As the construction industry evolves, we continue to see increasing interest in adopting technology that improves productivity. Our latest Know It All podcast episode, titled “How Tech Makes Construction Managers More Efficient and Productive,” dives into what spurred the industry to embrace tech more and what this looks like for teams.

Nate Tockerman, Partner Manager at Procore, and Jason Barber, Former VP at ViZZ Technologies and current Transportation Strategy Manager at Autodesk, discuss new technologies, data and better practices and processes that can help construction companies build better, manage their processes more efficiently and increase their profits.

**As Nate explains in the episode:**

“Looking towards the future, I really think it is going to be that you're going to drive these wins and gains and abilities to perform into the plan when you estimate. If you're not planning on prefabbing, being more efficient, saving those 30% hours, being safer and lowering your EMR… if that's not all baked into your empirical data on how you're going to build, then numbers that you're sending out the door are going to be wildly different than your competition.”

Read the full transcript below to explore key insight :

Jason & Nate - Part 1

**Jason Barber:** Welcome to Know It All, the podcast about the future of construction and manufacturing. I'm your host, Jason Barber. And I'm joined today by a very special guest, Nate Tockerman. Nate is the Partner Manager at Procore. Great to have you, Nate.

**Nate Tockerman:** Thanks, Jason. It's great to be here,

**Barber:** Nate, today, we are going to talk about technology, data and better practices and processes that can help construction companies, managers, and other products be more efficient and productive for the industry.

Before we dive into this a bit more in depth. Just want to take a minute to just talk about each other's roles at each of our respective companies and what experience you have in the construction industry to help make it be a bit more relevant.

**Tockerman:** Yeah, absolutely. I come from the industry. I was a project manager for 11 years at Rosendin Electrics out of the Bay Area in California. We did large commercial projects like airports and hospitals, data centers, and tech campuses. I like to say I've touched everything except for multi-tenant high rises, and I was never too broken up about that.

Running large projects, like a Microsoft Silicon Valley campus that was a $90 million electrical contract, is like running a small company – teams, people, systems, process. You try to make it as similar to the company standard as possible, but it has to be flexible to the constraints of the project, so it was always a learning experience of what tools you’re going to use. It was always an interesting endeavor to say, what are the needs of this project and what are we going to do to service the needs of this.

**Barber:** And Nate, tell me, how do you take that experience and use it in your role today?

**Tockerman:** It's basically having a perspective and bringing that domain knowledge to either a consultative approach or just a consideration of where are we going to end up as a, as a result of our efforts. So, coming into Procore and partner managing it's a lot about putting the right tools in place to the solution sell that we're doing or mapping out what that integration is going to look like to deliver the best value to our joint customers.

**Barber:** Thanks Nate. I think that's one of the reasons you and I get along so well, is our backgrounds have a lot of similarities. I also came from the construction industry. I spent 15-plus years in various roles, much like Nate, including Senior Project Manager on infrastructure projects, and then also ran operations for a large electrical contractor in the Denver area. You can't gain that experience of dealing with all the complexities of a construction project, but by doing it with boots on the ground. And, honestly, the joys and the pains.

We as an industry build some cool things. And there's a lot of people that are proud of that, but it is really difficult to do it. It's probably more difficult than it needs to be. You know, Nate, one of the things that we always talk a lot about, and I think the industry as a whole does is productivity.

What's your perspective on productivity? I mean, everybody talks about the McKinsey report that's been out there with that chart that shows manufacturing has been increasing productivity, construction is lagging. That's been out there a lot. What your perspective, Nate?

**Tockerman:** There's so many ways to go here. I think of productivity, as a project manager, as a way to ensure the performance against budget target that I’m aiming for. What are these leading indicators that are going to give me indications that we're going to make it, or we're not. And what I've sort of highlighted in my whole career is this divide between the office and the field.

You know, I was a union contractor. We didn't have agreements on production. We had tool lists and we had show up times and we covered basically everything in the agreements save for what a person could do. The tool list kind of said that he could do everything, but not at what speed and getting them to buy into the fact that we bid these jobs off empirical data, and if we hit these production milestones, we're going to be profitable. And if we're profitable, we're going to perform. It flows into everything – getting the next job, etc.

Trying to highlight that to a union field personnel, saying, I want you to buy into these goals that we've got, was a real challenge. But, if you can show somebody what success looks like for them, instead of trying to brow beat them on going faster and squeezing out another fixture install, then we're going to be proud of what we do and everyone's going to be happy.

A great example is the field hates rework. They hate reinstalling something, even if I can convince them we're getting paid for it. Nope. They want it moved six inches. Well, can't we just wait to put it in until we get the final location and I'll just come by and do it once. And the concept of getting paid to do it twice just doesn't ever seem to resonate. And so, I think if you can honor what we owe the field, which is tools, information, and material to make them productive, they're going to lean into that. There’s a pride to work.

In fact, the JTCS hold these competitions for speed and quality. Who's the best apprentice? Locals are pitted against each other. And so it's already bred into them when they come out of the union and or the training centers to do good work, make sure you know how to do it and how fast can you do a bit. It demonstrates your knowledge of how it's going to go. And so, it's how do you cultivate that and how do you foster that in a, in a culture in the field that is buy into common goals that lead to production quality, as well as profitability,

**Barber:** You touched on a couple of interesting ideas or really truths in the industry there, like the disconnect between the office and the field, and really how much the field drives productivity.

I mean, that is the crux of productivity. I almost feel like the most successful companies that I've been a part of or even projects I've worked on, are the ones where we treated the foreman or the field supervisor as the end customer. That is who we were serving as the office – from the engineering standpoint, architecture owners – up and down the supply chain.

And that's been rare, honestly, in my career. Why do you think that there's this lack of understanding, or even just those scenarios where the field is the end, but it's not the end customer? It's just the afterthought.

**Tockerman:** I think the nature of the business is such that it's hard to make a field employee feel valued.

We would build a job with maybe 20 core guys that we moved through projects, and we go to the hall for the other 60 or 40. It creates this mentality of, you know, we'll all work for anybody in the valley type of thing – pays the same, same tools, etc. And so, whether I'm doing what you need, or they need, it's going to be different tomorrow, so really what I want to just do is show up and install.

And when you try to get buy-in, they take it as you're trying to make them into a company man. And they’re not trying to be a company man. Some of these guys come from Louisiana to make a better wage in the summertime. It's not a separation between the officer, it’s a cultivation of diving into what matters to the individual, which is a sense of pride in their work and craftsmanship. And like I said, if you show them, and we got creative about it, like, ‘Hey, if you can get to the end of the hallway by Thursday, you can have Friday off. Cause you already met the installation rate we were trying to hit.’

You’re saying, I don't need you here Friday. I don't need to make X amount more. I just need to hit this budget or this target for 10% savings or whatever that is. And then you get people like me, the younger generation people that are like, ‘Hey, if I can work to get time off, I'm going to go twice as fast as you thought ever possible.’

Some of the older generation guys are like, ‘No, I'm going to feel worthless on Friday if you send me home.’ So, it's just about identifying how to unlock that potential in your crews and create and nurture that competitiveness within them.

**Barber:** Yeah. And I think that competitiveness is inherent in most people that are in this industry for various reasons. Like it's that level of craftsmanship, it's that level of care. It is so high across the board and it's one of the things I love the most about it. Go into the productivity, what does that mean to you? Let's unpack what really is productivity and how is that measured? And how does that look?

We talk a lot about man hours, whether that's direct or indirect, but what do you think is incorporated in that and is leading to this larger statistical data that's saying projects are stagnant in their productivity.

**Tockerman:** I think productivity is construction stoichiometry, right? It's a unit per something – per hour, per foot, per lineal feet, whatever that is.

And we're trying to create these little recipes by cost code as we track stuff. And so, what is productivity? It's that measured mile. It's the systems that we do. And a lot of times it's in Excel, right? We estimate this job, we convert it and the rate that you have, and what's inclusive of that.

Productivity is this sort of big stone block that you have to chip away at to figure out what are we doing here? Is it a statue of David or is it just a pedestal for the front of the garden here? And then how complex is that project we're going to take on? It’s the tools that you use, the agreements across the business, on what these rates are going to be comprised of and then the presentation to your teams.

One example of the stakeholders in productivity and what does that mean to a construction industry is getting estimates from the field on what they think they've installed only to find out when I cross check that that we've delivered less conduit to the site that the field thinks that they've installed. And it's not because they're trying to mislead you. They're just putting their thumb up in the air and guessing, ‘I think I did about this much.’ And the information capture to support productivity is a big part of being a production tracking business.

Long and short of it is that I think productivity is something that's going to touch multiple stakeholders within your company and is going to require multiple eyes and inputs. And ultimately going to take buy-in from all of those people on how we're going to do it.

**Barber:** Agree. I think one of the things that you're really getting into is collecting the information to let people know where they're at, like that example of does the procurement quantities match up with what people are reporting is installed quantities. In the past, and still for lots of companies today, you know, that used to be an 8.5x11 card that each foreman would fill out for each day, and then they'd turn it in at the end of the week. And you'd have, you know, an army of office engineers, field engineers that would then enter that into your ERP system.

For most companies today, like you said, it's Excel spreadsheets, but it's not anything more sophisticated. I mean, there are tools like Procore and Manufacton and others that are trying to supplement that. If you got a big job and you're spending 600,000 man hours a year on these projects, you know, you described that $90 million electrical contract, what are the ways to break that down? I mean, that's a pretty abstract number and we go to cost codes and you know, we're looking at production rates and comparing that to the estimate.

But really one of those things that's not in there is that it's meant to be all inclusive of staging the material, prepping the material, getting access to the locations. What do you see as the challenges and what do you see as some of the potential solutions to make that easier for people?

**Tockerman:** I think one of the biggest challenges is looking at too much. To your point, 600,000 man hours is daunting when you try to undertake it as a total project. And depending on how sophisticated you are in your cost coding, we used to contemplate on big jobs, whether we break down a single-phase code by similar scope, right, where there's conduit or fixtures, switch gear or whatever. If we wanted to start cracking that up into smaller and smaller pieces, and then you go, okay, well now I'm going to have cost reports and daily timecards that have 350 cost codes because it's by area system phase level, you know, all of these different separators.

And then you start to realize if you go all the way down to that level of granularity, it's just information overload. And you're going to have all this code contamination, because I don't know if the conduit I put on was left or right at grid line five.

And so, one of the biggest problems is just trying to settle on what's the right number of ways to track. You get everyone's buy-in on that. And you try to make it simple. You try to do as few as possible to give you incremental information against that install. You don't want it to be something that spans nine months because it's hard to aggregate questions like: Is my percent spent versus my percent complete versus my production quantity rewarded all jiving? It’s too long to ascertain the health of that task or activity or its similarities. I'm 30% complete, but I did it on work that was quick and easy because there's nothing in my way, hangers, put in rods and racks. The other 30% comes with a bunch of materials stacked on the floor because there's a bunch more trades that came in pre-schedule, I'm starting to see some lags and production there and you can't accurately forecast the blended rate that long ago. So, the difficulties are really in the setup and the thought that goes into what's going to happen. Against that install in those areas because of schedule and all those other things. And that's a lot to digest. So, you try to take it in manageable chunks.

I think those are the challenges. I think the second part of what you're saying is what are the successes? You have it as part of your process to check in on a lot of people, get these complicated whips or ports and it’s information overload or paralysis by analysis. And so, at a point to talk, you must about what you're doing and find out what's working and what's not. And you have to make that communal knowledge on both sides.

So, one guy is saying, ‘Hey, look, I found out that this thing comes with earthquake clips, but they're not in the fixture. You got to go downstairs and get them.’ And no one else knew that. So, he went and picked up a big old package of them and has been blowing these things out. And the other guy has been walking downstairs to get them every single time. You must get those people talking. You need a medium to share that knowledge that you're learning on jobs.

**Barber:** Yeah, for sure. I think that 30% complete, or even the complexities of trade stacking and the trend that's forcing it is that we've got tighter and tighter schedules to deliver on projects. And, it's not a new concept, but it really seems like we're at a tipping point for prefab and offsite construction so that 30 to 50% of the install is already done offsite and beforehand. And then it's just final install on assembly. This eliminates a lot of the challenges of trade stacking.

What do you see as some of the other trends that are happening there and the benefits of it? Obviously, there is that holy grail that it could save as much as 30 to 40% of your project costs if you’re prefabbing a lot of it. What’s your perspective on that?

**Tockerman:** I think in construction, it's like careful what you do, because as soon as you perform at a certain level, that becomes the new benchmark of expectations.

Like, you can do a data center in 10 months? Oh, well then, we should be able to go back to the table and figure out a way to do it. Well, I got three people to quit doing that 18-month data center in 10 months, that inherently is what we do – we try to move the needle to do cheaper, faster, better. The challenge is always going to be the competitive nature of the landscape when you hard bid a job.

Looking towards the future, I really think it is going to be that they're going to drive these wins and gains and abilities to perform into the plan when you estimate. If you're not planning on prefabbing, being more efficient, saving those 30% hours, being safer and lowering your EMR, more competitive in your labor insurances – if that's not all baked into your empirical data on how you're going to build, then numbers that you're sending out the door are going to be wildly different than your competition.

I think in selling prefab there's a few detractors. And I'll talk about the elephant in the room, which is labor saying you're taking hours out of the field and all of the lobbyists and everyone that is saying, ‘Hey, we're trying to preserve the working conditions for our constituents.’ To which I say, ‘I'm spending the hours, I'm just putting them in a different place.’ And I don't know a field electrician that would complain about not working in a hundred degree weather on the roof of a building versus in an air conditioned lunch room set up in a warehouse. And so, I'm transferring hours, not eliminating them. And again, the safety piece is huge for me.

I think we went something like three years without a reportable in our prefab shop. Big sign right at the front is because it's clean. All of this stuff is available. It's similar, repetitive tasks. The safety conditions within that warehouse are just extremely controlled because everybody works for the same company.

And I think that you're starting to see solutions like yours. You're starting to see things like cloud-based project management solutions that are aggregating and putting everyone in the same place, even if they are in different locations. And the breakdown and delivery and communication and all that stuff that is increased when you endeavor to do a high amount of prefab is starting to become less of an obstacle.

And I think we're going to start seeing those benefits. My question really comes down to, are we going to start baking that into the estimates or not? Are people going to make that choice to leave that margin on the table?

**Barber:** Yeah, I think I'm seeing it even shift from how it was when I was running operations. The way we would estimate things for prefab was we would just take a percentage of the total direct man hours and say, okay, we're going to do this much prefab, but it had no planned logic to it. It wasn't like we always prefab our panel boards, we always prefab our hangers or we always prefab whatever it is. Then, taking that approach and saying how many hangers or panel boards do we have on this particular job? And then letting that kind of translate out into our prefab targets.

I see companies making that shift now where they are taking that approach of, we always prefab these certain things. And our goal is to increase the number of things that we always prefab and always pre-assemble or kit or whatever it is. And that's part of the tipping point.

And like you said, you know, yes, it does introduce some challenges around collaboration because you've got different locations and more logistics to deal with. Honestly, I think maybe a silver lining to the pandemic is that we've all been dealing with that now for 16 months or whatever it is that we can learn how to do that. We can use tools like Manufacton and Zoom and it’s not if you can't see it, you, you don't trust it. There's just lots of great ways to really collaborate around that and roll that up to tools like Procore that gives you the real benefits to it. And you can see those schedule gains and, and safety.

I mean, getting everybody to go home, the same way that they came to work is, is a huge endeavor and it's not easy. And it's awesome when that happens, and you have those successes.

**Tockerman:** You said something there that rang true for me, that question of whether or not you're going to use these processes to burn margin or not as sort of, you know, that's a business decision for each company, but we were already setting up assemblies within the estimate to say that these are pre-targeted for prefab. We know that we've already got a recipe, a bill of material. We can take this template all the way to operations. And if you just tell me how many you got, we can quickly extrapolate that and create a prefab shop around these. That work has already been done, the bill of materials already compiled. So you just put the multiplier in there and that was a spreadsheet, but it was a direct export from the estimate. Say here's what we're doing and here's all the qualified areas.

We said, let's do X amount hours in prefab this year. And each project contributed their percentage. But if you took that export from the estimate and you said, based on the quantity of these pre-targeted or tagged assemblies, I've already got 25,000 hours of qualified prefab material without getting creative about what else we can do, I think that's a great start.

How do you avoid doing brand new work every time and take that coordination down in that learning curve down to say, ‘We've got a plan to deliver to the operational teams as a start-up or handover meeting.’ The prefab manager is included and says, I looked over your estimate and it looks like XYZ. Here's what I've got for you.

**Barber:** That whole planning aspect. There's so much data that shows over a long period of history, the better planned a job is, the better the execution. And it seems like a no brainer. Then, when you look at prefab and what you are discussing in the estimate and really logging out there, I mean, cause this estimate is really just the best stab at a plan, given what you know at the time and prefab forces even more in depth planning and a lot of those other things. And then it starts to get to one of the things we also wanted to talk about is that you've got that data from the estimate, but then a lot of times that kind of gets thrown over the fence and estimating doesn't really know what happens in prefab, or it doesn't really know what happens in the field. What are the challenges you see there and what's happening industry-wide to address that?

**Tockerman:** You know, by nature of the professions there, they're sort of separated, right? It's always funny to me that estimating is on the ground floor. Like the guys in the basement, just hammering away on those drawings. I think it behooves the operational managers at the end of the day to really seek out the help and feedback.

And just like we talked about operationalizing culture, I think you need really to operationalize your estimate. You need to marry those two worlds together almost seamlessly.

The feedback loop of what we're currently performing things at and do we want to update our empirical data and change our estimate rates, because we're just constantly losing it on branch conduit, for example, or does that inherently make us less competitive? And so those two teams really need to be talking. Do we want to make our business practice factoring in what we're doing operationally into RSA? If those people aren't talking and syncing on what are we going to do with his data on either side of this line pre-bid and award, you're just sort of hoping that the industry stays static to your process.

And we see it on material pricing, right? What am I buying it at? What's going on in purchasing versus what do we have in our database? We link those. That's a no brainer. You're like we can't be buying it for the wrong material price. We're going to lose on low-risk stuff. And almost every company I think hits that pretty well.

When you start talking about this stuff and process-driven production improvements and process improvements, it’s we'll get to them when we have time and we never seem to wind up having enough time to do that.

**Barber:** Right. Some of those postmortems or even, you know, kind of real time feedback loops.

One of the things that I'm pretty passionate about is recognizing that one of the big blockers to that is having structured data to be able to compare actual information and it's the classic apples to apples versus apples to oranges. And I think a lot of people don't really think about it, but I'll try to use some examples: if estimating calls it a junction box, but then the operation on the field team calls it a Foursquare box, there’s no way of knowing that it's the same thing, or it would take a lot of mapping of data.

I view the responsibility of technology is to help companies structure their data across all the different stakeholders so that whatever estimating is calling it versus pre-con versus VDC versus the field versus warranty, so on and so forth, they can actually match it up. And that's just within one trade contractor. You abstract that to information that GCs and owners need to really start to compare and contrast and look at what's going well, what's not going well. The silly one is AC – AC can mean asphalt concrete, could also mean air conditioning, totally different things that if you're comparing data on both of those, you're going to get things that are meaningless essentially. Software technology is a great way to put some swim lanes and to make that data be structured so that then you can actually do some real analytics.

Everyone, thanks for joining us for another episode of Know It All. We're just getting started on a great conversation with Nate and there's more to come next episode. So, join us again as we continue, our conversation with Nate Tockerman on better data in construction next time on Know It All.