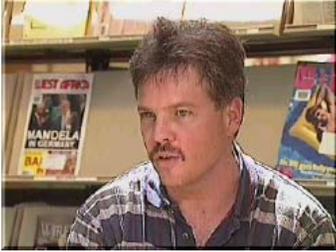




Sloan Career Cornerstone Center

Profiles of Mechanical Engineers



Thomas Bean

**Corporate Counsel
Manufacturing - Telecommunications R & D
Lucent Technologies
Holmdel, NJ**

Education:

JD, Rutgers University
MS, Systems Engineering, Cornell University
BS, Mechanical Engineering, Cornell University

Job Description:

Corporate Counsel, focusing on the legal issues surrounding intellectual properties.

Advice to Students:

"Study hard and to soak up information like a sponge while they're in school because it's a marvelous opportunity. There is so much that's easily available to learn at that stage."

Comments:

Tom's work in the Quality Assurance Audit Division and benchmarking made him aware of the legal implications of adopting "best practices" from other companies, and this led him back to school for a law degree and to his current position as Corporate Counsel.

Video Transcript 1:

"Engineers tend to certainly make substantial decisions about products, and they tend to find themselves moving into higher-level positions where a lot of the fundamental decision-making about markets and market strategy are derived as well, because the markets are very much based on the technology we're producing. So it's not unusual and unlikely to find engineers in virtually every type of functional activity that goes on within the corporation."

Video Transcript 2:

"There were a number of legal issues that we had to address, including things such as protection of intellectual property, anti-trust issues. When companies of large size get together and share a lot of information about cost and prices, there are anti-trust issues that arise, and I found them to be sort of difficult to deal with as a technical person. And I thought I'd like to get a little bit better handle on being able to deal with them directly, and that kind of spurred me on to an interest in law."

"Profiles of Mechanical Engineers"

Prepared as part of the Sloan Career Cornerstone Center (www.careercornerstone.org)
Source: "Careers for Mechanical Engineers" © American Society of Mechanical Engineers

Interview:

Q: Tell us a little bit about your work.

Bean: What I'm involved with is consumer products. Mechanically, we're involved with taking the industrial engineering design, which is the overall shape of the product, and taking that shape and developing only the internal plastic features that are required to achieve the interfaces with the electrical, such as the charge contacts, charging the phone. This is a cordless phone.

Q: Right.

Bean: So there's a charging issue. We have an antenna interface. We have PWB basically, so much within plastic.

Q: That's what Don Stills's group was into. PWB design, analog.

Bean: So, we are in the interface to Industrial's design team. We also interface with the manufacturer. So, we're focused primarily here on the design of injectable plastic. That's the primary. There are some other substances. There's rubber for keypads. Some sheet metal work based on charge contacts. Some optics for LED problems, things like that. That's the primary interface. It's a broad role.

Q: Is the intent for insulation or heat transfer, vibration protection, or longevity, or just physical integrity?

Bean: The intent of the design is to meet a product-function criteria, which is based around the environment.

Q: Is that a CAD-CAM tool, you're talking about.

Bean: It's a CAD-CAM tool, taking the pro-engineer developed product or model, the mathematical model. Moving that through some flow analysis, some of what your injections are going to look like, if they're going to have certain texture issues, some things like that.

Q: What was life like for you as an engineering student?

Bean: Well, that's a good question. It was quite a few years ago now, so I have to sort of hearken back to that. It was an enjoyable life. I remember enjoying a lot of the things that we were doing, a lot of the labs and hands-on work that we did, and I tried some of the extracurricular events that went on outside of school as well.

Q: Where'd you go to school?

Bean: I went to school at Cornell University, in Ithaca, New York.

"Profiles of Mechanical Engineers"

Prepared as part of the Sloan Career Cornerstone Center (www.careercornerstone.org)
Source: "Careers for Mechanical Engineers" © American Society of Mechanical Engineers

Q: Undergraduate, graduate?

Bean: Undergraduate, and once I graduated from Cornell, I started with AT&T. One of the reasons I started with AT&T was I was interested in going for a master's degree, and at the time, AT&T was sponsoring that. So, it looked like a good deal for me.

Q: What did you do about graduate study?

Bean: Just to continue to develop some skills and knowledge and to diversify. As it was, I wound up going for a master's degree in systems engineering, following a mechanical engineering degree, and I thought at the time that I'd like to do that. It would be far easier to do it, at the tail end of school, rather than wait some time and try to get back into studying it.

Q: So tell us about the job that you have had since then?

Bean: OK, I began at AT&T, an organization that was responsible for developing quality-assurance audits for manufactured products or test procedures and those sorts of things. So, we're involved in characterizing what features and requirements were necessary and how to go about measuring those, both physically and electrically, and that sort of thing. And I moved from that point, as more of the company's products began to be focused on software, to looking at software engineering. And, within the company itself, I began to acquire some knowledge about software and software engineering through courses internally and externally and started to move into that area.

Q: What's the connection between the mechanical engineering you studied and software engineering?

Bean: I think the thought processes are very similar. The basic discipline of engineering problem-solving and reasoning, and taking a very structured and disciplined approach to characterizing the kind of capability and functionality you want to create, are very similar. So it wasn't -- I didn't think it was a very difficult transition.

Q: What job title did you have?

Bean: I moved from being a member of Technical Staff to supervisor and then to being a technical manager, which is the position I hold today.

Q: I understand that there are two tracks at AT&T, one is technical and one is more supervisory. What is your position?

Bean: The two tracks do exist. They've existed pretty informally at AT&T until recently, and within AT&T now there is going to be a more formally recognized track. One of the things from an engineer's point of view I think is nice about this company, is it has a very strong technical focus, and regardless of what I think of title, people are able to take on challenges and be fairly entrepreneurial and wind up with substantial responsibility for engineering large-scale systems and the like. And although we're going to become a bit better at formally recognizing that, I think that's something that engineers have always had a lot of flexibility in doing here, much more so I think than people with other backgrounds who work in the company.

"Profiles of Mechanical Engineers"

Q: And then?

Bean: Well, we moved into doing some work that was really focused on the systems level, at process engineering and process improvement, which was focused on some engineering modeling. And one of the things that we were doing was to look at what other corporations were doing in this area, and in arranging to do that I found that there were a number of legal issues that we had to address, including things such as protection of intellectual property, anti-trust issues. When companies of large size get together and share a lot of information about cost and prices, there are anti-trust issues that arise, and I found them to be sort of difficult to deal with as a technical person. And I thought I'd like to get a little bit better handle on being able to deal with them directly, and that kind of spurred me on to an interest in law.

Q: You studied where?

Bean: I studied at Rutgers University and just recently graduated and am now trying to get into good study habits to study for the bar exam, which is coming up in a month or so.

Q: As you look back over the kinds of things you've done, what kinds of things have you enjoyed? What are some of your accomplishments?

Bean: I think some of the problem-solving that was required to start to launch new ideas within the company. Along with Jerome, we've really created this whole benchmarking process with him --the Bell Labs portions of AT&T -- and kind of conceived it and molded it and created it, put it in place, and tried to attract people to be interested in it, so it grows. I think the ability to go from idea to physical reality has been particularly worthwhile to me.

Q: If you could give any advice to students -- freshman, sophomore mechanical engineering students -- given your experience, what would you tell them?

Bean: Well, I'd tell them to study hard and to soak up information like a sponge while they're in school because it's a marvelous opportunity. There is so much that's easily available to learn at that stage. It becomes much more difficult, I think, once you leave, to have the same amount of information available for you to acquire and to focus on developing fairly broad skills. I think I found in my case that what I do today is not very much like the classical mechanical engineering that I studied many years ago. But, nonetheless, a mechanical engineering background, I think, prepared me fairly well in terms of general approach to problem-solving and thinking things through. And I'd tell them to follow their gut in terms of what they'd like to do and I think they'll find there's a number of opportunities in a variety of areas which may intrigue them over their careers. I don't think you need to be uni-dimensional in your career. There are many different things that you can consider and may wind up doing.

Q: Who are the people you have to keep in contact with in order to do that?

Bean: Oh, a whole variety of people. Certainly, many, many people in the technical community who have engineering degrees, but also people who have marketing and sales and finance backgrounds, people who run manufacturing locations, people who run service

"Profiles of Mechanical Engineers"

Prepared as part of the Sloan Career Cornerstone Center (www.careercornerstone.org)
Source: "Careers for Mechanical Engineers" © American Society of Mechanical Engineers

centers, and customers who are attempting to use some of the more complicated products that we produce. So, it's quite multidimensional.

Q: What's the role of the engineer in how decisions are made at the company?

Bean: This company has a fairly strong technology and science core, and I think engineers tend to make substantial decisions about products and they tend to find themselves moving into high-level positions where a lot of the fundamental decision-making about markets and market strategy are derived, as well. Because the markets are very much based on the technology that we're producing. So it's not unusual to find engineers in virtually every type of functional activity that goes on within the corporation.

Q: Who has influenced you in your career?

Bean: I guess there are many. I think that for a lot of us, people in our families, and parents and siblings and other relatives who provided a lot of encouragement and support to enable us at least to get through school and into the first job. I think once you go to work, you find that mentors are available and very important. I had a number of people throughout my career show me the ropes and kind of explain to me how things work and how to go about solving new kinds of problems that I hadn't grappled with before, that they had grappled with. So I would suggest it's very helpful to sort of hitch yourselves to the rising stars and coattails of others who've gone before you, and that you can learn quite a bit from them that'll be helpful to you in your career.

Q: Talk a little about the "process" of how you work.

Bean: More and more we're being concerned with not so much the issues of IQ, but the issues of EQ, or emotional intelligence, the learning organization. We talk about the importance of establishing efficient processes. We talk about the importance of sharing information, so that everyone who's involved on the team is on a common ground and has the appropriate information for them to do their work. And we talk about the importance of the people dynamics and the team aspect of how we need to work. When you have creative people, generally they're people who have a myriad of different strengths. Now, to work as an individual as one might do in an academic program, you only have yourself to struggle with. But now we've got teams of five or 10 people that you're working on, and you need to respect and appreciate, if not tolerate, and learn to exploit each other's strengths without understanding why they're successful since you can't replicate them. Now, what I think is even more paramount in importance is the significance of your will to succeed. And your desire to look within yourself -- to express your work excellence, and draw on your academic background, which has provided you a grounding and a platform, but does not solve the problems for you. Most of the problems that we work on at AT&T are problems that have no cookbook solutions. We can get ideas from different models that we've worked with before. But generally, each time we work with a different customer on a different problem set, it has something unique and unusual to it. So, we can't completely reuse ideas or models or mechanisms or architectures that others or ourselves have accomplished before. But we seek to use them as a stepping stone to the solution. But, as many people will tell you, the differentiator is, adding the unique value and the unique way of combining what you've known before, and stretching a little bit farther to create something that performs better.

"Profiles of Mechanical Engineers"

Q: Is it that aspect, and those things, that help keep the job stimulating?

Bean: The stimulation comes from having an inquisitive mind and a desire to work and a desire to get some measure of your life satisfaction from producing something -- either with your mind or with your hands in some form.

Q: Talk about the social importance of some of the things that you're doing.

Bean: Well, in terms of what I like to believe, with regard to the social effects of the work that I do, I look at it on a few different levels. First, is the immediate level that I feel in terms of the people that I work with, the people who pay me to do what I do, and the customers that I work on behalf of. Those are very real people that I see in face-to-face situations periodically, and I like to think, that through establishing cooperative and respectful working relationships, we can truly aspire to “win-win” situations or at least negotiate towards struggling through what's necessary to get to that point. And then, ultimately, in terms of the products that we leave behind. A civil engineer can look at a bridge or a building that was built, a mechanical engineer can look at a piece of equipment or machinery, and a software engineer can look at something too. But I like to think that the type of work that I do -- which is involved more with intellectual property and information to influence strategic decision-making -- that what we see behind us, are the decisions and the shifts and the paradigm changes that are made by the management that represent our customers and that hopefully, they're using their resources more efficiently. And, hopefully, the people who are working in those organizations are finding more meaningful work and not working under the brutal conditions that people of generations ago had to endure.

Q: Jump to the notion of the engineer and what we think of as a competitive environment.

Bean: Sure. Well, I would say that my experience from being in school is, as every one is quite familiar with here, you're continuously being tested. You're continuously being asked to prove yourself. I feel as though that is an area in which, particularly our Western society is overdeveloped. And, as we are evolving into a more abstract, boundary-less world, that issues that are more abstract -- such as trust, conviction and commitment -- become more and more important. And so, the struggles that you have aren't so much head-to-head competition with the person sitting next to you, or so much another company who's in a similar industry, because our future security in terms of work productivity isn't coming from what we can copy from other people or replicate that was already done. But, rather, from what we can innovate through our creativity. And so, it's going to become less and less important, in my opinion, to spend our efforts trying to figure out how to “out-compete” someone or run faster because merely being smart and fast is not what's required to succeed. It's more and more important to be adaptable, flexible -- the ability to change, and let go, and to realize that the capabilities that have brought you to where you are now in your career are now going to be useful. They'll take you to where you're going to be going in the present moment, or in the future years of your career, and you'll continuously need to reinvent yourself by continuously learning. And as we talked about many times today, I think that the formalism of an engineering program is just one phase of career and life development. What's required for those people who will thrive and not merely survive, is to have a very passionate interest, and not something that you talk yourself

"Profiles of Mechanical Engineers"

Prepared as part of the Sloan Career Cornerstone Center (www.careercornerstone.org)
Source: "Careers for Mechanical Engineers" © American Society of Mechanical Engineers

into. It's something that you develop and it's something that you continuously need to refine, as you continuously let go of things that are obsolete. And they're becoming obsolete faster and faster with the advancements of technology. So, flexible minds are what are going to make all the difference.

Q: What's your notion of engineering as a profession and the concept of professionalism? Does that figure into this anyway?

Bean: Yes. I'd like to start off by commenting about professionalism in general. Because, as I mentioned, the important issues, in the nuclear age, and in an information age, in an age where it takes as much energy to make a little thing happen by pressing a button as making a big thing happen, that the feel and the experience doesn't give you the feedback it did as it did during the industrial age. So, the trust that is required in terms of team collaboration and in terms of the respect for intellectual property and patents and new ideas is pervasive throughout every industry. I think what's important, as far as the engineering profession goes, is that there are aspects of it that are unique and somewhat different than the legal, the medical, the accounting, or the trades, or other manufacturing areas. What's important for practicing engineers -- whether it's through continuing education, or the pursuit of a professional engineering degree, if that's appropriate to your work -- is just understanding your need to remove your own blind spots towards how you make decisions. Decisions that are going to affect both your own company's bottom line and welfare -- both from a legal and financial context -- as well as the respect that other companies will give you in the marketplace. That's crucial.

Q: We've been talking a lot today. When you distill it and you look back on the things you've been talking about, where you come from and all that, about which things are you most proud, that you've done?

Bean: I would say the things that I'm most proud about are the time that I spent on introspection and taking career counseling, and even psychotherapy. I read one book on career counseling, or a section of it, at any rate, that said that it's not really possible to excel to your complete potential if you don't seek out a mentor or a career counselor or some type of therapeutic counseling and ask others to be your sounding board. So that you get feedback from others who have "objectivities" that you don't have. You have to test yourself, to find out and ask yourself, "Is what I'm doing worth it because it takes an awful lot of energy. It takes an awful lot of time." You only go through it once and you can look inside and make the tough decisions to change and let go of things. In my case, I would say what I've been most proud of, is the ability to let go of things that I had tremendous investments in -- even moving outside of my financial and academic investments in mainstream mechanical engineering and working in other areas that have been offshoots from that. That is something that has been the most significant -- and I would say, in retrospect -- the thing that I'm most pleased with. My ability to change. I think you're as good as your ability to change is robust.

"Profiles of Mechanical Engineers"

Q: That sounds like a model that works well in today's market. Is it changing with the circumstances, or changing with one's development? What drives this? Why do you have to change?

Bean: Well, I guess we're all standing on a moving platform. And there are some slogans out there about the importance of building the future that you want to live in. I mean, "change," in that, if you do nothing, you're certainly not going to be productive. And you won't be that force that helps to shape the world that you live in, or the type of work that you do, or the type of company or reputation that you personally have. The playing field that we're all operating within is dynamic. The technology and the social ramifications of the technology are so pervasive, so profound, and so powerful. So, the landscape is making it such that we either steer the boat, paddle the boat, or guide the boat. Or we'll just get tossed in the waves and end up with a lot of motion, a lot of busyness, but not a lot of accomplishment or productivity or satisfaction.

Q: Have things changed a lot in the last five years, in terms of the practice of engineering, from your perspective?

Bean: I would say that the thing that has changed is that your knowledge becomes obsolete faster and faster. And that will probably continue to be the case with the pervasiveness of information sharing and technology development. So the course work that I took, the fundamentals of it, of physics and chemistry, of course, are still valid and true. But the cutting edge, state-of-the-art technologies are things that you have to relearn continuously. And then one other thing I would add from another perspective, is that the career patching is much different than when I started. There is no such thing as job security. That's an historical artifact at this point. And so, the need to change and create your own self-differentiation, in terms of your competency and ability to provide things that are not commodities to your own customers and employers, is more of an issue. You probably will not be working for one company your whole career, and probably we will not use the language, "I work for AT&T." It's that I work for myself at AT&T, and I work at many different places at AT&T, and I may work in other corporations as well. But I will always be working for myself.

Q: These sound like very new ideas compared to what it was like in the '50s and in the '40s and even in the '60s. Yet in this new environment of behaving as an engineer and what an engineer has to do, what are the things that your father taught you that still work?

Bean: Well, the things that my parents -- both my mother and my father -- taught me are: determination, perseverance, patience, persistence, the will to succeed. As I've mentioned, the work that we do is based on platforms of technology, processes, information-sharing and team-building. But what we don't talk about as much and that I think we'll be talking about more, in time, is the will to succeed and the determination to create something that's worthwhile that's valued by other people, and that you can be proud of. I think that will continue to be true for time immemorial, and will become something that we'll all become more and more invested in.

Q: OK. Thanks.

Bean: You're welcome.

"Profiles of Mechanical Engineers"

Prepared as part of the Sloan Career Cornerstone Center (www.careercornerstone.org)
Source: "Careers for Mechanical Engineers" © American Society of Mechanical Engineers