Dan Ruble Full Interview_Final

[00:00:02] Santhra Thambidurai: Welcome to the eighth episode of the Numeracy Report. I am Santhra Thambidurai. I'm a math teacher, a math coach, mother of two, and a lifelong learner. The reason why I started the show is to learn how math is used in different industries so that I can illustrate to students why they're learning what they're learning.

[00:00:04] Santhra Thambidurai: Today I'm speaking with Dan Ruble. Dan is the co-owner of PME Equipment, a sales representative firm that provides equipment and designs production lines for food, pharmaceutical or industrial manufacturers in New Jersey, New York and Connecticut. Dan has applied various areas of mathematics in several engineering and sales roles over the past 30 years. When not working, he is an avid pickleball player and enjoys spending time with his family. Ladies and gentlemen, put your hands together for Mr. Dan Ruble. Dan, very nice to have you on the show.

[00:00:47] Dan Ruble: Glad to be here. Good morning to you.

[00:00:49] Santhra Thambidurai: Yeah, I'm so looking forward to this conversation because like I mentioned to you earlier that while every single episode has been really fascinating and talking to different people who I don't usually talk to, you are the only or the first business owner that I'm talking to. And that is exciting for me because and it's inspiring also because you found a way to do something of your own and provide something of your own in this world, which definitely requires courage and creativity and also self-direction. So I am excited for this conversation.

[00:01:35] Dan Ruble: I'm looking forward to it as well.

[00:01:37] Santhra Thambidurai: So can you, to help our listeners understand a bit better, can you describe your work?

[00:01:46] Dan Ruble: Yeah, absolutely. So as you mentioned, I do own a sales rep firm and we specialize in selling equipment. So I'll give a few examples. It's equipment that we go into factories and it could be a food manufacturer, a pharmaceutical manufacturer, chemicals, plastics, and other industrial types applications. So for example, if I'll throughout this whole chat that we have, I'll probably use examples from the kitchen because everybody can relate to that.

[00:02:18] Dan Ruble: So if you have a jar of spices at home, we potentially could be providing the equipment that measures the six ounces that goes into every jar. Or if you take your KitchenAid mixer at home and you make it about a hundred times bigger and you put it in a factory that's making cake mixes that go into boxes, that type of stuff. So it is large scale manufacturing, it's production lines.

[00:02:43] Dan Ruble: And as you kind of alluded to, although we sell equipment, the way that we succeed in selling that equipment is to kind of serve as a consultant to our customers and help them design the flow of manufacturing, the labor that goes with it, how the product moves throughout the various steps, so on and so forth. So there's quite a lot to it.

[00:03:04] Santhra Thambidurai: Yeah. I mean, it's fascinating because you are an engineer at your core and you are merging that with business and consulting and really keeping it interesting. So when somebody places an order with you, do they typically give you the mass of the product and tell you to design something that holds that? Is that what usually happens and you have to figure out other things based off of that?

[00:03:41] Dan Ruble: Yeah, it varies from customer to customer. And in a lot similar to a lot of sort of industries in general, companies are equipped differently. So for example, if we're working with a multinational food manufacturer, chances are they have a pretty substantial engineering staff and it's therefore it might be a document that says, we know exactly our requirements. It's this, this, this, and this, and provide equipment that can do those things.

[00:04:10] Dan Ruble: In other instances, it could be a small business where it's one or two or three people and they'll say, hey, we've been hand mixing spices for the last five years. We want to get into some automation. This is the recipe. This is the various particle sizes, the densities.

[00:04:29] Dan Ruble: And this is how much of it we want to make. And this is how what we want to pack it in because they could be, for example, making jars that would be going into a person's kitchen. They could be selling it in 25 and 50 pound bags that could be then going to another manufacturer to use in their processes. So we do a lot of what we call business to business or B2B type work. And then we also do business to consumer or B2C type work.

[00:04:58] Dan Ruble: So the neat thing for me and the reason I was very interested in talking to you is because of my background and what I do, I really do get a chance to apply math in a lot of different ways on a daily basis.

[00:05:10] Santhra Thambidurai: Yeah, that's awesome. Can you give an example of how perhaps you use geometry in designing custom machinery?

[00:05:25] Dan Ruble: Absolutely. So the easiest example that I can use comes into what I would refer to as a storage bin. So in a lot of processes, whether it's filling into a mixing line or filling into a packaging line, there needs to be storage and capacity. So we could have a bin that let's just say hypothetically needed to hold 1500 pounds of material. Well, we would know based upon the available height, the available footprint in that area, what sort of space we have to design that bin.

[00:06:01] Dan Ruble: Then we would know based upon the materials, not to get too technical, but one of the terms that we come across a lot is called angle of repose. And basically what that means is if I was to pour a powder onto a table, it's not just going to roll flat like pouring water. It's going to start to form a peak as you pour it. And the worse flowing that material is, the steeper that peak will get. So I've actually seen materials where I would pour it on a tabletop and it would actually look like this, almost look like hands praying. It would be that steep.

[00:06:35] Santhra Thambidurai: Right.

[00:06:36] Dan Ruble: If you have a material that is that steep, you can't just have a hopper that is very shallow in terms of angles.

[00:06:45] Santhra Thambidurai: Yeah.

[00:06:45] Dan Ruble: So then we have to start looking at the angle of a hopper, which basically a hopper is going to be a cylindrical section and then a conical section. And so from an industry standard, you would say that the typical hopper angle is 60 degrees. For most materials, 60 degree angle, that product's going to flow.

[00:07:05] Santhra Thambidurai: Okay.

[00:07:07] Dan Ruble: And then we can look at that and using sine and cosine to know that if the top of the hopper has a three foot diameter, the bottom of the hopper has a six inch diameter. Well, we're tapering down from that upper diameter to the lower diameter on an angle. We calculate using sine and cosine how tall that's going to be. And then we would know in turn if that's going to fit in the available space.

[00:07:33] Santhra Thambidurai: Okay.

[00:07:36] Dan Ruble: Interesting. In some cases, it might be a 70 degree angle because it's that really difficult material. It won't flow on a 60 degree angle till we have to get a 70 degree or even 75 degree. So in doing all of that, we then know will it fit in the space? And if it doesn't, what provisions are we taking? Are we going to shorten the hopper? Are we going to say, well, we can design you a hopper, but it can't hold 1500 pounds. It can only hold 1200 pounds, things like that. So a lot of geometry in that design of a bin.

[00:08:39] Santhra Thambidurai: Are there any other examples of math or do you use any statistics at all in your business?

[00:08:47] Dan Ruble: A little bit of statistics, but there's all sorts of other examples of math. So, and I'll just throw a few sort of random ones out there, and then obviously we can delve in deeper as it makes sense to do so. So simple things going back to the hopper situation, I said that I need to have a hopper that holds 1500 pounds of material. Well, a hopper holding 1500 pounds of salt, which is a pretty dense, heavy material versus holding 1500 pounds of milk powder, which is very light and fluffy are two entirely different hoppers.

[00:09:20] Dan Ruble: So we get into a lot of mass volume density calculations, for example, to know, because ultimately I'm not being asked to design a 1500 pound hopper. I'm being asked to design a hopper that has a volume of whatever cubic feet that is. So there's a lot of that that takes place. I may be told by a customer, I want to produce 5 million pounds a year. I need to then start some calculations and asking questions. Is it a single shift operation or three shifts? Is it five days a week or seven days a week? Is it eight hour shifts or 12 hour shifts?

[00:10:00] Dan Ruble: And from there really kind of getting down from that 5 million pounds a year to saying, okay, they really need to produce 625 pounds an hour. Right. And then knowing based on the steps required to do that, is that a one person operation, a two person operation? Is that machine that they have because they want to reuse an existing piece of equipment, can it achieve that? So there's a lot of sort of calculations. And then if we look at it from the business side, we start looking at a big part of my job is just helping customers justify the purchase.

[00:10:38] Dan Ruble: In some instances, we might be selling a piece of equipment that's $3 million. Well, what's that customer getting for $3 million? And the answer might be, they're currently working two shifts and they only have to work one. So then we have to understand how many operators they have and what's the labor rate and what's the cost of electricity and taking all of those factors into account to say, well, by cutting from two shifts to one shift, you've saved yourself $1.6 million. So you have an ROI under two years. Right. Things like that.

[00:11:28] Santhra Thambidurai: So when you do, excuse me, cost benefit analysis, like what you were talking about, what kind of software do you use or do you use any software at all?

[00:11:39] Dan Ruble: Yeah. So we've always tried to find software, but the problem is that every customer has so many different variables that it would take forever to design that software. I mean, there is some basic modeling things that are utilized and stuff like that, but you start talking about like, and again, I don't want to get too caught up in details, but you start talking about like the cost of cleaning equipment because you buy this automated equipment and that's great, but it's going to cost you money to clean it every time.

[00:12:13] Dan Ruble: So what's the cost of that and the labor and the utilities. And so by the time you start kind of stacking all of that up, you really end up with this thing that has, I don't want to say an infinite number of variables, but literally hundreds of variables that can come into play. So ultimately to answer your question, it's a lot of pen and paper and Excel spreadsheets.

[00:12:35] Santhra Thambidurai: Okay. I see Excel. Excel is used a lot.

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[00:00:10] Dan Ruble: Yeah. Yeah. And a lot of volume calculators and things like that. So even just going on to the internet and doing searches like the volume of a cylinder, the volume of a pyramid, just to try to get those geometries that we were talking about to understand, to make sure that what we design meets that capacity. So there's a lot of sort of those internet tools that already exist as well. But yeah, it's definitely sometimes just pen and paper.

[00:00:38] Santhra Thambidurai: Yeah. You had talked a little bit that you do use a little bit of statistics, but do you use any to track your company's performance? Do you use that kind of tool to help with that?

[00:00:55] Dan Ruble: Yeah. So we have a CRM system that kind of does a lot of that for us in terms of like forecasting, quote, the closed date, things of that nature. We try to keep track of like, if a project doesn't come to fruition, why? So we and it's not very sophisticated, but it's enough to try to identify trends like are we finding that this particular product isn't selling because the price point is too high? Level of investment can't be justified, things like that. So there is a little bit of that.

[00:01:30] Dan Ruble: Some of the statistics that we get involved with and it's indirectly from a day to day basis, but we work with our customers a lot on testing equipment. And so, and the best example of this is mixing and blending. So we do a lot of systems and I alluded to spices. It's a very easy example to utilize where a customer is going to take and we'll just say hypothetically, salt, pepper, garlic and parsley. And they want to make a marinade that's going to go on to meats or vegetables or whatever.

[00:02:01] Dan Ruble: So. So they may go through blending for 15 minutes, take a scoop sample and analyze the percentage of parsley in there compared to the percentage of parsley in their good end product. And they might take 20, 30 samples and look at a standard deviation of the parsley flakes to determine if that's a suitable blend or not.

[00:02:35] Santhra Thambidurai: Okay, I see. Interesting. Okay. Yeah, that is a great example of how you use statistics in your work. That's awesome. How did you get into this business? How did you come across this idea of starting this business?

[00:02:58] Dan Ruble: So basically, I've been in this industry for almost 30 years and going way, way, way back to my college years, I actually took an internship at an equipment manufacturer and worked as an engineering associate, just doing some sort of junior engineering type work. And then continued in engineering roles, sort of project management, design engineering, things of that nature, and had an opportunity within working for a business, not my own business, working for a manufacturer to become more of a regional salesperson. So I would support sales reps.

[00:03:38] Dan Ruble: So I was familiar with the sales rep model and how it worked. And it just became, I kind of came to the end of my road. I was sales director for North and South America for an equipment manufacturer. And really outside of relocating, I kind of had got

to the end of my road staying in New Jersey and I didn't really have an interest in relocating. So the next opportunity for me was to go out on my own.

[00:04:02] Santhra Thambidurai: Yeah, yeah, that's amazing. Did you feel a lot of fear when you did that or you were ready?

[00:04:09] Dan Ruble: Definitely fear, obviously going from the liability of having a consistent paycheck. But in fairness, the company that I did get involved with, it wasn't a complete startup. It was an existing company where a gentleman had retired and I bought his insurance.

[00:04:26] Santhra Thambidurai: Oh, I see.

[00:04:27] Dan Ruble: I see. I see. Cool. So there was it mitigated the risk that there was an established customer base.

[00:04:35] Santhra Thambidurai: That makes sense. If you were to go back in time, you know, what kind of math would you have perhaps like to learn during your high school years that would better help you right now? Or what would you or what would you say to a current math student? Let's let's make it simpler.

[00:05:03] Dan Ruble: Yeah.

[00:05:04] Santhra Thambidurai: Who's interested in this in this in this in this career?

[00:05:07] Dan Ruble: So it's so admittedly, I am the biggest math fan on the planet. Going back in time, I tried to take every math class I could. So yeah, that's probably not a better way to ask is the second way that you asked that question.

[00:05:21] Santhra Thambidurai: Yeah. Yeah.

[00:05:23] Dan Ruble: I mean, obviously being an engineering driven field that I'm in, geometry and trigonometry is a huge part of it dealing with shapes and calculations and things like that. It segues very nicely into physics and forces and those types of calculations. So I probably would have had it not directly answering your question, I probably would have been more interested in physics than I was, if I'm being honest.

[00:05:53] Santhra Thambidurai: Right, right. Had you known this is the path you work with? Did you know at that time like that you wanted to go into engineering?

[00:06:01] Dan Ruble: No, because coincidentally enough, at that time, I thought I was gonna be a teacher.

[00:06:06] Santhra Thambidurai: Oh, yeah.

[00:06:09] Dan Ruble: And specifically, I thought I was going to be a high school math teacher.

[00:06:12] Santhra Thambidurai: Oh, wow. Wow. Awesome.

[00:06:13] Dan Ruble: Yeah. Yeah.

[00:06:13] Santhra Thambidurai: So I mean, your path took you in that direction. And you just followed, you know, the break in.

[00:06:19] Dan Ruble: Yeah. Yeah. And realistically, and I kind of alluded to this earlier, being in a sales rep firm and kind of a pseudo consultant, I kind of satisfy that passion by looking to educate my customers. So I kind of try to bring that teaching skill set into my job. But, but yeah, no, and it's funny that you didn't bring this up because I have my youngest son's high school junior. And I legitimately have the argument with him almost on a weekly basis about math.

[00:06:53] Santhra Thambidurai: Yeah, yeah.

[00:06:54] Dan Ruble: And the classic, I'm never going to use this. So why do I have to learn it?

[00:06:58] Santhra Thambidurai: Oh, wow. That is incredible. So there is a huge, you know, motivation for you. Wow. Yeah. I mean, you know, I really hope to support teachers, you know, provide value to teachers who can then support students in recognizing, you know, how math is used and how they can apply this in any field. I feel like if you have a quantitative mindset, that kind of, that will always help you, you know, but it's just harder to convince kids. Yeah.

[00:07:38] Dan Ruble: No, and that mindset is exactly right. Because any time in life when you're solving a problem, one of the best ways to solve a problem is to take apart the problem and understand what is known, what is unknown, and then what you have to do to figure out the unknown, which is essentially a word problem.

[00:07:58] Santhra Thambidurai: So, yeah, yeah, yeah. But would you, I mean, thinking back to your math education, would you, I'm just thinking about this question now, would you, what would, if, what have done differently would have helped that math education?

[00:08:18] Dan Ruble: That's a good question.

[00:08:21] Santhra Thambidurai: Was it at that time, was it more just, you know, giving a problem and just doing pen and paper kind of thing? Were there any projects and stuff at that time?

[00:08:34] Dan Ruble: I think the, I think that going back, because we've kind of just alluded to this, I think if I would have understood that learning this was helping me to think differently.

[00:08:51] Dan Ruble: and that being actually conveyed by a teacher to a student, I think the power of that would have been pretty significant.

[00:09:03] Santhra Thambidurai: Right, right. And it's interesting because teachers tell students quite a lot all the time, and I feel like it's very powerful when it comes from somebody else. It's just like when your parents tell you something, you're like, oh, okay, you're just saying that. And similarly, similar role as per teacher, where teacher says to you, you're a math teacher, obviously you're gonna say math is important.

[00:09:31] Santhra Thambidurai: But it's powerful to hear from people who are outside of the education industry also. And so I'm really grateful that you took the time to the project. So yeah, very, very thankful to you about that.

[00:09:49] Dan Ruble: No, awesome. And the other thing I would say to any person who's that high school age in particular is, and I'm sure if we talked to a thousand people, 999 of them would agree with this, what you think your life's gonna be and what you're gonna do when you're 15 and 16 years old almost never mirrors what actually happens when you're in your 30s, 40s, 50s, et cetera.

[00:10:14] Dan Ruble: You never know where life's gonna take you, what you're gonna be doing, and again, it's understanding if you're able to think, if you're able to solve problems, that that skillset applies no matter what you're doing in life.

[00:10:29] Santhra Thambidurai: Right, right, that is awesome. I mean, that's a fantastic advice. I totally, totally agree with you on that. And it's a process, right? Life is a process and you just experience it and take opportunities and just run with them. While we're wrapping up the conversation, is there anything that you'd like to say to a teacher who's impacted your life?

[00:11:01] Dan Ruble: There's so many teachers. Yeah, just the patience, the ability to have a classroom with 20 kids with 20 different minds and 20 different personalities and being able, the best teachers I ever had all had one thing in common, and that was that they were able to look at the classroom of kids and understand that each of those kids had different needs, different ways of understanding things, different ways to be reached and being able to apply that.

[00:11:33] Dan Ruble: So to any and all teachers, I'm in all of that ability it's one thing to know material and one thing to present material. It's another thing to connect to human beings, regardless of age. And for me, going from an engineering role to a sales role, learning things like empathy and emotional intelligence and not... and not getting past the point where I would get angry because surely everybody should understand me the way that I communicate.

[00:12:09] Dan Ruble: And I know that's not necessarily math related, but that ability for anybody to connect with different people from different walks of life, with different experiences, different ways of understanding that's the strongest skillset any teacher can have. And any one of the teachers that I remember, they all had that in common.

[00:12:34] Santhra Thambidurai: Yeah, yeah, I know. That's really great to hear. I also wanna thank all the teachers who nurtured you and supported you and kind of helped you become the person you are. So, yeah.

[00:12:51] Speaker 3: But anyways, Dan, I've learned so much from you in this short time and would love to keep talking, but I know you have a business to run.

[00:13:01] Speaker 4: Yeah, time to plan.

[00:13:04] Dan Ruble: Got customers waiting, unfortunately.

[00:13:05] Speaker 3: I know, I know. So thank you so much for your time.

[00:13:09] Santhra Thambidurai: And it's been really lovely.

[00:13:13] Dan Ruble: Now, this has been a lot of fun. Thank you very much, Nasser, I appreciate it.

[00:13:16] Santhra Thambidurai: Take care.

[00:13:17] Dan Ruble: Yep.

Introducing Dan and Concluding.mp4

[00:00:39] Santhra Thambidurai: Listeners, I hope you enjoyed this conversation just as much as I did.

[00:01:06] Santhra Thambidurai: If you know anyone who is passionate about the way math is used in their work, whether it's yourself or somebody else, please reach out to me. I'd love to talk to them.

[00:01:17] Santhra Thambidurai: Detailed on my website, numeracycoach.com. If you enjoy this content, please subscribe. And if you know anyone who could benefit from listening to the show, please share with them. Until next time, adios.