



Sloan Career Cornerstone Center

Profiles of Mechanical Engineers



Martin Alexander, P.E.

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Education:

MS, Mechanical Engineering, MIT
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Job Description:

Vice-President of Engineering Services, providing consulting services in the areas of environmental noise, vibration, and architectural acoustics.

Advice to Students:

"Be really open-minded. Some of the best jobs are not the traditional jobs."

Video Transcript 1:

"Oh, I wanted to be an astronaut. I really got interested in engineering and science, because the space program was just unbelievably fascinating to me. Then, as a teenager, I became very interested in automotives. So, I made the decision for mechanical engineering between the aeronautics of old interest, and the automotive interest. And, I was a musician, playing in a number of groups in high school and in college. And I did some studio work. And I became very, very fascinated by the technical aspects of the recording industry, and how a recording studio was built, and the electronics of this. And, so, this acoustics interest sort of lay dormant, almost, through my career."

Video Transcript 2:

"What got me through it was, I knew I'd find another job. I networked. And I viewed it as an opportunity that I might not have taken, had I not been laid off. I might not have left the job. But having been left of the job, it forced my hand to make a little bit of a career change. And, so, in hindsight, I view it as a positive aspect. I mean, we all have to live through it, and you have to make the best of it, and look at it as an opportunity to do something better."

Interview:

I took a job back in New Jersey partly because of location, and partly because it was a small firm, a consulting firm, and it seemed to me that I'd have more opportunity for growth in a small firm. A lot of people overlook smaller firms, because they are less stable. There's no doubt

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about it. But, the advantage of a small firm is that you have more freedom to make what you want of yourself, and that means more career opportunity.

Q: Name, rank, serial number.

Alexander: Yeah. Okay. My name is Martin Alexander. I'm a mechanical engineer, with my education at Cooper Union, here in New York City, and, a master's degree from MIT. And I've worked in the field -- the eclectic field of acoustics, for the last, twenty-odd years. And, on the weekends, I play rock-and-roll and blues, in a small -- in a small group. So, that's the rounded picture. I have a family. A wife and -- and two children; one at University of Michigan, and one who's going to be going into the middle school in Summit, New Jersey.

Q: Please describe your work with Bruhl and Kerr?

Alexander: The work with Bruhl and Kerr involved, very often, going over to the factory, which is in Denmark. This is a Danish company. So, that's always been really exciting, because I'm now familiar with getting around another country. Going over there, I get to meet people who are doing what I do, who are engineers -- mechanical engineers, electrical engineers -- in different countries. And the thing that's really fascinating is there's a similarity of experience, but then there are these sort of unique differences, which mostly have to do with the attitudes, in the countries, towards regulations. And so quality of life issues. And when you get involved in acoustics and environment noise and employee noise exposure -- you know, quality of life issues and regulations really rank high on whether or not people are interested in that area or not. And there's a real difference in Europe versus the United States. But, on the other hand, there are a lot of issues which have to do with marketing and competition and what people are interested in, which I find are the same. I mean, I can sit at a bar, and I'm talking to a guy from the United Kingdom, from Scotland, from France, from Italy, from Hong Kong and from Japan, and we all have the same sort of experience, even though the countries are so vastly different. And that's because people are people. People are really people, all over the world.

Q: Characterize that experience, please. What is it?

Alexander: Well, a lot of times, it has to do with the factory telling the local subsidiaries that "you're the only one complaining about this issue; nobody else has your complaints; everybody thinks it's the right thing." And when you get in the bar, you talk to the everybody-else, they say the same thing to the factory, and the factory gets the same story from them. That's not always the case, but -- it's unusual, uh -- it's just -- I don't know, it's electrifying to meet people from all over the world, and to find that there's a much larger commonality of experience than there are differences. And that -- that, obviously, is getting more to be the case with communications growing. I mean, even talking to people who -- I was talking to the people who handle what used to be the Eastern Bloc countries. And that was a vastly different experience, because nobody could talk about anything. And, now, there's an opening and a lot more freedom; so that's changed. That changed a lot, too. So, there are the aspects that I've discovered, over the years, that you really have to be open to not only opportunity, but to sort of extending yourself into areas that you never really might have thought of, when you were a lot younger.

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Q: How did that happen to you?

Alexander: Well, the way I sort of got involved in different areas was that I always enjoyed the personal contact aspect of my work. I never worked in a, quote, "straight engineering" job, inasmuch as I either worked in consulting or sales and marketing. And in consulting, a lot of the work you do is really client interaction. And I always, from a very early stage in my career, provide expert testimony. Testimony at hearings and in court cases. And a lot of people hate doing that. That's the aspect of the job they really dislike, and I always found that electrifying. And I always enjoyed teaching. And, so, I sort of looked, in my mid-career, when I was about thirty, I said, well, maybe I want to change this; maybe I want to sort of get more into the personal aspect --still in engineering -- either in management or marketing. And I actually signed up to a program, at Rutgers, to get my MBA. That was a big thing in the seventies. You know, engineers going for their MBA. About the same time, I was laid off of my job. And I interviewed for a number of positions, some of them straight engineering, some of them at other consulting firms. And then one position -- at Bruhl and Kerr Instruments, which is a company that makes test instrumentation for laboratories and for acousticians, which has been my field. And, I said, I want to try something different. And I -- I really wanted to be different. And, so, I took the job at Bruhl and Kerr, which was involved in sales, and lecturing and marketing. My fear, at the beginning, was that this would be a non-technical job. It turned out that it was more technically demanding than a lot of the work I had been doing as a consultant; mainly because you had to be an expert in understanding a lot of different areas of acoustics. I was a little bit more narrow in my acoustics background. And, all of a sudden, I'm working in modal analysis and lecturing in modal analysis, and lecturing in signal processing. As a matter of fact, I went back to Cooper Union, my alma mater, and I lectured there and -- to a class, an electrical engineering class, in signal processing. And it felt pretty good, as a mechanical engineer, going back and -- and doing that type of -- type of work. So, that was sort of the mid-point, when I got more involved in marketing. And what I've really discovered and I tell a lot of -- especially younger engineers, that I talk to, is that you always have to sell yourself. You're always selling, no matter what you do. If you're an engineer at a board, there's always a point where you have to sell your idea or your concept to either your management or to your company's customer. And, so, at every level, people do more than just the straight engineering --- especially if they want to be successful. They have to be able to sell their concepts and themselves. And that's sort of the lesson, in the lecture I give to a lot of people, that communications skills are really important, from the -- the first interview for a job, to, uh -- you know, when you have to go for that promotion, or whatever it is. So, they have to put emphasis on that, as well as the, engineering aspects of your education.

Q: What did you want to do when you grew up?

Alexander: Oh, I wanted to be an astronaut. I mean, I really -- I -- I got interested in engineering and science, because the space program was just unbelievably fascinating to me. I can remember being ten or eleven years old, and saying I want to be an astronaut, but I wanted to be involved in the sciences. And in aeronautics. And that was sort of my first interest. Then, as a teenager, I became very interested in automobiles. I mean, you know, hot rods and sports cars, and I got extremely interested in -- in how cars are designed, and how they actually work, and the various aspects that make cars do what they do. And I had a very close friend who was also interested in that. We sort of fed on each other, and actually became roommates and went through college together. So, I made the decision for mechanical engineering between the aeronautics, of old interest, and the automotive interest.

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But during my high school years -- actually -- people ask me why I'm an acoustician, and I can date it to 1964 and The Beatles on Ed Sullivan. That's my -- sort of my running joke I mean, when John Lennon was murdered, I went into mourning, because my whole career was really based on the fact that I had this innate interest in acoustics, from my experience as a musician. And, I was a musician playing in a number of groups in high school, and -- and in college. And I did some studio work. And I became very, very fascinated by the technical aspects of the recording industry, and how a recording studio was built, and the electronics of this. And, so, this acoustics interest sort of laid dormant, almost, through my career. And I went up to graduate school, and worked in bio-engineering, because I had support from the NIH. And, while up in -- in graduate school, this -- this acoustics interest was reborn, when somebody walked into my lab and said, "Oh, I'm looking at the course catalogue for next term; there's a course in acoustics taught by Amar Bose. Do you think that's the guy who makes the loudspeakers?" And three or four of us took his course. And then I ended up taking a course in the architecture department, and a course in the mechanical engineering department, and got back to this acoustics interest, and found that mechanical engineering -- mechanical engineers probably make up, if not the majority, the biggest sector of acousticians, inasmuch as noise control work, which is a big part of acoustics, really requires a good understanding of fluid mechanics, of mechanics of mechanisms. I mean, why -- why does something make noise? It's either because the gears don't mesh right, or because there's turbulence in the flow. And, so, an understanding of that aspect of engineering becomes important if you want to work in acoustics. And, then, I ended up working in acoustics. And that's what I've done for the last twenty-five years. (Laughs) Twenty-five years that I've been out there. Either as a consultant, or in sales and marketing for a company that focuses on acoustics and vibration, which are, obviously, closely related.

Q: Tell me about some of the technical papers you wrote.

Alexander: Oh, I have to remember those. Let's see. I think we were talking before we got together here. The first paper I did was about noise control in the bottling industry. I had done, back in the early years of my career, a lot of work for the people who bring you beer. Anheuser-Busch and others. Beverage World, I think was the name of the magazine, which doesn't have technical articles, but, at that point in time, noise control within the industry was a big issue, because it's extremely noisy. I mean, it's -- well above the limits that can cause hearing damage, if not -- if the employee isn't protected. So, they were trying hard to reduce the noise in bottling plants. So, I wrote a paper on that, based on some of our experience. Sort of the most fun paper I wrote was a paper I gave at an Acoustical Society conference, on measuring speech intelligibility in orthodox synagogues. Now, the problem in synagogues is that they can't use a sound system. Because, when you turn it on -- and, actually, even when you speak in the microphone, you are effectively, in the view of the orthodox -- orthodox Jews, creating a fire, which is not allowed on the Sabbath. So, on the Sabbath, they can't use speech reinforcements. So, the really issue is, how, in a larger synagogue, can you make sure you have enough acoustic power flowing to the congregation, so that it can be heard. It's -- it's also exacerbated by the fact that the rabbi doesn't face the congregation; he faces the ark; so, his back is to the congregation. And, so, I did some work for an orthodox synagogue, with a friend of mine, where we used an instrument to evaluate the speech intelligibility in the synagogue. And then did some sort of makeshift modifications to see if we could improve that by putting up some reflecting panels. And it was just a fun project. I mean, I -- I grew up in Brooklyn, and I grew up in the orthodox synagogue - my grandmother's synagogue. And, so, I never even thought about that as an issue, because I was in the basement. Here we were, in

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a big synagogue, and they were trying to figure out a way that they could improve the acoustics of the space. So, I joked, when I gave that paper, that I wasn't sure if I was going to present it to the Acoustic Society or the Rabbinical Society, because it was sort of a weird paper to present. So, that was sort of a fun paper. And then I've done sort of more straight-up papers on traffic noise, on evaluating the noise from like landfill projects, and the ways that people can -- the different descriptors and the ways of looking at the noise. Because noise is really complex. I think one of the reasons it's always been interesting to me is -- it mixes in it, sort of equal parts of engineering, physics, psychology, physiology, sociology. I mean, when -- when you're looking at a noise problem, it's as apt to be a problem because the people have some other grievance against the noise generator. But noise is easier -- you know, it's -- it's a power plant that's noisy. And they may not like the utility, because the rates just went up. But it's easier to complain about the noise. So, there's a lot of different aspects to it, in evaluating why people might complain about the noise. And some of the papers I've done have been involved in that. And that's one of -- one of the areas that makes it fascinating, that you have to understand people as well as the mechanical processes, to really solve them.

Q: What's the quick synopsis -- born here, I went to school here, I took these jobs, here, here, here; I did this and that. Just the one-minute -- the one-minute preview of Marty.

Alexander: Okay. I've sort of kept my hands in a lot of different areas, and that makes it interesting. Because no day brings the same thing. That's what I like about it. I mean, there's a lot of challenges. I'm always solving problems. Whether I'm solving problem -- a problem for a customer who is trying to evaluate the noise from one of his machines, and he doesn't even know how to measure it so he can determine what it is, to -- oh, designing an auditorium. Or designing a church -- the acoustics of the inside of a church, so that the liturgy sounds good, in the church. So, it -- tonight, I'm going -- and we talked about it a little bit -- I have to leave, from here, and go South Jersey, where I'm testifying for Lucent Technologies, which is -- used to be AT&T Bell Labs, and they have a small start-up facility in South Jersey, and they're going for planning board approval, to build this. And one issue is the noise that this facility will generate, and its impact on the community. So, I had to do an evaluation of that, and I'm going to be presenting my findings to the planning board. And that's a lot of fun. And you get grilled, a little bit, but I find that fun. So, I've always had sort of an eclectic job, as opposed to a -- a more narrow job. But what I've found, over the years, is that any job is as varied or narrow as you want to make it. In any company. in anything. So, I talk to guys, in some companies, and if they have the initiative, they find -- they can take on other responsibilities, that helps them, and they can get involved in areas that aren't straight engineering. And I think that's what makes things interesting for people.

Q: In all those transitions -- Cooper to MIT, to this job, to that job, to that -- what were some of the factors that influenced those transitions? Some that you planned; some that you didn't plan; some that showed up; some that surprised you. Or not.

Alexander: Well, I mean, if I go through in my -- let's see. How did I get to Cooper Union? Somebody mentioned it, in gym class, when I was in high school. I'd never heard of the -- the school. And decided to apply to it. And, certainly, when I found out that it was tuition-free -- I mean -- and had a fantastic reputation, that was a big factor in going there. And MIT, was really -- I -- I thought Boston was a great place. Having visited Boston, it was just -- wow, this looks like a neat place to live. And it was sort of hard to not say yes to MIT. Just because of

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the reputation. Career-wise, one of the influencing factors is -- after a couple of years in Boston, I really wanted to sort of get back closer to my family and my wife's family. I was married in the middle of graduate school. And, so, I took a job, back in New Jersey, partly because of location, and partly because it was a small firm, a consulting firm, and it seemed to me that in a small firm, I'd have more of an opportunity for growth. And, a lot of people overlook smaller firms, because they are less stable. There's no doubt about it. But, uh -- it has the advantage, in that you can -- you're more apt to be able to make what you want of yourself. You have sort of more career opportunity, I think, in that. And then there was this -- the big move was really after doing that for about ten years, and decided that I wanted to try something that was not pure engineering. And I got involved in sales. Which was -- it's tough. At the beginning, going from a -- a job where you're viewed as an expert, to a job where you have to sort of prove what you know -- you know, people -- when the salesman calls up, nobody wants to talk to you. And so that took a little bit of an adjustment. But I found that -- I made that a challenge, as opposed to a -- something that would de-motivate me. And, that's worked out well. And then I got involved in marketing and stuff, and -- and, again, continuing in consulting. So, in one sense, I've made decisions; but, in another sense, I think there -- you know, there's this, invisible hand that sort of pushes you. Either it's subconscious or it's the way the economy is, or other factors in your life, you know, your marriage maybe, and maybe your -- I mean, a lot of people, nowadays, sometimes their job choices are -- are a function of their spouse's jobs. You know, location wise or availability wise. All my jobs have not been nine to five. My father said, when I was growing up, that he wanted his kids to go to college, so that they'd be able to work normal hours. He was a retailer. And what I found is nobody works normal hours. I mean, there's no such thing as normal hours. I get up, in the morning, and I'm -- I boot up the computer, at about a quarter after seven in the morning, and check my E-mail. And I'm out at night, a lot. I go out -- I leave the house at ten o'clock, because I have to measure some acoustical source that it's not quiet enough around, until midnight. I travel a lot, and I'm away from home. And that's a little bit of a stress on my -- my family. Less so, now that the kids are getting older. But there are aspects of work, other than what you do, nine to five, in the office, that often determine your career path, and, what you'll do.

Q: Tell us -- say something more about what some the aspects might be. Some of those things that students would not necessarily think about.

Alexander: Well, a lot of -- I find, if I talk to most of my engineering friends, there's a lot of travel involved. Either -- either because they do that -- that traveling, or because it's required with their job. And there's a lot of off-hours. I have a friend who works for Exxon, and he wears a beeper. He's at our house for dinner, and the beeper will go off, because he's involved in their environmental and regulatory issues. And sometimes, that has an impact on your family life. If you're married and with children. And you have to work around that. You have to make sure it isn't -- you have to satisfy your boss. But you also have to satisfy your other boss. Which is your spouse. And your kids. I mean, my son, you know, gets upset when I go on trips. I'm going off to Denmark, later this month, and I'll be gone for six or seven days. And, every once in awhile, I'm gone, and he has a concert at school, and you know, you try to work around the family issues, as well as the professional issues, as best you can. And it takes a lot of understanding between husband and wife, to do that. And, often, it's the wife that travels more. I mean, you have to get away from this view that -- I know, I have a friend who is a consultant and one of the reasons he did that was his wife travels a lot, in her job. She's an engineer, too. They're both engineers. And he wanted to have more time to spend at home, be sort of the house-husband, and raise the kids and take care of the house. And,

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so, that was the career decision, in his life, that high-dose decided that he wanted a job that he can make his own time, and maybe give up some of the advancement and the monetary rewards, just so that his wife, who was more into the corporate structure, could do that, and somebody would be home to take care of the kids, and take care of the household. So, there's a lot of aspects that we don't think about, when we're students, that, do affect our decisions, later on.

Q: What kind of advice would you give to students? ...

Alexander: I mean, I think, they really have to be open-minded. And ask the right questions. I think most engineering students know they want to be engineers, but I don't really think they know what engineering -- the breadth of engineering careers involve. And that can be really wide, from working for a large corporation to private practice, as a design engineer. They should recognize that interpersonal skills are important, and see if that's what they like to do. You know, if that's where their strength is, are they comfortable with that. They need to develop it, anyway, because you're always going to be working with other people. But they need to be really open-minded, in terms of -- some of the best jobs are not the traditional jobs. I have a good friend who works for Imagineering, at Disney. And he designs the acoustics for the rides. I mean, I'd give my eyeteeth. That's the greatest job in the world. I mean, it's got to be -- you're making things fun. So, you really have to be open-minded, in terms of careers, and keep your ears open, and talk to a lot of people. And, they'll give you insight. Your professors are a help. Especially if you have some sort of part-time professors, who are at the university, while they're having -- while they have a normal job. I had a lot of teachers like that, at Cooper. And those people can give you a lot of insight into what goes on, in the corporate world, and their real life experience.

Q: You mentioned, earlier, that you were laid off. How did that happen, and what got you through it?

Alexander: Oh, that was in Nineteen-eighty/eighty-one. And business got real slow. The economy was slow. And the fellow I was working for decided to close up shop. It turned out to be a temporary situation. And he laid off the staff. Actually, in a strange sense, it was the only long vacation I've had. At about three weeks in, I knew I was going to get another job, and then I just painted the house. What got me through it was, I knew I'd find another job. I networked. And I viewed it as an opportunity that I might not have taken, had I not been laid off. I might not have left the job. But having been left of the job, it forced my hand to make a little bit of a career change. And, so, in hindsight, I view it as a positive aspect. I mean, we all have to live through it, and you have to make the best of it, and look at it as an opportunity to do something better.

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