



Sloan Career Cornerstone Center

Profiles of Mechanical Engineers



Kathryn A. Ingle

**Consulting Engineer
KT Enterprises
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Education:

BS, Mechanical Engineering, Catholic University of America

Job Description:

Consulting Engineer, dealing with manufacturing systems, logistics, and procurement issues; systems integration and training.

Advice to Students:

"I think every engineering student should fail at least one class, because generally we were the ones who got the A's and B's in math and science, particularly in high school, and so the experience of absolutely failing in something that is our technical interest, is something very humbling. Basically, too, if you're a freshman or sophomore, "sticking it out" is the most important. I didn't get to the interesting classes until junior and senior year, and I really loved it."

Comments:

Kate previously worked in government agencies involved in manufacturing, shipbuilding, and procurement for the U.S. Navy. When downsizing came, she seized the opportunity to start her own business. She stresses the importance of keeping flexible, looking ahead, and networking with other professionals.

Video Transcript 1:

"One of the biggest issues I've seen with women is that a lot of times we feel that we need permission to be where we are, instead of expecting to be where we are. I walk into a meeting because my skills are required by the people who are having the meeting. Or if I'm chairing a meeting, then I need these other people to give me that input. And so in some cases, we're our own worst enemies by asking other people to provide us what we should be providing for ourselves. Well, just recently I've realized that over my career, I've spent a lot of time looking at the mistakes, instead of looking at the accomplishments. The mistakes constitute this portion, whereas the accomplishments often go this way, and we women, in particular, focus on the mistakes."

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Video Transcript 2:

"If you're a freshman or sophomore, "sticking it out" is the most important. I didn't get to the interesting classes until junior and senior year, and I really loved it. The education for me was getting pieces of the engineering puzzle to work together. How the second law of thermodynamics affects the production systems that I was working on, on a daily basis. It was more, for me, integrating all the different parts. And I also knew that in the real world I would be fine."

Video Transcript 3:

"I learn best from watching other people, and I try and pick the people that are doing what I need to follow in their track, or find somebody I know who's really good in a particular area and get them to do some coaching. But, a lot of the formal education is coming from distance-learning programs and short courses."

Interview:

Ingle: My name is Kate Ingle. I live in the Knoxville area, and what else do you need to know?

Q: What do you do?

Ingle: I'm starting my own business right now after being laid off from my company after 6-1/2 years.

Q: Can you tell me what your career path has looked like?

Ingle: I think it was really kind of interesting, because when I graduated, it was a difficult time to find a job. I was also a December graduate. So, in January, companies aren't hiring that much, and I was looking for jobs all over the country, and ended up getting a job 15 minutes from my mother's house. I didn't want to stay there but six months, just to get some work, and I happened to get lucky and get a wonderful boss and ended up staying there 5-1/2 years. I worked for the Naval Sea Systems Command, in the logistics center, where we smoothed the way between people who actually bought the parts and people who actually required the parts and had to sustain them in the fleet. We were the go-betweens between the two organizations.

Q: So was that interesting work in that position?

Ingle: It was a logistics position, and we would review all the technical drawings that people bought, to review for their accuracy and to see whether or not we could buy it from another vendor or if we only could buy it from a sole source. This was back in the mid-'80s, when Congress required that the government try and compete as many procurements as possible.

Q: And what about your job after that?

Ingle: The funding for that ran out, and I started looking around other Navy installations. And I had been funding Oak Ridge to do reverse-engineering work for the Navy at the time, and they heard that I was looking, and then offered me a job down there. And I thought this would be wonderful because then I could do the reverse-engineering work from a program manager's

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standpoint without having to do first-line supervision. And I had a couple of junior engineers who I'd sooner take a baseball bat too, than be their supervisor. So, I knew I wasn't ready for a situation where I had to do performance reviews and all that. And it would be quite some time before I could get any advancement. So, to go down and do program management and have the people working for me but not me having to be their direct supervisor seemed like the best move. There are some benefits to having such a large organization, because you could be transferred from project to project, and we were always in the midst of different projects going at the same time.

Q: So when the funding ran out, you left that project?

Ingle: Basically. A lot of times, I'd be overlapping. You're always looking toward your next project and networking, and basically there wasn't a lot of supervision to what you were taking. It was basically by chance and by budget --who your friends were and who needed you on this project and what skills you had to offer to the other projects. So you were freelancing within the company, essentially.

Q: So, in the type of jobs you took, you always had to have an eye toward what you were going to do in the program? Was there any security?

Ingle: Long-term security, in that they somehow always find projects. But short-term, no. There was no ability to direct your career. There was no ability to pick which projects, unless your friends were helping you. And it was very difficult to have some consistency. At one point, I was on a small project and ended up being a LAN administrator for six months. I then went into a communications project and then came back out and worked the shipyards again. So, in some ways it was really good because you'd see a lot of different kinds of equipment and projects, the kinds of skills that you need on different things.

Q: Is there anything you would have done differently, when you think about it?

Ingle: Yes. I had a lot of difficulty with my second job because I had been doing an engineering-ethics conference that was coming up and my boss had asked that I do two things that were illegal at the time. I went to the corporate-ethics officer and, apparently, he got the corporate "finger-slapping" for one of them. I was only there three months, he was there 40 years -- and he spent the next year basically trying to "deep-six" my career by giving me projects that were destined to fail or had the worst people to work with or whatever, and I really believe that I should have left there earlier. But we often get into a situation where we have just bought a house or we have children to feed and mortgages to pay and it doesn't become reasonable, and I realize now after 6-1/2 years, how unhappy I was at various points and should have left much earlier.

Q: What was your last year of education?

Ingle: Well, I started some master's work in engineering management, partly because it kept me in the engineering and it had a lot of the business. But I found that as I took the classes that it was teaching me more to be the "good corporate manager," and from my perspective in business, I really would prefer to be the owner, the director, as opposed to just a middle manager somewhere along the line.

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Q: So do you think continuing education is important?

Ingle: Oh, very much. Very much so, but in today's world a lot of it will be at local university courses and public speaking. You get your education in a lot of different ways. I learn best from watching other people, and I try and pick the people that are doing what I need to follow in their track, or find somebody I know who's really good in a particular area and get them to do some coaching. But, a lot of the formal education is coming from distance-learning programs and short courses. A lot of the long-term programs don't really give you a tremendous amount of benefit, outside of "getting that ticket punched" to get to the next point in your career path.

Q: Can you tell me a little bit about your most recent job change?

Ingle: Well, at the time, we had about two months till we were off the payroll. At first, of course, you're a little disturbed in general. But very shortly thereafter, I realized that there was quite a bit of work that I had wanted to, but I was not able to do. The year before I had been on an off-site assignment for the company at the Department of Commerce, on loan to them -- to the technology administrative -- and I was working in areas of manufacturing competitiveness, working primarily with the rapid proto-typing industry. And I was hearing from the manufacturers all year about the kinds of issues and barriers they faced. We did a manufacturing assessment throughout the nation of what was the problem. Manufacturing basically constituted almost 50% of the nation's GNP -- both at the primary levels and the second-tier suppliers and things -- and I found that they really needed a lot more support, but not necessarily from the government because the government bound them too much, and they didn't want that much government intervention. But they really did need a lot of services. In the organization that I was with, they had a lot of the high-end services, ultra-high precision machining kinds of things when they needed to learn CAD programming. So I see that the needs of the actual manufacturing community, which creates a lot of the wealth in this country, was being grossly under-served. And so I prefer to work with the entrepreneurs and the people who want to grow and build things instead, and I see this whole sector of the market that's being unserved, and I'd like to go and fill that niche. I think there's a lot of need for parts that are obsolete right now or they lack supply support, in both electrical and mechanical, and I'd like to be there to help fill those areas.

Q: So what is a typical day like? Or there isn't a typical thing?

Ingle: No, no. There's no typical day, and if it starts to get typical, I think I'd probably get very bored. But there's an awful lot of customer interface, a lot of working with the customer. I can do a lot of the work -- sending copies of contracts, documents, etc. -- over the Internet. But when you go to do things, you really still need that face-to-face presence, and people need to be assured that you are there, as opposed to just a voice on the box. So I think that's very important, that they need to see you in person. So the customer service end of it is very time-consuming.

Q: How would you say this job versus your other ones have affected your lifestyle?

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Ingle: This is much better for me. I don't do as well when I'm given "X" amount of hours, because I never really found a job that took the entire eight hours a day. Some days it took 12 hours. Other days, three. But companies can't accommodate that sort of thing, and for anyone who has an unusual work style, being a single parent has posed a very strong challenge. I had a supervisor once, who when I would call in and say that my daughter was sick, would tell me, "Can't you just do something with her?" And that sort of thing. And that sort of thing is very difficult for me because it ended up that my absence records were higher than my male counterparts because they could get those services from their mates, and I didn't have that advantage. And the same with travel. I had to hire someone to take care of my child while I was away on travel, where they just left everything at home and everybody was expected to understand. So, those were some unusual challenges and companies can't really adapt to those different needs without making a big "to-do" about it.

Q: So when you just decided to start your own company, where did you first go to find clients?

Ingle: Well, we're working on the marketing plan. A lot of it is through the people that I've known in the work projects and the meetings I've been to lately; three days of having meetings. I know people all over the country and all over the globe in the maritime shipping business, both naval and commercial, plus all my mechanical engineering friends from around the world, through ASME. And I think a lot of that will be where it comes from in the near future.

Q: So would you say being part of a professional organization has helped you?

Ingle: Oh, tremendously. In this case, because in a company you're not allowed to do a position until you've already been in that position for a while, and so it gave me the opportunity to do a lot of the kinds of things that I knew I was capable of, that I would never get assigned to at my age and point in career, within my company. The best experience, by far, has been being an intern on the Board of Governors, under the leadership development program. There's an opening right now on the Knoxville Utilities Board of Directors, and I think that my experience, with my technical background, qualifies me to at least apply for that job, which under normal circumstances a person at my point in career would never be able to do. And to have that large-scale vision of an international organization with a multi-million-dollar budget, and managing the needs of the membership around the world, is something that has given me a view of the world my peers will never get.

Q: Tell me about your college experience. Did you enjoy college for the most part? Was it challenging for you? Did you have a good time? Give me a brief synopsis of college.

Ingle: Well, I started in ocean engineering and so I picked a small school in the Washington, DC area, because I liked the campus essentially. But I found that it was really good for me to be in a smaller school. Freshman year was very challenging, and I had the social needs that the average freshman has, and so I wasn't devoting my full attention to my schoolwork. Of course, sophomore year you have to change that habit a bit and recover and learn how to study and all that good stuff. But then, after my sophomore year, I started paying for school myself and so I had to get a job, and one of the first things I did, I took a semester off and became a housepainter. That suited me for a little while, and I came back. And during that

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time I was trying to evaluate whether or not I really liked engineering or whether I belonged somewhere else. And so I took those career tests that they offer in career counseling, and lo and behold, I came out as an engineer. So, I kind of resented that actually, and I fought against that in a number of instances in my life. At one point, I dropped out and went to interior design school. I completely aced everything I did and everybody was in awe when I said, "Oh, yeah, I was studying engineering before that." And everyone asked, "Why did you leave?" And suddenly I realized, oh, there is a little something to this engineering stuff. People think that the minute I say "engineer" that they can't talk to me any more. I mean just average people, when you meet them, walking around in flea markets and such. Then I went back to school seriously after that and took two courses with my counselor's recommendations. I said I would give it one more try, and I did very well this time. In between though, at that point I needed to really start supporting my education, and I couldn't get a job as a typist. They didn't have co-op programs at that point in my schooling, and I ended up getting a job driving a forklift and loading tractor-trailer trucks for the Washington Post, and that was particularly good at the time. That's a major production facility, we're talking --. Seven days a week, three shifts a day, 365 days a year. There is not a day that the newspaper doesn't come out, and it can't come out "not on time." It has to come out on time every day. And at the time when I first started, they only had one manufacturing plant, one printing plant, and then they acquired a second one and built a third facility, and within that plant, I was able to see one of everything that I was studying – vibration analysis, I recall studying, and looking at the machines. At the brand-new plant, this place had a concrete floor probably two feet thick. But when all the equipment was operating, you could feel the concrete floor vibrate. It has a very practical application. So the production-engineering part of it, I got a tremendous view of.

Q: So you stuck with engineering, straight through?

Ingle: Yes.

Q: You were probably a non-traditional student, in how you went about it?

Ingle: Yes.

Q: Do you think it prepared you better?

Ingle: Yes, as a matter of fact, because there would be times when I would question whether or not I really wanted to be a mechanical engineer -- and now it's in my blood. I just know it's in my blood. I tried to escape it. I was hoping to, perhaps, over the summer, pursue pottery or something, and it's just not going to happen. Engineering's just there, and it's going to be there, and I really feel that that's the talent that I have to give back.

Q: Now talk about your most recent formal job before you went out on your own. It was downsizing. Just say for the record what downsizing is, and did you think there were any signs that this might be coming?

Ingle: Well, in our organization we relied heavily on other federal agencies for their funding for our kinds of projects because private industry couldn't afford the kinds of work that we were doing. We had a number of CRADAs -- Cooperative Research & Development Agreements. We had a number of those, but they were very expensive, and who ended up with the

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intellectual property rights was always a major issue. So most of our work was for other federal agencies, who in the last few years, have been downsized themselves. So we were having a smaller and smaller market to give our services to, with declining budgets, and there was fierce competition. And you could tell, and I think this is only the tip of the iceberg in our organization. I was on loan to another organization essentially for three years because of the way we matrixed. And when "push came to shove" in the organization I was in -- it was a data-systems research and development group -- when they looked to divest their payroll of people that cost them a lot, mechanical engineers were high on their list.

Q: Could you have been better prepared to lose your job at that point? Were you prepared?

Ingle: No, no. I knew there were layoffs coming because it was either going to happen or it wasn't. My name is either on the list or it wasn't, and I couldn't worry about it because there are times in your life when change comes upon you. You don't want it. You kick and scream and fight against it, but it's absolutely necessary to your career growth, to your personal growth. So, I took it in the best possible light, that this was the opportunity of a lifetime. I had always said that I wanted to do my own kind of work; have my own company; run things the way that I thought were best, and this became the opportunity. So I can't turn down this opportunity, just because the timing isn't perfect, and though I could be better prepared, there's no good time to have a layoff or a baby, I've found.

Q: [laughs] Words of wisdom. What about outside work? What do you do, what hobbies or things like that? What pulls your interest in your free time -- if you have any free time?

Ingle: Well, actually, I don't have free time. I make free time. And I enjoy golfing and swimming, when the weather is nice; skiing when it's not so nice. I enjoy spending time with my daughter and her friends. I do a lot of shuffling. I'm not allowed to go to basketball games and football games with her yet, though. So I get the evenings to myself. I read quite a bit. I'm not big on TV, and I like foreign movies, so I don't get to watch what I like from the basic box at home. So, I spend a lot of that time pursuing ideas and talking with friends. I found in the last year or so, too, that when I had a computer at home, I would spend two or three hours a night, keeping in touch with people about different ideas and things.

Q: What about continuing education for you? Are you still taking classes? Especially now that you're on your own, do you find that important?

Ingle: I try and place myself near people who have something that I need to know next. I basically take what it is that I need to know next and find somebody who's good at that and try and get some coaching, and that's essentially where I get my continuing education in a less formal sense. In a formal sense, it would be really very nice to pursue a Ph.D. in Engineering, or to pursue my P.E. I don't think at my point in my career I have that opportunity because at this point, no one's going to pay me to do that, and with my own daughter approaching college shortly, that's not going to happen until she's graduated.

Q: What about being a woman in engineering, any special challenges you might face? What advice do you have for young women? What would you say to them? What do

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you think, is something important that maybe you wish you had known when you were going to school?

Ingle: Well, I don't think I had quite the average experience as a woman in engineering. I had three brothers. I played baseball with them. I played whatever they did. I was always told that I was just one of the brothers. I could do whatever they did. So it never dawned on me that I didn't belong in an engineering class. It never dawned on me that I didn't belong on the manufacturing floor. And I think that's been one of the biggest issues I've seen with women, is that a lot of times we feel that we need permission to be where we are, instead of expecting to be where we are. I don't walk into a meeting because I'm going there to have fun. I walk into a meeting because my skills are required by the people who are having the meeting. Or if I'm chairing a meeting, then I need these other people to give me that input. And a lot of times, people feel that they need permission to speak or someone to be their mentor or be behind them and show them the way. A lot of times, you just need to "storm the door" yourself. And so in some cases, we're our own worst enemies by asking other people to provide us what we should be providing for ourselves. The other thing that's a particular challenge, though, is a lot of times I find that the other engineers' wives are very anxious, particularly if you have to travel a lot. And I found that to be a real stumbling block. In some cases, I've had to "pass muster" and meet with the wives before I traveled with some of the other gentlemen. And as far as I'm concerned, these are my brothers. These are the guys that I work with, essentially, and so I don't see them as anything other than that. And I don't know how they see me, but as soon as we start talking a common language, then the other people in their lives often feel excluded, and sometimes that's very difficult for me to deal with. Because I know I can talk to the husbands about certain things -- technical issues -- and I don't know how to talk recipes in the kitchen at social events. That can be difficult, too.

Q: How would you define "success?" How would you say you've come to this point where you're "successful?" What does that mean to you?

Ingle: Well, just recently I've realized that over my career, I've spent a lot of time looking at the mistakes, instead of looking at the accomplishments. The mistakes constitute this portion, whereas the accomplishments often go this way. And we women, in particular, focus on the mistakes. As a matter of fact, one woman I worked with made a mistake on a project and spent two weeks apologizing to our boss. Another guy made a mistake -- even bigger mistake -- on a major project, and the boss said something to him, and he simply said, "Oops, sorry, I'll fix it." And that's when I realized the "Oops Theory" works. "Oops, sorry, I'll fix it." Once I realized that the only person who is judging me was me, I found I was judging myself more harshly. That's when I decided to make my definitions suit myself more. I look at the end of a day: "Did I get to actually work with equipment instead of paper? If we're working on a major project, did we get the next milestone, well defined?" There are a lot of times you have to -- when you're working with too much paper and too many people -- try and find something concrete. That's your success for the day. And I think the best part for me is being able to walk into a room, and for people to respect what I have to say. To offer me their services in return for my services. To be able to go where I need to. To serve the people that I need to. For me, it's more of a service. Engineering is a service we provide, and for me having the freedom is the most important thing I can do, because then I will always make the best decision for the customer.

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Q: What advice would you give to people studying engineering -- freshman and sophomore year? What would you tell them to be concerned about? Even with your experience with downsizing you have to kind of regroup, but is there a way to prepare for that? Is there a way when they're in college? What would you say to them?

Ingle: Well, I think every engineering student should fail at least one class, because generally we were the ones who got the A's and B's in math and science, particularly in high school, and so the experience of absolutely failing in something that is our technical interest, is something very humbling. Basically, too, if you're a freshman or sophomore, "sticking it out" is the most important. I didn't get to the interesting classes until junior and senior year, and I really loved it. When I stopped, I had quit twice, and both of those times were before I finished my sophomore year. It made such a difference my junior year. It was so much more interesting. The people that were there wanted to be there. So I didn't get past the washout courses. That's a very important point. The other is to make sure that you don't judge yourself according to the way other see you. I was often told, "Gee, you ask the most interesting questions in class. How come you get C's on the test?" Well, for me the tests weren't the most important point in the schooling. The education for me was getting pieces of the engineering puzzle to work together -- how the second law of thermodynamics affects the production systems that I was working on, on a daily basis. It was more, for me, integrating all the different parts. And I also knew that in the real world I would be fine, and the classroom, well, that wasn't necessarily my strongest point. And I think you have to realize your own style after a point. I'd learned best from watching other people. Some people learn best from being taught. Some people learn it by rote. Then there's the other aspect -- some people are much better at analysis, some people at research, some people at the customer relations, the "go-between." There's a tremendous need for those who have a technical background to work with people who do the funding and the PR for projects and things. And without engineers, even in those positions, there will be something lost. Everyone who's ever worked in a technical position and had a non-technical person going into the funding battles, knows what can happen to your project technically, when somebody doesn't understand it and goes in to talk to the people who will give you the money. So, I think that recognizing your own style and finding areas that you feel more comfortable in -- if you can't wear a suit, don't like to deal with red tape, stick to the research, stick to the analysis, that sort of thing. There are a lot of pieces that end up being your style, particularly, over time. But it takes time to develop that, too.

Q: Is there anything else you want to add, Kate?

Ingle: I absolutely love engineering. I just think it's so much fun. I've never worked on the same project twice. The travel's always good. Well, sometimes you go to boring places, but people are always interesting to talk to. There's always something new to learn. I think, too, that getting outside of your company and your 40-hour week job, working with some other activities -- either professional organizations or local organizations, providing your talents -- I think those things are the things you learn much more from. Because, otherwise, you'd stay in one little narrow technical area, and mechanical engineering is built of so many areas, and that doesn't even include the civils and the electricals, etc. etc. So I think that that's the best part.

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