

CERAMIC TECH CHAT

Episode 55

Title – “Processing pathways for the next-gen workforce: Tim Powers”

INTRO

McDonald: “I’m Lisa McDonald, and this is Ceramic Tech Chat.

For many people, jobs are simply a way to pay the bills. But if you are fortunate, you’ll land in a career that inspires your passion.”

Powers: “One of the things that I always felt, I’ll use Mark Twain’s quote of ‘If you do something you love, you never have to work a day in your life.’ And I think there’s those kinds of opportunities in glass and ceramics. There’s a lot of hard work, but a lot of fun at the same time.”

McDonald: “That’s Tim Powers, who worked as the engineering design lead for glass furnace rebuilds in the Insulation Division at Owens Corning before his retirement. He currently serves as chair-elect of the Ceramic and Glass Industry Foundation Board.

In today’s episode, Tim shares his personal experiences working on some of the most well-known products produced by Corning and Owens Corning and describes how he is now supporting the next generation of ceramic and glass engineers through the CGIF.”

(music)

SECTION 1

Powers: “I knew I wanted to be an engineer, and I went to Ohio State. I didn’t really declare right away, but I really liked chemistry, I liked physics, and it seemed like ceramic engineering was a good blend of that. So, I started at Ohio State in ceramic engineering.

I graduated and then went to work for Corning Incorporated, at the time it was Corning Glass Works, and that’s where I started my career.”

McDonald: “That’s awesome. So, how did you end up at Corning then? How did you decide to work there after graduation?”

Powers: “I was actually a summer intern. I did some work on extrusion dies at the Erwin Ceramics plant, where they make catalytic converter substrates [from cordierite ceramics]. And they offered me a job and said, ‘Hey, why don’t you come back and work for us?’ So, that’s how I started with Corning, and I worked at that plant for four and a half years as both a process engineer and a lab supervisor.”

McDonald: “So, when you say process engineer, what does that mean?”

Powers: “So, as a process engineer, I really worked on looking at physical properties, whether those were in spec, whether we had trends that we needed to look at. And specifically, I looked at material shrinkage, and there’s a lot of things that go into that. And believe it or not, we had some specs like plus or minus 30 thousandths on a lot of these [products]. So, it was important to understand that and what drove a lot of those things.”

McDonald: “So, this information that you were learning about, material shrinkage, what types of products were you creating with this knowledge?”

Powers: “It was really focused on making the catalytic converter substrates that Corning is renowned for. They’ve been making them for over 50 years. It’s been integral to emissions controls in a lot of cars. And after being a process engineer, then I ran the laboratory where we did physical properties testing and released lots of, 50,000 catalytic converters at a time. So, it was kind of a dual role.”

McDonald: “That is so cool. And I know also in the October/November [2024] issue of the *Bulletin* that just came out, we had an opportunity to talk with Corning, and I know even now for them, emissions control remains a very important division within their company.”

Powers: “And then after that, the plant manager asked me, ‘How would you like to be in production?’ I said, ‘Well, I’m not sure about that, but tell me about it.’ And then I went down to the refractories plant. Talk about two ends of the spectrum! We had a plant with almost 500 people in it to a plant with 36 people in it. And it was a very hands-on opportunity. But I got to experience directly supervising hourly employees and hitting production targets and making products for customers.”

McDonald: “That’s really nice that you had the experience kind of doing some of the hands-on research yourself, and then when you transitioned into the managing role, because then you had probably a better idea of what the people you were managing were up to.”

Powers: “Sure. I was at Corning for actually almost 15 years. So, after the refractories plant, then I went to the Parkersburg plant and managed their mixing and melting department making Pyrex tubing.”

McDonald: “What is Pyrex tubing?”

Powers: “So, Pyrex is a historical glass that’s been around since 1915. Originally, they made a similar product for lamp globes, meaning oil lamps. And if it rained, it was common that the glass would break. So, they developed this glass that was low thermal expansion, and you could rain on it and it wouldn’t break. And somebody actually gave it to their wife, and she baked something in it and said, ‘Hey, we should do something with it.’ And so that became Pyrex bakeware. And it’s so durable, particularly the 7740 [borosilicate]

composition that Corning has historically made for many, many years, is very durable, and we used it for pharmaceutical tubing.”

McDonald: “That is really neat, that you were able to do so many different divisions of Corning and see all the different things that they offer.”

Powers: “Sure.”

McDonald: “So, was there anything else that you did at Corning? Or was that your journey?”

Powers: “No, that was it. And after that, I decided to start my career with Owens Corning, which are two different companies, by the way. Owens Corning was founded by Owens Illinois and Corning back in the 1930s. Corning is still its own company, but Owens Corning is focused on pretty much commodity products, building products. So, their focus is really how do you make those the best in glass.

So, with Owens Corning, they were starting a brand-new product. It was called Miraflex. It was a binderless fiberglass. And they were starting up a pilot plant. So, I got to be part of that team, and that was my beginning of working on fiberglass.”

McDonald: “So, for our listeners, can you tell us some more about exactly what is fiberglass, how it’s used in today’s society?”

Powers: “So, there’s a couple different types of fiberglass. One is the Insulation Division. Like if you know the Pink Panther, that’s the mascot that Owens Corning has used for many years. We made the pink fiberglass that we put in the walls of your home and in the attics. The other type of fiberglass is what they call continuous strand, and that’s used for reinforcement products. So, if you think about probably the biggest use today, it’s used in windmill blades. They’re very lightweight, but it becomes very strong and it’s a very important product in making things lightweight and strong.

So, I started in the Insulation Division. We went through this development. It turned out the product was somewhat novel, there are some things that didn’t work well with it. But we were really trying to, from an environmental standpoint, reduce our environmental footprint by eliminating binder in the system. It didn’t work as well as we’d like, but we learned a lot. Even though we would say it wasn’t successful as a product, we learned a lot about how to make our standard product through that. And we actually implemented quite a few improvements over the years that has carried us through for 30 years.”

McDonald: “And I think that is really important to recognize that learning what doesn’t work can be just as important as what does work, so that way you can know which pathways not to pursue anymore and really home in on the best one.

Out of all these different products that you worked with, do you have a favorite type of material or product?”

Powers: “Since I worked so much on fiberglass, I would say that’s it. And I was working on it at a higher level, meaning that I was looking at it from a ‘How can we build a process and improve that process?’ You know, when you’re in manufacturing, it’s pretty much day to day, and ‘How am I doing today and can I do the same thing tomorrow?’

In the staff position that I was in at Owens Corning, we could look at some longer term, some longer range things. One of the projects that I worked on was that I designed and started up the first gas oxy-fuel furnace for insulation within Owens Corning in North America. It was a huge learning opportunity. There are some things we didn’t do so well, but we learned a lot from that. And after two generations of that design, we were able to make a furnace that literally has broken records for tons of throughput during a campaign, longevity of campaigns, and lowest [capital] cost per pound of material.”

McDonald: “That’s very exciting, to be in that position where you’re able to see these big gains and how much of an effect it really does have on the industry.”

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SECTION 2

McDonald: “We’ve talked a lot about, you were very focused on the process of ceramic and glass manufacturing. But you’ve also become interested in the process of how we entice more people to go from being students to being young professionals working in these different fields. And part of that interest has culminated in you becoming on the Board of the Ceramic and Glass Industry Foundation. So, can you tell us a little bit about what is the CGIF and how does it help support this getting people involved in ceramic science and engineering?”

Powers: “So the Ceramic and Glass Industry Foundation has two parts. One is how do we attract and inspire the new generation of materials science, whether that’s in high school, whether it’s working with our PCSA [President’s Council of Student Advisors] members. But then the other part of that is on the industry side, is how do we engage industry? How do we help industry with a pipeline of new engineers that can help support their mission, which is to make a product which is beneficial to society and financially viable for them.”

McDonald: “So, let’s talk a little bit about how did you first become aware of this need for more students to be inspired by science, specifically ceramic and glass science? When did you kind of become aware of this need in the workforce?”

Powers: “What I saw in my career is that there’s a real need for good ceramic engineers. From a support standpoint, understanding how materials work. You know, and I don’t mean this...mechanical engineers and even chemical engineers, their focuses are a little bit different. Materials engineers sometimes look at things both macroscopically and microscopically, if that makes sense. And we’re very process driven. So, that is something that when we’re looking for someone to fill a role within our company, we’re looking for that person that’s process driven, that understands how things work.

The perfect person would be somebody that's worked on a tractor somewhere and, you know, grew up on a farm and then decided to become a ceramic engineer or a materials scientist. Those would be perfect. But there's room for all kinds of people in our industry. But the materials science background provides that really process knowledge. And particularly when you're troubleshooting, when we would have a stoning issue or we would have some other issues, understanding what those mechanisms might be that you can backtrack that problem to, that's where your materials science background really comes into play. So, that's a very important part.

And I got involved not only from the design standpoint but from the operations standpoint. And operations is really a process, you know, it's really understanding the process, helping the plant work through any issues, working with corporate facilities that might be looking at a defect through an SEM. You might be getting a chemical analysis on something to say, 'Hey, what could be causing this to be off composition?' Those sort of things."

McDonald: "I think that's really key, is that, like you said, we need these materials science, ceramic engineers educated in positions all along the chain. You know, not just maybe at the basic research side, but also on these process sides, upper management sides, to really help make a holistic community that can really drive the production forward."

Powers: "Sure."

McDonald: "So, when did you learn about the CGIF?"

Powers: "Yeah, certainly when I was at Ohio State in ceramic engineering, I was a member of Keramos, the ceramic fraternity. It's been around for a long time; I think really goes back to about the same time as The American Ceramic Society. But it's a way to get students involved in The American Ceramic Society. They do give scholarships; I think I got a \$50 scholarship when I was in college. But it's also a way to get students involved in something other than just your studies. It's outside, and we would get involved with industry partners in The American Ceramic Society when they would have like a quarterly or an annual dinner. And they always paid for us, it was like something other than dorm food, so that was fantastic.

So, I was certainly involved off and on with The American Ceramic Society over the years, but then I wasn't aware of the CGIF. But then I worked closely over the years with Bryn Snow, and Bryn when she heard I was talking about retirement, she said, 'You know, I think you'd be a perfect person to be on the Board for the CGIF.' And I said, 'Yeah, I think that'd be something I'd be interested in.' So, I looked into it, and I just thought that was a really fantastic opportunity for me to get involved and to really promote materials science and engineering."

McDonald: "With your time at the CGIF, what has been some of your favorite activities that you've helped to support or volunteer for?"

Powers: “Well, I wore my Hotbels shirt today. Marcus and I went down to Lexington two years ago and last year as well, and we gave a paper to the industry. Hotbels is a great opportunity to talk to many different people that we might not normally have an audience with. So, we may go down there again next spring. It’s just a nice venue because, again, a lot of these people may not necessarily be involved with The American Ceramic Society, so it’s a way to educate them what we do and why we do it.

And then the other one, the GLOW [Glass Learning Opportunities Workshop] event, it’s basically a hot glass. We had middle school students from Granville Middle School in Granville, Ohio, and they came over to The Works in Newark, and we had three different stations for them. We had a panel of people that are in the industry and also academia and materials science, and they got to ask them questions and they talked about what they did. But then I got to be out in the hot glass demonstration and explain. And some of the things I asked them is, ‘Where do you see ceramics around you?’ And the most noticeable is glass. And we talked about why glass is clear and that sort of thing. And then we got to make a [glass] pumpkin, which is really cool.”

McDonald: “That’s the best part, right? We all need our pumpkin patches.”

Powers: “Yeah. That was a good day. And the kids asked good questions, so it was a good day.”

McDonald: “So, as you continue working with the CGIF—as you mentioned, you’re chair-elect right now, so in 2026, you’ll become the chair itself of the CGIF Board—what are you most looking forward to with the future of the CGIF?”

Powers: “Well, I think that the focus in the next couple years is making that connection with industry a little bit stronger. And then we’ve done some fantastic work within Ohio. We’ve gone to Colorado now with some of our workshops that we’ve done with teachers. We’re starting to make some connections with some of the National Science Foundation folks. But how can we support teachers? There’s more and more materials science being taught in high schools now. So, how do we support those teachers with some of our kits that we can grant to people?

And then some of the other things I’ve been involved with is while we’re doing the teacher training, they invited us to have lunch with some of the teachers and we could talk, some of us in the industry, could talk about here’s how we got into ceramic engineering, here’s the kind of jobs that we did. And that’s very valuable because when they talk about this is why we’re doing this ‘How Strong Is Your Chocolate?’ and those type of things that we have in our kits, they can talk about here’s how you might use this in industry, this is why we do some of these things.”

McDonald: “That is fantastic.”

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BREAK

McDonald: “The Ceramic and Glass Industry Foundation supports the next generation of materials scientists through a variety of activities funded through generous donations by individuals and industry sponsors. You can support the CGIF’s mission by donating to the Foundation at foundation.ceramics.org/donate.”

SECTION 3

McDonald: “When you’re talking with people about your experience as a process engineer working with glass, what do you think is a fact that maybe is most surprising that people don’t realize about the glass manufacturing industry? I know before we started recording the interview, we were talking some about how difficult it might be to fire up a glass furnace.”

Powers: “Sure. You know, one of the things that I did for many years was to not only design but start up glass furnaces. And what’s unique about a glass furnace operation, glass melting operation, is that once you build it, it takes about 40 days to tear one down and build it up, which is almost the equivalent of tearing down and building a new house in that period of time. So, it was a very intense process.

It takes about two weeks to gradually heat those blocks up. Each block is about one ton, is about 2,000 lbs. And there might be 150 blocks that make up that sidewall assembly. Heating that up at a very slow pace and then filling it in with molten glass takes about two weeks. But then we run that for 365 days, 24 hours a day, for 10 years and we never shut it down, so that creates the challenges and opportunities.

And, you know, getting calls at 3 o’clock in the morning, ‘Hey, can you help me with this?’ is just something that goes along with the job. But it’s one of those things that you’ll look back on and say, ‘Hey, remember when we did this?’ and ‘Wasn’t this a fantastic outcome, even though it was hard work?’”

McDonald: “And that’s all we can ask for from a job, is that we’ll have fun with it even if it is hard work.”

Powers: “Sure.”

McDonald: “With all of your experience over the years, do you have a favorite story that you’d like to share?”

Powers: “When I first started with Owens Corning, I worked on the Miraflex project. We did a pilot plant operation and then concurrently we were building a factory to make this material. We started up the factory, I was part of that team, we were running the glass. It literally had gone six weeks without making any acceptable fiber, running lots of tests. And about five of us brainstormed and said, ‘Hey, why don’t we put this surfactant on?’ And I said, ‘You know, I know where I can get some.’ So I called up a buddy of mine that

I used to work with in Parkersburg, West Virginia, and he said, ‘Yeah, I can get you a quart of that.’ So I literally drove two hours down to Parkersburg and back on a Sunday evening with a peanut butter jar full of surfactant. And we put that on, and we ran the product, and we made our first acceptable product in six weeks. And from that I ended up being named on the patent for that application.

But it was a great collaborative, really satisfying to say, ‘Hey, let’s put this on there,’ and it worked. And it was just a small thing that we missed in the development of the product. But people were patient with us because they knew it was a development. And that was definitely an aha moment. So, I think anytime you have those aha moments, that’s when you look back and say, ‘Wow, that was really fun.’”

McDonald: “Yes, definitely. That is a great story to just really show how much the hard work and dedication pays off, even driving somewhere on a Sunday evening.”

Powers: “Yeah.”

McDonald: “Awesome. I think we’ve been able to cover most of the questions. Is there anything that we’re missing that you want to talk about?”

Powers: “I think I’ll just conclude by saying that ceramics and glass have given my family and myself personally a challenging and rewarding career. And, you know, if there’s people that are saying, ‘Should I go into ceramics or glass?’ there’s lots of opportunity out there and if you don’t mind working hard. But we do want those new engineers to come in and say, ‘Hey, this is what I want to do.’ And so I hope they can also find that same challenge and inspiration that I found when I went into ceramics and glass.”

McDonald: “And who doesn’t want to be associated with the Pink Panther, right?”

Powers: “Yeah, sure.”

(music)

CONCLUSION

McDonald: “Finding a fulfilling career can be challenging, but as Tim showed, ceramic and glass manufacturing is one great option for people who want their work to benefit the world.

I’m Lisa McDonald, and this is Ceramic Tech Chat.”

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“Visit our website at ceramics.org for this episode’s show notes and to learn more about Tim Powers and the Ceramic and Glass Industry Foundation. Ceramic Tech Chat is produced by Lisa McDonald and copyrighted by The American Ceramic Society.

Until next time, I'm Lisa McDonald, and thank you for joining us."