

Chapter One

Make It So

“Crisis is the mother of Change, and Conflict is its father. I have found only a few companies that will adopt a significant paradigm shift without a major crisis that proves that their current knowledge is not sufficient to overcome it. If they can’t resolve that conflict, then they can’t make significant change.”

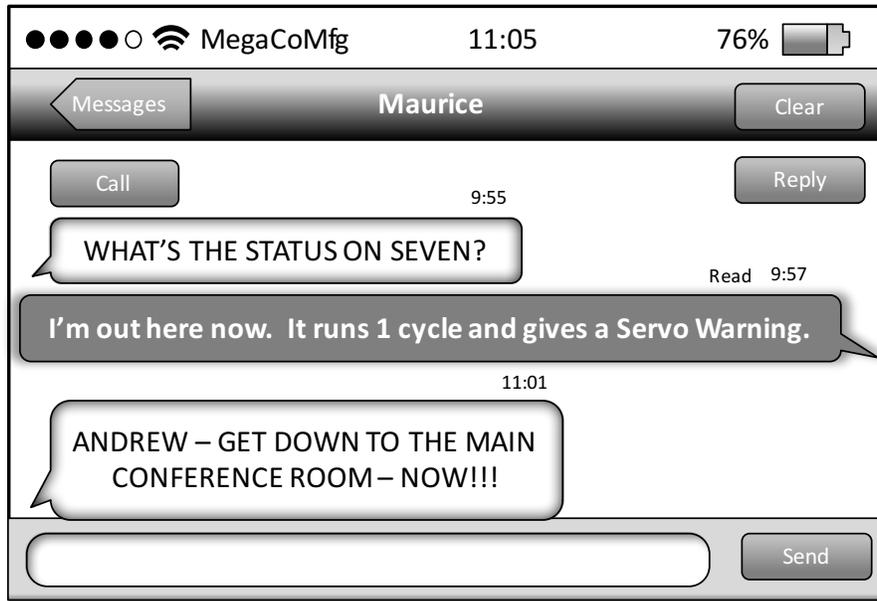
Blog entry from Mike Sullivan
President
Spare Part Garage



“This is straightforward. The answer is that we can do what they want, when they want it,” says Mr. McCann. “No other answer is acceptable in any way, shape, or form.” McCann is the CEO of MegaCo, where I work. He’s tall, good-looking, with just the right amount of gray in his black hair to make him look both young and experienced. He’s a wolf in an MegaCo polo shirt, and his infamous stare is locked on me.

My butt has just hit a seat in the conference room when I hear that for the first time. Despite his calm voice and demeanor, I find myself flinching backward. My flight instinct has just kicked in, begging me to go hide in the men’s room. Or better yet, the women’s room.

Minutes earlier I received an urgent text from my boss, Maurice, to come to the main conference room. It said:



He's used his "THIS IS SO URGENT I AM USING ALL CAPS" mode on his text to me. I get a lot of those. The door is closed, so I had to carefully peek in. I am surprised to see our CEO, Mr. Jack McCann, at the front of the room. He rarely comes down from Central Office. I think I have only seen him here once before, when some big order was late. I must be in the wrong room, I concluded. But my boss, Maurice, is here, and he motions me urgently to a chair at the main table. Maurice is older than McCann, balding, with black "Just for Men" hair, a slight paunch, and "weight of the world" posture.

Jack McCann's gaze has turned back to the conference room as a whole. "This is a huge contract for MegaCo, easily the biggest we have ever had. SPG has taken this quote to two other suppliers, and didn't like the answers they got. So, we are going to make sure they get the right answers. Right?"

The chorus in the room answers, "Right!"

I knew MegaCo had a possible contract with Spare Part Garage. With the renewed interest in classic cars and Do-It-Yourself backyard mechanics, they are growing quickly. They are making service parts for some of the auto companies, and have their eyes on the motorcycle market as well.

SPG is proud of the fact that they do high quality work with short lead times. They have auto shops, dealers, and internet stores as part of their supply chain. Their prices are five to ten percent higher than their competitors, but their customers buy from them because they are quick and their quality is excellent. They strive to match original specification for their parts, so they don't have to be reworked before they are

installed. They have done this by making their parts in-house, and they are known for having the right parts in the right place at the right time.

But they are experiencing growing pains. A key success factor up to this point was that they were doing much of the engineering and manufacturing inside their four walls. Thus, they controlled quality, lead times, and delivery. They were also known for hiring talented people, but they couldn't find enough of them willing to work in manufacturing. They had to turn down sales opportunities as a result, including some that were outside of the auto industry.

I'm still not exactly sure why I got invited to this meeting, which I have now cleverly deduced as being about the SPG quote. I'm an electrical engineer, and have been working at MegaCo's Springfield, Kansas, plant for about three years. Compared to the logic and relative clarity of class work at K-State, I have found MegaCo to be confusing and frustrating. This is shaping up to be another one of these situations, but with C4 involved.

Mr. McCann's stare has returned to me. I gulp.

"Ah, right?" I say. I am pretty sure that's the right answer.

"And how are you going to get that right answer?" Mr. McCann says, the stare becoming even more intense.

"I'm not sure, sir," I answer, looking around the room for someone who can answer that question. But everyone is just staring at me.

He turns to look at Maurice and says, "Are you sure this is the right guy to do this analysis? If he can't do a little pre-work before the meeting, we need someone else who will!"

"I was hoping Andrew would take the time to do it, sir. He has all the information that you sent me, but we have been having problems on the Lathe 7," Maurice says, without looking at me.

They are talking about me, as in Andrew Wright, me. As in "What the hell is going on?", me.

"I really don't have anyone else to offer. Perhaps someone from Central Office?" asks Maurice.

I'm confused. They turn their discussion to doing an analysis at CO, so I pull out my phone again and look at my emails. Two arrived within a minute of each other about an hour ago. The first is a reply email from Maurice to Mr. McCann that says he has assigned me as the analyst to work with SPG. The original email from Mr. McCann to Maurice is dated about two weeks prior to today's meeting.

The other is a forwarded email from Maurice that says "Get this done" in the subject line with nothing in the body. The email he forwarded to me today is from SPG and is dated two weeks ago as well. It has a huge spreadsheet file that I can't even read on my smartphone screen.

An hour ago I was working on the Lathe 7, which had broken down again. He knew it had broken down because we had exchanged texts. And then he called and asked again why it was down.

"I'll have it back up in a half hour," I told him. "It's the same servo warnings. We are going to have to take Lathe 7 down for a shift to get it replaced. Otherwise, it's just going to keep breaking down, and I'll have to put another bandage on it to keep it working. It's working much slower than it's supposed to, by the way."

Lathe 7 is a complex piece of equipment, and is really several stations combined into one cell. It has robots, loaders, a turntable, etc. The only thing it doesn't have is a lathe, which has always confused me. But it's called Lathe 7 by everyone in the plant.

"We can't afford to take it down for a shift," he said. "Get it back up and running ASAP—the order that is running on it is HOT! And check your emails."

How the hell was I supposed to get Lathe 7 up and running while checking my emails? And the information from SPG had sat in his mailbox for the last two weeks! Maurice makes a quiet clearing-his-throat noise to get my attention. My focus snaps back to the meeting.

"They could probably help, but SPG wants someone from the plant to assist with getting data. Something about a reality check on the numbers that will be used in the analysis," says Mr. McCann.

"Who were the other suppliers, and why did they lose the work?" a voice in the back asks.

Chris Hunter, who runs Sales, starts talking about the competitors. I recognize the other suppliers—they are bigger companies with lower prices than MegaCo, but they usually can't match our engineering work or our part quality. Chris has that one

quality that I think good sales guys all have—everyone likes him. Everyone likes to spend time with Chris, have a coffee with Chris, or have lunch with Chris. He’s not good-looking, but he has a pleasant face that makes you smile when he smiles. He’s not physically imposing like Mr. McCann, so you don’t find yourself sucking in your gut around him. He always shakes your hand, touches you on the shoulder, and makes you feel like you are the one person he really wanted to see that day. But Chris is sharp and knows our products, our customers, and our competitors. Just getting a shot at the SPG business is a feather in his hat.

During this discussion, I get a text that says Lathe 7 is down again. It’s approaching noon, so I’m hoping that when the meeting ends at lunchtime, I will get a half hour or so to do some work on the servo while everyone else is at lunch.

“OK, that’s it then,” says Mr. McCann. “The tour will start at one, and SPG is always on time. Don’t be late again,” he says, looking at me.

“Ah, no sir.”

I catch my boss as he heads out with Mr. McCann. “Can I have a second?” I ask him.

“Make it quick. We’re going to lunch, and we need to be back before one.”

“Well, it would help if I knew what the hell this analysis thing is, and why SPG needs it.”

“It’s just a capacity study that shows we can make their demand and not have any stock outs in the supply chain. Just read through the emails and put together a spreadsheet that we can go over after the tour. Which you are leading, by the way.”

His phone beeps with a text. He reads it and says, “Seven is down again, Andrew?”

“Yeah, I got the text in the meeting. It will have to wait until after I make the spreadsheet if I want to get this analysis completed before the tour.”

“Get 7 running as well,” he says. “It must be at least moving for the tour.”

“I can’t...,” I start, but he holds up his hand. “It’s called multitasking, Andrew. Try it sometime,” he says, as he turns to leave the room.

Chapter Four

The Plant Tour

“When I say that I need an analysis to make a decision, some think that I need a complex study that takes weeks to accomplish. My favorite analysis tools, however, are a stopwatch and safety glasses. Using safety glasses means you went to the plant floor to see what is really going on.”

Blog entry from Mike Sullivan
President
Spare Part Garage



Nick DePietro, our customer representative from SPG, has arrived for the plant tour. I had hoped that everyone would be prepared to go on a plant tour, but I find that many of the people from Central Office do not have safety glasses or earplugs. I waste twenty minutes scrounging up the needed safety equipment. The CO people give a small gasp as they move from the conference room environment to the sudden shock of the manufacturing environment. Nick wants to walk through the plant in the order of operations. Since that's not physically in a straight line, we end up wandering back and forth through the plant. Some of the machines he just glances at, while others he times with a stopwatch app that he has on his tablet, making a few

notes each time. He asks to go back to Lathe 7 and begins taking cycle times. Ben Bufton, who is the area supervisor and second to the plant manager, Maurice, has chased down Fred, and Fred takes over for Lucas. Fred runs the machine much faster than Lucas. Nick takes more cycle times. He watches it for a good half hour, while we watch him watching the machine. I can tell that the other people on the tour are getting sweaty, antsy, or bored. Cellphones don't work inside the plant, but a few phantom phone calls come in for the CO people, causing them to leave the plant floor and return to the comfort of the conference room. Others head off in twos or threes to talk about something where they don't have to shout.

"Is this the typical amount of time it takes to complete a cycle?" Nick finally asks.

"No, Lathe 7 is running slow because we are trying to work around a maintenance issue. Bad servo," Maurice offers. "Andrew hasn't gotten around to fixing it yet." I roll my eyes. "But we're hoping he'll get it done on Sunday."

In between cycle times, Nick looks around the machines in the area, counting baskets and looking at the manila tags that have information scrawled on them. He is always back in front of Lathe 7 when the cycle ends. Between other cycles, he asks Fred some questions.

"How long does a changeover take?" he asks.

"It depends," he says. "I think the fastest we have done one is thirty-five minutes. One time it took a whole shift."

"OK. I am looking for an average, and a plus and minus to that—a range."

"Hmm," Fred says. "I would say it takes about two hours on average, plus and minus an hour."

"Great," says Nick. "I'll let you get back to work." He scribbles on his tablet, then turns back to me.

"Let's go back to the first operation again, Andrew. I want to confirm an observation," he says.

By this time only Ben and myself are still with Nick. The others have found excuses to leave the heat behind, saying they will be meeting us back in the conference room. Maurice was called away to handle a Purchasing issue. We end up back at the first operation. It was sitting idle on the first pass, and it's still idle when we return.

The operator is sitting at his work table, and it looks like he is playing a game on his phone, which he is not supposed to have on the floor. The phone disappears when he sees us, and he walks over.

“Waiting on baskets,” he says to our unasked question.

There are full baskets near his machine, I notice, but they contain in-process parts that don’t come from his machine. Nick is reading the tags that are attached to the baskets, making more notes.

“I told Maurice that we need to buy more baskets,” Ben says to us as a way of an excuse. “He doesn’t think we need them, but it’s obvious we do.” He points to the idle machine as an example, shrugging his shoulders as if to say I have done all I can do. Ben is one of those guys who still looks the way he did in his high school photo album, but now that he’s in his thirties, the look no longer works. Especially the mustache. He also wears the dark blue uniform of a plant production employee, a degree of grime a level or two above Fred.

“No, that’s not the problem,” Nick says. “His machine is blocked.”

“Blocked?” I say, frowning. “He is waiting for baskets.”

“He’s starved for baskets, but not parts. He has materials to make parts,” Nick says, pointing to the rack of raw materials that are waiting to be cut to size on the machine. “But he can’t make them because he has nowhere to put the parts after they have been cut. If he was starved, he would be waiting for a rack of material. And he’s clearly not experiencing downtime. He is not running because he has too many parts after his machine and before another operation. The large number of parts that are blocking him are in baskets. So many baskets that he can’t find an empty one to put his parts into. Blocked.”

I think about it for a while. I guess it’s true.

“So what’s blocking him? I don’t see any baskets at the next operation, so that can’t be it.” I feel foolish, asking my customer for insight into my own plant.

“Where are all the full baskets located?” he asks.

“They are all around the plant,” I say.

“Yes, they are. If we look at these baskets of parts, by Operation 10 here, what was the last operation performed on them?” he asks.

I check the tag. “Well, each one of these baskets probably holds a different part number, so it’s hard to tell. No, wait, all of these have the same part number and have been through Op 60. The next operation is Lathe 7,” I say.

“And what are they doing way over here, do you suppose?” he asks.

“I don’t know. Let’s ask the forklift driver,” I say. Ben gives me a look like I shouldn’t do that, but I still flag the driver down and ask him about it.

“We ran out of room by Lathe 7, so we are putting them wherever we can,” he says.

“How do you know which basket to use in Lathe 7 next?” asks Nick.

“The closest one to the machine, obviously,” the driver says, looking at Ben as if it is a trick question. Jim’s a big guy who looks more like a cowboy than a factory worker—hat, bolo tie, and handlebar mustache included. I even see a Louis L’Amour paperback wedged under his seat.

“So if you use the closest ones, when do the parts in these baskets end up in front of Lathe 7?” I ask, pointing at the baskets of parts near Op 10.

The driver shrugs. “Whenever we need them.”

“Andrew, please look at the date on those tags and tell me how long they have been sitting here,” says Nick.

The tags have the part number, last operation, and date they were produced in barely legible writing. Some baskets have dates from four months ago. Worse, some of the tags are red, which means they were “hot” four months ago, but ended up here instead. They should have gone into Lathe 7 as soon as possible.

“Ah, for a few months,” I say, conveniently neglecting to mention the red tags.

“But we’ll use them sooner or later,” says Ben. “These baskets hold our best sellers, our high runners. What if we have a big breakdown on an operation before Lathe 7? Then we’ll need those parts to keep Lathe 7 running.”

“How many times have you had Lathe 7 stop for a lack of parts?” Nick asks pointedly to the driver, not Ben.

I can't think of one. The driver says, "We had that huge breakdown on the CNC dedicated to these types of parts. It was down for more than two shifts. That was what, two, three years ago?" He looks at me, and I shrug. I don't remember that downtime.

"Not the question. Did it starve Lathe 7?" asks Nick.

"No, but it did drain a lot of inventory," I say, recalling the incident. "And we had to run parts on the other CNC to keep Lathe 7 running."

"So Lathe 7 did not stop for a lack of parts at that time, and hasn't for two years. How about the other way around?" asks Nick. "How often has it stopped because it is blocked, like the situation we are seeing here at Operation 10?"

"He means how often does Lathe 7 stop because they have no place to put the completed parts," I tell the driver.

"Never happens. We make sure there are always a couple of empties behind the machine. They are painted a different color to make sure they don't end up on this side of Lathe 7," the driver says.

"OK, let's review," Nick says. "Most of the baskets around the plant are full of parts waiting to go into Lathe 7. The operations before Lathe 7, like Operation 10 here, are blocked to Lathe 7, because they have no empty baskets to put completed parts in. And Lathe 7 is never starved for parts, and is never blocked for baskets. Sound right?"

Ben, the driver and I nod our heads.

"So, you have just learned one of the most basic methods to identify a bottleneck in a plant. If there is a large pile of parts before a machine, and little or nothing behind it, you have found the bottleneck," Nick says.

"Hey, I just do what Ben tells me to do," says the driver, getting defensive at the perception of being blamed for a problem. "Ben tells me to find a place to put the full baskets, and that's what I do. It's not my job to figure out why he wants me to do that. Talk to him, or Maurice, or whatever jackass who runs this company if you want to find out why anything stupid happens out here. They won't know, but at least they can provide you with a hot plate full of bullshit." He spins the forklift around and heads down the aisle, shaking his head and flipping us off.

I think back to my first days at the plant, when my first boss was handing out sage advice. “It’s human behavior and physics—never piss off the guy who is sitting on a four-ton bull with two horns sticking out front.” It seems like a good day to remember that.

I turn my attention back to Nick. With the heat and the pressure and the lack of sleep, I slide back a notch in my personality meter, which is now just above smartass. “Well, that was informative, wasn’t it? You can always count on an honest assessment of the current situation from employees like Jim.” Ben looks a little horrified that I would be so flippant with a customer, but I am not having all that great of a day. “So, Lathe 7 is the bottleneck, like from *The Gold*? That kid, Harvey, was the bottleneck?” I offer. I think that’s the first intelligent comment I have made since we have come out on the floor. Of course, I am wrong.

Nick is giving me a side look with one eyebrow arched. “His name is Herbie,” he corrects. “And the book is called *The Goal*, by Eli Goldratt. I want you to read it over the weekend so we don’t waste any time hitting the ground running on Monday.”

I sigh out loud. Great, as if I didn’t have enough to do this weekend. I should have kept my mouth shut and just continued to look like an idiot. Now I have to read a book that I remember being interesting, but pretty long. Well, longer than a text message, which is all that I have time to read these days. Maybe I can find an audiobook? Cliffs Notes? Audiobook Cliffs Notes? Will there be a test on this material?

“OK, I’ll see if I can dig up a copy back at the office,” I offer. What I am really thinking is that if I don’t happen to find one in the office, for some odd reason, then I can’t read it over the weekend, right?

“Buy the version online, so you can always have it with you. We’ll be using it during the analysis phase. Is there a men’s room out here?”

I wait outside while he’s in the john. He pops back out in a minute, writing notes on his tablet again. God, can’t the guy take a piss without that damn thing?

Chapter Six

That's Just the Way It Is...

“When I was working at my first job as an engineer, I was confused by the phrase ‘That’s the way it is here at our company’ as the answer to things that didn’t make sense. As an engineer, I believe in ‘cause and effect’ thinking. And now everyone around me was saying that there was no logic, no reasoning about what was happening around us. But I eventually found that there is a very strong ‘cause and effect’ logic in place. It just can’t be seen.

“The lack of a visibility in ‘the way things are’ environment is much like a smoke-filled room. This smoke is so dense that collisions and conflict are unavoidable. The process, while logical, is based on incorrect assumptions, which creates smoke, the unavoidable ‘effect’ of these false assumptions. This unseen process cannot be improved, so the environment will not change, and the smoke will stay in place. Worse yet, this smoke is hiding fires. These fires are found by staggering blindly into them, causing an instant crisis. The result is constant, reactive firefighting.

“There is an inherent comfort for many employees in the paradigm. It’s always smoky here. I know where most of the fires are—if you don’t, that’s your problem. In this environment, avoiding blame is as simple as pushing someone else into a fire.

“Dropping a new CI method into this smoke may not be the best idea. Usually the CI method will gradually disappear into the smoke, and then collide with the unseen logic, causing more conflict and doing little to

increase clarity or focus. It rarely puts out the fire, and may actually fan the flames.

“Management’s job, we have said at SPG, is to provide the process to lift the smoke screen and keep it from coming back. This means understanding the reasons for the problems, challenging assumptions, and creating the business process that will lead to improvement.

“It’s a systemic process. First, buy the team ‘thermal imagers’ to allow them to focus on the fires and put them out. Then have them open the windows and use fans to get rid of the smoke.

“Then put in the enablers for a repeatable process. Install air filters, buy fire extinguishers, put in smoke detectors, etc.

“Then set up the repeatable process with triggers. For this example, it might be a yearly trigger. Change the filters, check the fire extinguisher, replace the batteries.

“You move from reactive firefighting to fire prevention. You go from asking ‘where’s the next house-on-fire?’ to ‘where do we keep the batteries?’”

Blog entry from Mike Sullivan
President
Spare Part Garage



The room empties out until just Nick and I remain. My little conversation with Willie has helped my mood, and my thoughts return to the meeting.

“Listen, Nick, I’m sorry if I came off as an asshole out on the plant floor...”

“Don’t worry about it,” he says, waving his hand dismissively. “If I had been working that many hours, I wouldn’t trust myself to be around any sharp objects. How do you think the meeting went?”

“I have to say, that is the most decisive I have ever seen Maurice. I guess the threat of not getting your business has made an impression, Nick.”

He smiles. “I’m sure it may have helped. Nothing like a crisis to get things started. But don’t be too hard on Maurice. He seems like a pretty logical guy,” he says, closing up his computer bag.

“I suppose. But most of the time our management is pretty indecisive.”

“There’s a logical reason for it, but I don’t have time to go over it in any detail. The bottom line is that managers like Maurice are the constraint for decision-making, and their constraint is time. I want to go over a couple of things for you to think about over the weekend,” says Nick.

“Read *The Goal*, I know. I’m downloading it as we speak.”

“Try to have it read by Monday afternoon. You’ll need that knowledge to address my concerns about giving the contract to MegaCo,” he says. “Make sure you get through the chapter that deals with the Boy Scout hike. We can go into the details next week.”

He’s moved over to the whiteboard as he is talking, and reaches up to write in the area I just erased. “In the Boy Scout walk, the main character learns about Dependencies and Variation. We did some of that today. We walked the line to look at the sequences of operations and how they depend on each other.”

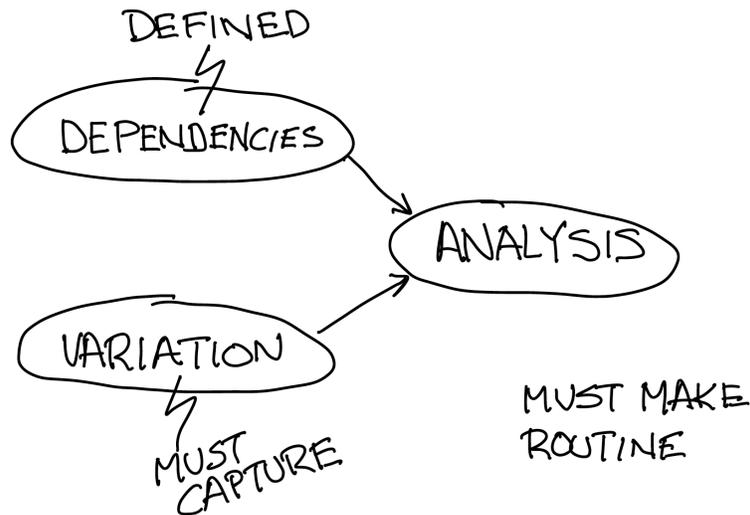
He draws an oval and writes Dependencies, and then a squiggly line that connects it with the word Defined.

“I asked some questions about variability, like when I asked Fred about the changeover times,” Nick says. “I wanted to make sure he just didn’t give me a guess of one number. At the same time, I didn’t want to hear about their all-time best or their worst ever changeover. I wanted to find the systematic variation of the changeover, not their special cause variation.”

He draws a second circle under the first, and writes Variation inside of it. The squiggly line appears with Must Capture.

“Then we did an analysis,” he says, making an oval to the right of the first two. He connects the Dependencies and Variation ovals to the Analysis oval.

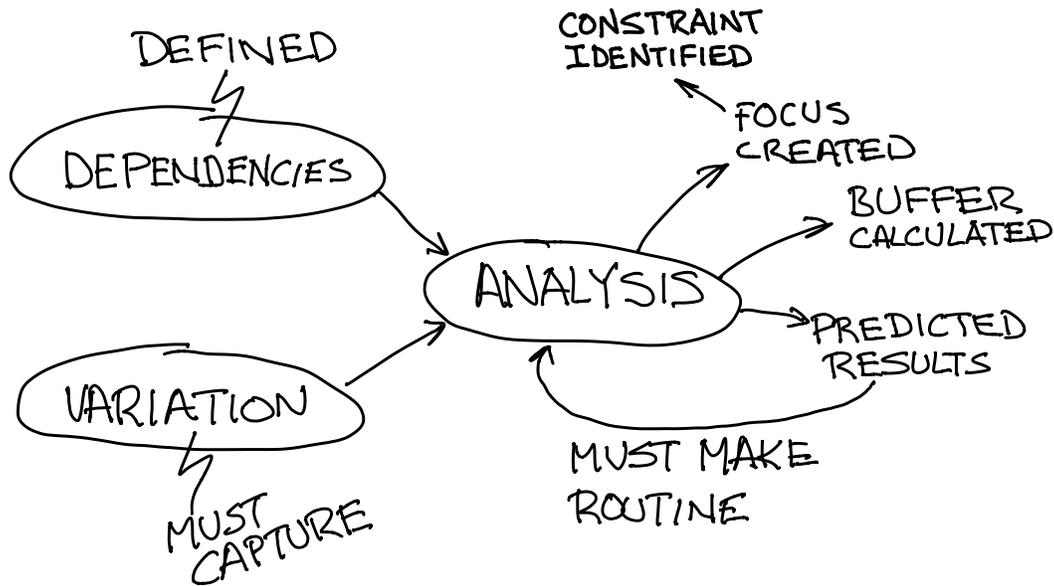
“I set up those daily meetings for a reason. The analysis we will do must become a routine.” He adds that to the whiteboard, which now looks like this:



“This analysis produced three results. First, we validated the constraint to the point that Maurice agreed to work on it this weekend.” He writes down Focus Created and then Constraint Identified with an arrow leading to it from Analysis.

“Second, we calculated the buffer size, in baskets, that we would need to ensure the constraint kept running on Monday.” He writes down Buffer Calculated with another arrow leading to it.

“Finally, we predicted the results of our decision, which is that we will have enough parts to keep the rest of the line running while we changed out the servo.” Predicted Results goes up on the whiteboard. It now looks like this:



“At SPG, we call this the Dependencies—Variation—Analysis Business Process, or just DVA. One of the basic keys for success is that we make DVA a routine so that it addresses the manager’s constraint, which I said before is time. The analysis that is created by DVA must take less time than whatever method guys like Maurice are using now, which is usually the time-honored method of ‘intelligent guessing.’ Sometimes you’ll hear it called ‘educated guessing,’ or something along those lines. Maurice has a lot of knowledge and experience about what goes on in the plant, but he has less and less time to make decisions. He has to resort to guessing more and more, hoping his decisions are correct. Crap.”

He’s looking at his watch as he flips his computer bag over his shoulder.

“Read *The Goal* first, and I’ll email you an introduction to the DVA Business Process. Think about DVA after you have read the Boy Scout story in *The Goal*.” I walk with him back to the lobby, and watch him scurry out to his rental car, waving at me as he drives out of our parking lot. I head back to the main conference room and stare at what Nick has written on the whiteboard.

I hear a rustling to my left, and I turn to see Willie scrambling on the glass wall. I reach in and grab him, setting him on the table, hoping I won’t have to clean up turtle poop. He scuttles up toward the whiteboard, as if he is reading it, but I know he is just trying to get off the table.

“What do you think, buddy?” I ask him. “Worthwhile, or the same old shit, different package?”

I decide to run an experiment while I mull things over. I put another carrot on the far side of the table. If Willie makes the effort to get the carrot, I’ll look at this stuff tonight. If he poops, it’s the same old shit, and I’ll make some excuse on Monday about why I couldn’t read it. If he does nothing, I’ll just sleep on it tonight and look at this stuff on Sunday.

He stops about two inches before the edge, still oriented toward the whiteboard wall, his head bobbing up and down as if he is trying to read something with bifocals. He realized he is too close to the edge, I think. He withdraws his head and his legs into his shell...and goes to sleep. OK, then.

I can’t help thinking that this is a defining moment. The stuff Nick has written is simple and makes sense. And yet I was not smart enough to see before today. Had I been brainwashed to think that way? I had certainly heard “That’s just the way it is at MegaCo” often enough. That always seemed to be the answer when something didn’t make sense. I had accepted it at some point as a way to give up trying to solve a problem. I had bought into the “group think,” and I was blind to the simple logic that Nick had used. I know I have to get through *The Goal* this weekend. And the DVA presentation. And the charity ride. I yawn one of those joint-cracking yawns as I think about it. “I’m going to go with your advice, Willie, and sleep on it tonight, then dive into it on Sunday. But I am blaming you for my lack of a social life.”

I get up, turn off the lights, and head out to my car, still obsessing about what happened during the day. I am halfway home before I realize that I left Willie out. I sigh and turn around, not wanting him to fall off the table and get stepped on. I go back to the conference room and flick on the lights. Willie is still asleep in the same spot, so I put him back in the tank. I turn off the lights and go to close the door—and stop. I step back in and turn on the lights. The carrot is gone.

Chapter Seven

The Bike Ride

“Even Training fits a DVA process. It requires an understanding of the steps required—the dependencies if you will—as well as the understanding that training has variation. It must have some analysis to predict the impact of training, which I like to see end up on the bottom line. This type of training is focused on improving current and managing future constraints. Not only is a time buffer necessary, but a strong routine must be created to ensure the training happens again and again.

“The typical shotgun training classes I have been a part of in the past generate interesting but not applicable learnings—basically just trivia. The primary motivation to take a class in this environment is to be able to say that you took a class.”

Blog entry from Mike Sullivan
President
Spare Part Garage



I got hooked on reading *The Goal*, and fell asleep last night after reading about the Boy Scout hike. I had dreams about being Alex, being Herbie, and getting blindsided on *Survivor*. I wake up with a start when the neighborhood squirrel decides to torture Rusty, my neighbor's dog, by chattering at him from a branch that is just high enough to cause Rusty to bark at the maximum volume and rate. His owner comes out and begins to yell at him to stop barking, because it will wake up the neighbors. I would normally be at work at this hour, thus missing this very loud attempt at conflict resolution. Instead, my brain is now fully engaged.

I head to the kitchen for breakfast. I make a large coffee, and since I have conveniently stored all of my dirty dishes in the dishwasher, I microwave a Pop Tart in a slightly used paper bowl. I scan through the DVA process training material that Nick emailed me, and find the material pretty straightforward. Per Willie's advice, I decide to apply some of what I have learned to today's charity bike ride. I scribble out a few notes on the back of a sales receipt I find on the table, and find I am pretty amped up. This will be either a very insightful day or a very frustrating one. Time to find out which.

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I show up to the charity bike ride tired, but excited to try out my plans. It's a beautiful day, sunny and only a few clouds. It's cooler than most days in southeast Kansas—only about ninety-two degrees. This is the southernmost part of the Flint Hills, and it's still green and lush. We meet up at an abandoned gas station that is in the middle of nowhere, but is close to the bike trail that will lead us to Springfield. The congregation of vehicles at this old gas station is the most it has seen since the Interstate was finished in the 1960s. I toss my keys to Aunt May, one of the volunteers who has agreed to drive cars back to Springfield. "Fill 'er up and give it a wash," I say with a smile. I own my dad's old car, a 1978 Firebird that looks like a lot of Kansas cars, with little rust but with washed-out paint, a cracked dash, a frayed interior, and bald tires. But I have added horsepower and been obsessive about keeping the engine and powertrain in top form, even if I have to pay others to do the work. Luckily, parts for the screaming chicken are easy to get.

"You gotta give this old girl some more love, Andrew," says Aunt May, who snatches the keys out of the air with graceful ease. "The car could use some work, too." May is a fixture at the Mercantile in downtown Springfield, and collects husbands like some women collect handbags. Most women her age are drooling in a senior center, but I am actually worried that she will go joy-riding up to Kansas City and start doing burnouts in a truck stop parking lot, trying to pick up truckers. "I thought I might drive it up to Country Club Plaza and leave it locked up on the street, Andy. Maybe

someone will break in and upgrade the stereo system.” Before I can say anything else, the engine growls to life. She revs the engine up to red line, making me cringe, then pops the clutch, spewing gravel into the air as she slides on to the road. I shake my head as the tires chirp as she shifts into second. I head over to the muster area worrying about the cost of new tires.

My team consists of myself, Mac, Oliver from IT, and his girlfriend, Fiona. I like to think I am a decent rider, but Oliver is easily the best. He is normally in the longer, more competitive race that takes place in the morning, but since he has brought his new girlfriend, he decided to ride in the charity race with her.

I’ve asked the team to come a half hour earlier than the original time I gave them, explaining I needed them to help me with something for work. None of them have a problem with it, and they all arrive at the time that I have requested.

I explain the basics about today’s “team building” event. It’s a charity ride that’s about thirty-three miles long. We’ve donated \$200 among the four of us, but if we make it under two and half hours, Western Bike and Fitness throws in an additional \$50.

“So, my objective is to make sure that we all get there in at least two and half hours, which will be 3:30 p.m. We all have to pass the finish line by that time, so the last rider sets the time for the group,” I explain. “It doesn’t matter who the faster rider on our team is, or which person finishes first. We want to figure out who on our team will get there last.”

Everyone nods their heads except for Fiona. All I can think of when I look at Fiona LaFlame is that Oliver is a “lucky bastard.” She looks like a tall version of Mila Kunis, with a quick sense of humor but a short fuse. She also may be a bit crazy. To be honest, I can only take her in small doses, but the biking outfit she has on today will help increase the tolerance time. She looks at Oliver and says, “That will probably be me. I don’t think I can ride faster than the rest of you.”

“Just gut it out,” Oliver says. “I’ll keep pushing you to make sure you make it there before 3:30.” Fiona doesn’t look very happy. Oliver is not your typical nerd IT guy, and is tall, thin, and fit. He is an avid bicycler, and works out a lot. And I am told by the women in the plant that he is very good-looking, if you are into that kind of thing. He and Fiona like to push each other’s buttons.

“I’m here to have some fun, not to ‘gut it out.’ I’ll toss in an extra \$50 if it means I can enjoy myself. Or I can give the \$50 to Andrew and go back to Wichita.” She is

giving Oliver a “just dare me” look that could bring the whole day to an end. Time to step in.

“Great, Fiona!” I say. She gives me a confused and challenging look, but before she can say anything, I continue. “You have clearly defined one of our Necessary Conditions. We want to get the matching contribution, but if it means that any one of us is unhappy doing it, then we can’t pursue our Objective. So a Necessary Condition is to ‘have fun.’ Any other Necessary Conditions, team?” I ask.

“Well, obviously, safety,” says Oliver. “I mean, I could have ridden in this morning’s race, but it can be very competitive, and there are accidents. I don’t think any one of us wants to get hurt trying to give away an extra \$50.”

I solicit a few more, but their responses run along the lines of “stopping for ice cream” and “avoid being bored to death listening to Andrew.” I take that as a signal to move on to the next step.

“Next, I want to do a bit of analysis first, and see if it causes us to make any changes.” They shrug. Mac says, “Sure, but let’s not make this into a big production.” Mac is a guy I have known since my Wichita days, and I got him a job at MegaCo. Mac is probably smarter than me, but life has already thrown him more curves than most people see in a lifetime. While I am single with no prospects, he is already divorced with three kids. He jokes around with me, but is usually stoic with others. His outfit is the opposite of Oliver’s, probably coming from Walmart. And where Oliver has a six-pack, Mac has a pony keg.

“Excellent. I want to do something real simple to start. I want Fiona, Mac, and myself to ride down and back to that sign post. The sign post is only about an eighth of a mile away, so it’s a quarter mile there and back. Don’t sprint—ride at the pace you want to ride during the race.”

“What about me?” says Oliver. “I can do that faster than anyone on the team!”

“I have no doubt,” I say back to him. “But we need to gather data on the slowest rider, not the fastest.” If I didn’t know Oliver better, I would say he is pouting. “Besides, I really need you to be the timekeeper.” He looks a little mollified by that.

Fiona goes first, then Mac, then myself. Fiona is the slowest, but it’s clear she is a good rider, and can handle her bicycle. Mac and I are being a little competitive, but Fiona is making a point by riding at a nice, easy pace.

“Here are the results,” says Oliver. “Fiona did the lap in 75.0 seconds, Mac in 64.3 seconds, and Andrew in 63.9 seconds.”

I do a few calculations on my phone. “We are not going to finish the race by 3:30 p.m. at our current team speed.” Fiona knows she is the constraint, and looks unhappy, but she doesn’t say anything.

“Team,” I say with authority, “what are we going to do to make sure we all get there in two and a half hours?”

“I still like the idea of ragging on Fiona,” Oliver says with a big grin.

“Not if you don’t want me to find another bike to ride,” she says, with a bit of fire in her voice. Yeow.

“That’s a good idea!” says Mac.

“What?” Fiona and Oliver say at the same time, glaring at Mac.

“No, no, I don’t mean that. I mean, what if we have Fiona ride Oliver’s bike? Let’s face it, his bike is the fastest. Why don’t we try the eighth-mile thing with Fiona riding Oliver’s bike?”

“I love it,” says Fiona. “I’ve ridden your bike before—it’s really fast! Please? Pretty please? Besides, it’s for a good cause.”

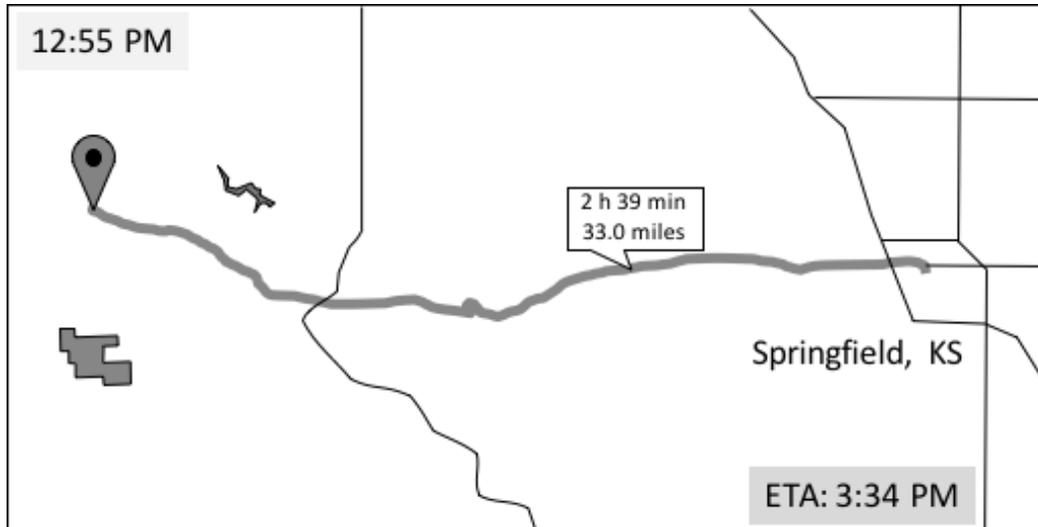
“And it will help me solve this problem I am dealing with,” I say. “Be a good sport, Oliver.”

He grimaces, but reluctantly agrees. “If she dumps it...”

“I’m not going to dump it, jerk—it’s a flat rail-to-trail path, not a mountain bike trail,” she says, getting off her bike and jumping on his bike. She rides off down to the 1/8-mile signpost and back. She’s definitely quicker, and actually faster than Mac and me. I guess that is the difference between a \$500 bike and a \$5,000 bike. And I know this particular bicycle is nowhere close to being his fastest.

I do the quick math and say, “That’s pretty good! I think we can make it with a bit of breathing room. All right, here’s the order. Fiona goes first, then Oliver, Mac, and then me. Oliver, I want you to be in charge of watching the time, and making sure that neither Mac nor I get too far behind.”

“I’ll use one of my bike apps to check on how we are doing,” he says, pulling out his phone. “It only takes a minute to set up, and doesn’t even need a network connection.” There’s a happy beep from the app, and then Oliver shows me his phone:



“I’ll set it to beep every mile and check our ETA. We might be a little behind at the beginning, so I’ll make sure we are not losing ground to our original ETA.”

“Good idea,” I say. “Go ahead and give the rest of us a thumbs-up if we are OK.”

We hear the announcement for the start of the ride, and the six or seven teams that are there line up. The whistle sounds, and off we go, Fiona in the lead. Every mile, I see Oliver give the thumbs-up signal. After about seven miles, Oliver starts to ride next to Fiona, and then I hear them talking and laughing. She’s having fun, which I know is required for this little adventure. He drops back beside me after about fifteen miles and shows me the screen. “We are looking good, captain,” he says. “Our ETA has dropped to 3:21 p.m. But we have a few hills coming up, so we’ll probably lose a couple of minutes. Overall, though, we should make it.”

“Great. Keep checking the ETA each mile, but you can just slow down and talk to me if we are having a problem.”

“I’d rather just keep giving you the thumbs-up. Fiona likes to see our ETA improve every time it beeps. She gives me this huge smile when she sees we are on track.” He grins and rides back to her. I hear his phone beep a minute later. He gives me a thumbs-up and shows Fiona his phone, and she gives him a smile that makes me smile. I look over at Mac, who is smiling at me after he sees Fiona smiling. I guess that’s as good as a reward as there is.

I start to think about what Nick wrote on the board in the main conference room. It's clear that our little team is dependent on each other to reach our goal—we can't leave Fiona behind. Oliver is like many in the plant—he sees this ride as an individual competition, not a team event. That's what he is used to, because that is how he is measured.

It's also clear that I have captured enough data to understand how fast the team will go. I would have preferred to have Fiona do more test laps, but I don't have that luxury. She was really booking it on the one lap she took with Oliver's bike, so I took that into account when doing my analysis. She'll probably average one or two miles an hour slower during the ride, but who knows? It's variability.

The Analysis was easy at that point—the rate of the slowest rider, the Constraint. After that, we set up a Routine to validate that we are on track. We all get a nice Reward by seeing Fiona's smile.

I end up riding next to Mac, and we catch up on the latest. I explain a bit about constraints, DVA, etc. He listens, asking questions as we ride. "Seems like common sense," he says. "But if it's so great, why don't more companies use it?"

I'm not sure, which bothers me.

Mac tries to answer his own question. "Probably comes down to time and gambling. You've made it clear about the 'manager's constraint is time' thing. But people love to guess, and believe that their ability to guess well is an innate skill and not just luck. Lottery commercials are a great example. Just go to the slot machine where all the smiling, well-dressed people are, pull the lever, and 'Look!' you and everyone else just won a lot of money. It's all based on your ability to pull a lever at the right time." He shakes his head, but then turns the conversation to my lack of female companionship and wonders if he should start calling me "Father Andrew." Ha ha.

The time goes quickly, and I'm surprised when the ride is over. We end up five minutes ahead of the two and half hours, and Western adds our team name to the "\$50 matching gift" list. We head to a nearby bar, where we end up eating things that will hurt my stomach and drinking things that will hurt my brain. It's great.