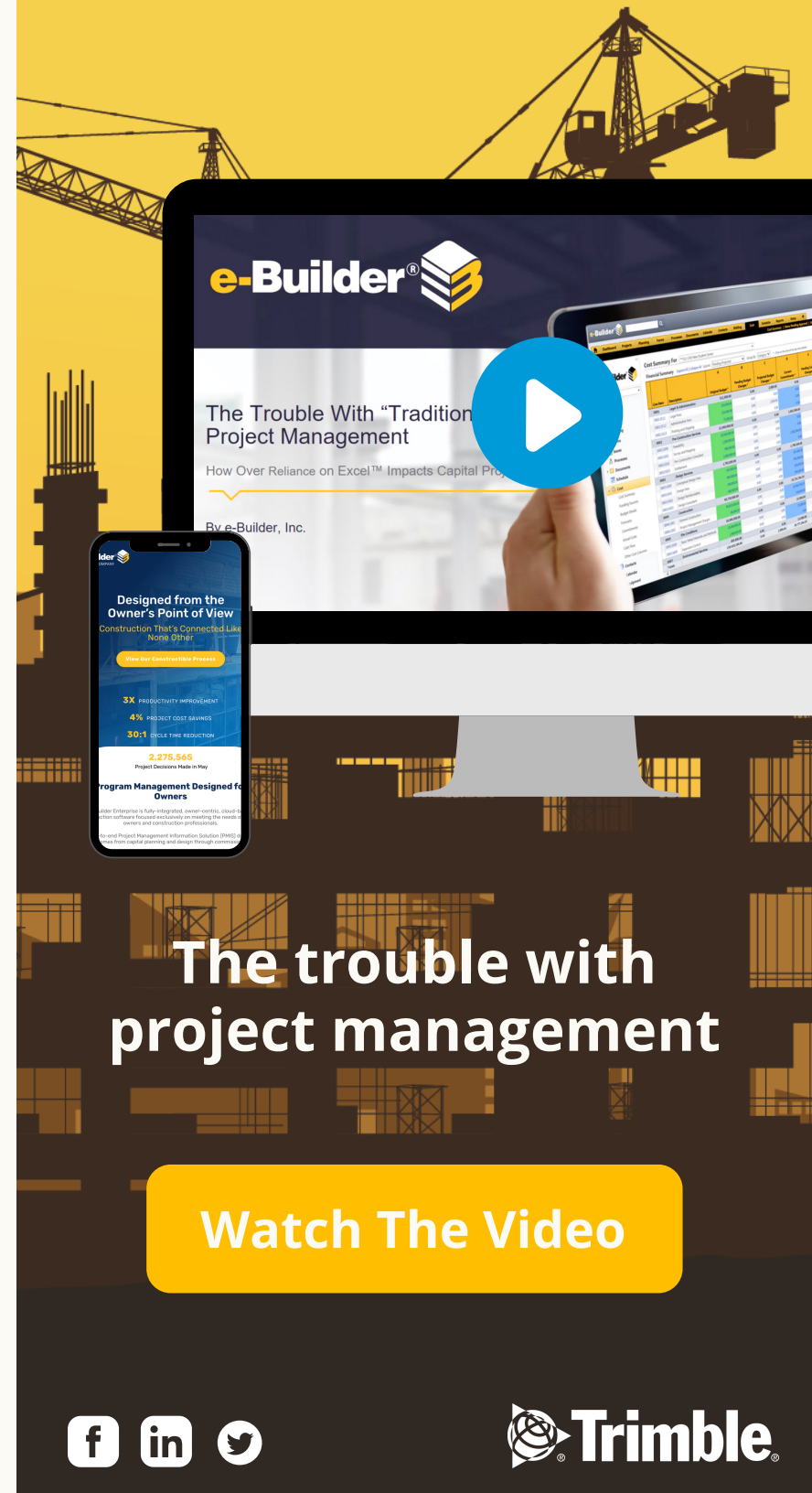
Ensuring a smooth technology transition

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WHAT ARE SOME RISK MANAGEMENT STRATEGIES THAT BUSINESSES SHOULD INVEST IN?

- Monitoring social distancing and sanitation measures is almost as important as implementing them to avoid “gotcha” moments
- Review labor agreements
- Restart meetings that create a true strategy for labor projections, supply chain impacts, critical path impacts, owner needs, and third-party impacts (inspectors, municipalities, etc.)
- Pay greater attention to insurance
- Frequent client communications and relationship-building
- Maintain a low overhead
- Draw on external expertise
- Make sure you are signing contracts with financially viable companies. For example, procurement reviews should shift to include additional financial and firm information: Cash on hand, current projects, staff/key personnel and their bios, workforce size, firm longevity, quality of bond language and viability of surety provider
- Adopt alternative risk sharing methods between owners and contractors



The trouble with project management

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HOW CAN CONTRACTORS RESPOND TO CHALLENGES IN WORKFORCE PRODUCTIVITY AND SCHEDULING?

- Do not forget to account for the downtime – trade contractor mobilization takes time.
- Avoid crew stacking as it has long been associated negatively with productivity.
- Revisit the critical path of a schedule.
- Teams may need to create new work breakdowns and phasing to avoid area overpopulation, workflow and sequencing, and revised inspection schedules.
- Take advantage of prefabrication and modularization to avoid unnecessary stacking of trades.
- Scrutinize contractor schedules to understand the impact of challenges.
- Review schedule changes for alignment with contract terms, and review contract terms for necessary updates.
- Employ third-party scheduling specialists for support in development and review of scheduling.
- Monitor actual progress and crew productivity versus planned



Remote construction site monitoring blog series

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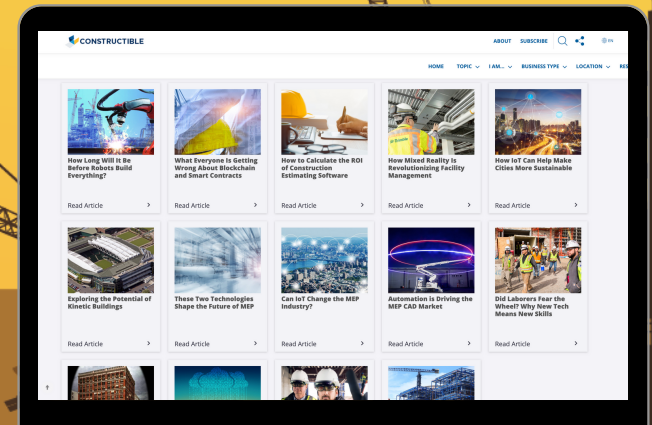
WHAT DO CONTRACTORS NEED TO KEEP IN MIND WHEN THINKING ABOUT SUPPLY CHAIN SHOCK AND MATERIAL DELAYS?

Gregg Shoppman suggests it is key to **go through every single material item and make sure you understand the factors at play at each step.** List out trade partner vendor, material origin or fabrication point, original delivery date, delay in days, actual delivery date, impact to the critical path (yes or no?), cost to accelerate shipping if applicable, general condition impact, general contractor cost impact, and verification with the vendor for every single item. Even for some smaller items that you normally assume is off the shelf.

Shoppman wants contractors to remember, “while there are obvious possible product disruptions internationally, domestic supply chains are also probably affected, including trucking and shipping lanes.”

Don't forget the impact to ports. Once ports are open, there will be a critical handling shortage. And, Shoppman continues, “keep in mind that everyone will ask about acceleration but what is the realistic possibility or cost of that request?” It's also vital to keep project teams accountable to check everything, leaving absolutely no items to chance or to fall through the cracks.

What everyone is getting wrong about blockchain and smart contracts



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WHAT ARE YOUR RECOMMENDATIONS FOR AEC COMPANIES LOOKING TO BUILD BUSINESS RESILIENCE AND EMERGE FROM OUR CURRENT ENVIRONMENT STRONGER?

“One of the things that’s going to define a successful project team is one that can demonstrate its ability to pivot. Firms need to be able respond to a shutdown, for example, and re-negotiate quickly to adjust to whatever that pivot might be, and keep the project going even though it may be on a different schedule,” explains Andrea Rutledge.

Mark Blumkin sees the COVID-19 crisis as a catalyst for innovation, identifying several technologies that will help owners and contractors recover and rebound: the use of robots onsite as labor levels decline, leveraging drones for remote site monitoring and inspection, digital twins, 5D BIM, AR/VR during planning and design, and modularization to overcome schedule overruns.

Several panelists emphasized the importance of individuals and companies being open to better processes. ‘What do we do because of tradition and what do we do because this really is the best way to do it?’ was a common refrain. As Andreea Ursu says, “Investing in technology that allows us to do our work from anywhere remotely, electronically, is important. But you need to work on the culture change too.”

Finally, Barry LePartner sums it all up as, **“Owners are looking for firms that know how to be efficient and productive in the design and construction phases, use technology in a nimble way, and are smart about communicating how they get from point A to point B.** Those firms will step into the shoes of a lot of good business.”

"Firms need to provide special, value-added services including modular housing and environmentally-oriented projects if they want to be in demand."

Barry P. LePatner Esq
LePartner & Associates,
and CEO and Founder of
Insights + LLC



What happens next: Changes to contracting, risk management, & productivity

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