



Sloan Career Cornerstone Center

Profiles of Civil Engineers



Alexia A. Nalewaik, E.I.T.

**Consulting Engineer
Deloitte and Touche, LLP
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Education:

B.A., Physics, University of Dallas

M.S., Structural Engineering, University of Southern California

Job Description:

"As a Consulting Engineer in Management Services and Solutions, I am responsible for cost engineering, estimating, and scheduling for major construction projects."

Advice to Students:

"Take the EIT and PE exams as soon as possible, while you still remember all of the information. Don't be afraid to look off the beaten path for a job - civil engineers have many options, and the traditional companies are already swamped with resumes from job seekers."

Video Transcript 1:

"I now in cost engineering. I put together the estimates for all of our bids and figure out how much process plants are going to cost and these are in the millions of dollars. In cost engineering and scheduling I track the progress of our existing projects and jobs and also schedule them and make sure we're on track figure out where we're losing money, where we're making money, and why and then try to feed that information back to the estimating department, so that hopefully, our bids will be a little more on track."

Video Transcript 2:

"I'm a competitive swimmer. I spend, basically, actually, most of my time outside of work, either in the ocean or in the swimming pool. And I do long-distance events. So I need to put in some pretty serious workout time. There is a balance there. I have the full support of management within the company, and they understand that the swimming is important."

Video Transcript 3:

"There aren't very many women in my company at all. It's not really a problem. Every once in a while somebody will fail to take me seriously, and then they learn pretty quickly that that was a bad idea. People know that I definitely am going to do whatever it takes to get the job done, and that's very well respected."

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Interview:

Nalewaik: My most interesting project was serving as a consultant to Gap, Inc., performing estimates for over 40 stores using as-built construction drawings in order to develop a tax-savings model for Gap stores and subsidiaries throughout the United States.

Q: Could you define structural engineering, to someone who doesn't know -- it's a specialty, right?

Nalewaik: It is a specialty. It's basically the design of any structure. The design of bridges, buildings, structural supports for furnaces and pipe, which is largely what our company does. It's anything that you can build with wood, masonry, plastics, steel, whatever you want -- pick a material, build it, that you need a structural engineer.

Q: Is there a demand for people in this specialty?

Nalewaik: There is a demand and it's -- it is not really a fluctuating demand, it is a constant demand for infrastructure and for anything that you build. I mean, if you're putting together a building or a bridge or absolutely anything that has a structural -- a structure attached to it, then you're going to end up needing a structural engineer. So there's a demand, but it doesn't fluctuate like the environmental fields or any of the others.

Q: So describe where you work.

Nalewaik: OK. I work of Kinetics Technology International Corporation. It is a company which builds process plants and petro-chemical facilities. We build hydrogen plants, ethylene furnaces -- things along those lines. So largely our structural engineers and our civil engineers are building pipe supports, foundation and structural steel for the furnaces.

Q: And what is your role?

Nalewaik: My role is cost engineer scheduler and estimator. I'm fluctuation in-between two departments at the moment. I used to be in estimating, I'm now in cost engineering, but estimating is still short of staff, so I keep running back and forth. I put together the estimates for all of our bids -- figure out how much process plants are going cost and these are in the millions of dollars. I mean, when I first started working I had literally divide by 100,000 in order to get some sort of grasp of the numbers I was dealing with. I mean, when I'm looking at the compressor price and saying, "Wow! This thing costs more than I get paid in ten years," it's a bit of an adjustment. I mean, you're no longer just calculating how much wood you're going to put on something. So it was a bit of an adjustment, but it's also fascinating. Every estimate is different, every job is different, every approach to an estimate is different. I mean, there are countless things that get added into an estimate that you perhaps wouldn't think of. And so your basic rule of thumb for estimating is -- consider everything. And that sounds really simplistic, but it means, consider the temporary fencing around the plant during construction, consider a security guard. Consider what kind of paving you want. Consider your lay down area and whether or not you have unions, and whether or not you have other jobs in the area which are going to pull workers. So you need to put in some sort of bonus or incentive to keep workers on site and construction on site throughout the job so you don't change your learning

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curve, and your progress during the construction phases. In cost engineering and scheduling I track the progress of our existing projects and jobs and also schedule them and make sure we're on track, figure out where we're losing money, where we're making money, and why and then try to feed that information back to the estimating department, so that hopefully our biz will be a little more on track.

Q: Where to you see yourself in a couple of years?

Nalewaik: Project management. Project engineering first, and then project management. As I said, I like to see the full picture. I want to see everything that's going on. I don't want to concentrate on just the piping or just the civil design or just the mechanical or just the estimate. I want to see how that estimate was put together, how the project flows, how it finishes, what happened at every phase during the project -- and that's project engineering and project management right there.

Q: You obviously have some strong commitments in your live. So how do you keep that balance?

Nalewaik: In addition to eight, nine, ten hour work days, I spend several hours a day in the pool. I'm a competitive swimmer. I spend, basically -- actually, most of my time outside of work, either in the ocean or in the swimming pool. And I do long-distance events. So I need to put in some pretty serious workout time. There is a balance there. However, that balance flexes constantly. There are weeks when I spend more time in the office, there are weeks when I spend more time in the pool, and it's probably not the smartest thing. But, fortunately, I have pretty much the full support of management within the company, and they understand that the swimming is important. I need to swim. At this point it's not really an option. The only option is how much I swim. Swimming is a terrific source of stress relief. It's a terrific way to relax, it's great way for me to stay in shape, so there's no way I'd give that up any time soon. It's just a matter of how much I swim. At the moment there's a lot of commitment there.

Q: In a typical day -- could you sort of walk us through what happens?

Nalewaik: Every day is different. Every day at work is different. I'll typically show up about an hour early for work. We're supposed to be in between 7:30 and 8:00 and I'll show up between 6:30 and 7:00 simply because the computers are faster then -- nobody's asking me questions, I don't have five people standing in my office wanting something now. So I can get a lot more accomplished by showing up early. And I almost never stay late during the winter season, because I have ... practice. So I am out the door, like shot at 4:30 in the afternoon, I'm just straight out of the building. During the summer practice extends to 7 PM, so I can stay and extra hour, hour and a half, and that's fine. But you work through lunch hours, you come in early, you do whatever it takes to get the job done. In estimating you have a definite deadline. There's a date when the client needs a number, they're not going to change. If you don't get your bid in by that date, you lose the opportunity to bid on the project. So, you're going to get things done no matter what. I mean, you're going to stay all night, you're going to come in on weekends, you'll come in on holidays, you'll do whatever it takes. Project controls and scheduling -- the only information that you're putting together is internal. It might get fed to the client at some point. The client doesn't necessarily want it specifically on the first of the month,

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so they have a little bit of flex there, and anything internal keeps getting revised so much that there's a generic due date, but it can flex.

Q: who are the people that you work with? Do you find that you work mostly with people who have similar backgrounds to yourself, academically, at least?

Nalewaik: Academically, yes. I mean, everybody -- everybody in the company has an engineering degree of some sort. We have very little support staff, very little secretarial staff or drafting. Everybody's expected to be able to balance their work and all of the support work as well. The people I work with range from the discipline engineers in piping, mechanical, electrical instrumentation, rotating equipment, civil, structural -- just about every -- every type of engineer there is, we have on staff. I work with them, usually trying to weasel some sort of information out of them, and then I, in turn, communicate with the project managers and the departmental managers to make sure that the right information is going out to the field. I also go out to the field and take a look at what's going on and sometimes spend a couple of days on site of in one of our regional offices and basically fill in wherever it's needed, to make sure that the project stays on track.

Q: There's been a lot of talk about the global market place. Do you think that's been overstated?

Nalewaik: I think it's understated. Civil engineering itself, as a matter of fact, almost every job opportunity right now, is global. However, opportunity is a strange word to use because as soon as you say that there's a large demand for global engineering, then people start saying, "Oh, great! I can be transferred overseas." At the same time, students in other countries and students overseas are picking up the knowledge that they need, in order to execute those projects successfully themselves. There's also an overseas trend at the moment, to hire within -- within in the country. So, unless you're a specialist with five to ten years experience, there's a very good chance that you won't be going overseas, except as a project manager or as a lead discipline engineer.

Q: You seem to have a lot of international experience, could you explain that, and is that, you think, unusual for engineering, or engineers?

Nalewaik: It's probably unusual for anybody to move overseas as much as I have. I was following my father around. My father worked in the oil business. He's still in the oil business. The difference now is he finds the oil and I refine it. So in a way, I've been following him around overseas and I've picked up a lot of experience as a result and looks very attractive on a resume, certainly, but I'm not so sure that much of that traveling was done specifically as an engineer.

Q: Let's talk about how you got your job.

Nalewaik: You obviously haven't heard this one. I was in my last two months of school at USC getting my master's degree. I had an absolutely impossible time get -- finding work as an engineer while I was in graduate school, because I didn't have a bachelor's degree in engineering. I had a bachelor's degree in physics, so I could have taught on the side, I could have worked at a science museum, I could have done anything of that sort. So all I could really

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find as an internship or summer job was in drafting. And then, fortunately, I started doing some freelance work for one of the professors at USC working in estimating. So I got some estimating experience. Nobody was biting as far as the job market went. I kept trying to find engineering positions, I kept getting offers for more drafting. And I kept saying, "Look, I have a master's degree, I'm not going to do drafting for the rest of my life." But the estimating, in the end, came through for me. It was that extra experience which broke me out of the mold as a drafter. I sent resumes everywhere like buckshot. I got so desperate at one point that I looked up a list of all the companies that my parents owned stock in, and I mailed resumes to all those companies. So my resume, in this particular case went to the ombudsman in Frankfurt, who looked at it and said, "Yes, I think we actually do have a construction group somewhere." They mailed my resume back to the New York office ombudsman, who mailed it to a subsidiary in California which was the head office of their construction division, and I actually ended up being hired by that construction division. So there are all kinds of unique ways to get a job, and I think that's just one of them.

Q: How about a student who's thinking about a career like yours? What advice do you have and what skills do they need to compete?

Nalewaik: In order to compete they need not only to be able to manage their job, but they also need to be able to handle the support and technical work, the drafting, the secretarial -- you know, running around, stapling things. They need to be able to type, they need to be able to use a computer. Those are all very basic, because companies at the moment are streamlining, they're cutting back the support staff and they want to be sure that the person that they are hiring can handle, not just their job, but everything that it takes to make their job run smoothly. And also, they want to make sure that the person is a team player. One thing I've noticed is that in the industry it's very easy to get pigeonholed. Very often that first internship, that first summer job that you take where you think, "Gosh, this is kind of neat, I'd like to try that," ends up being yours for life. I mean, I took a job in drafting and ended up doing that for three or four years, and it certainly was not a career goal, it was just that that was where my first job opportunity was, that was where I ended up staying, and it was very difficult to break out of that. So, while it might be fun to go from job to job as an intern and try out this area of engineering or that area, you also have to keep in mind that if you intend to put that on your resume, people will probably, forever, see you as that sort of engineer. So I can't really say whether it's bad or good, but while it's great to run around getting experience in different fields, you might not want to put all of them on your resume, because you'll end up stuck with the one you don't like.

Q: How about when you're actually working -- do you work really on teams or do you a lot of your work individually?

Nalewaik: I do most of my work individually, but I spend a lot of time running around, trying to get information from people. And so, it's interactive to a point, but I don't actually work on a team.

Q: Can you give me an example?

Nalewaik: Most corporations come to us when they already have a refinery or they want to build a refinery and they need some way to turn their off gases into a usable product, or --

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which -- that's an environmental issue -- or if they just want to build a refinery to produce a particular -- a particular stock or a particular fuel, that's when we'll come in. We have civil engineers who design the equipment foundations, pipe supports, layout all of the buildings, layout the plot plan. We have a piping department which does all the piping to and from all of the equipment, bringing utilities in from outside, feeling the product out to wherever it's going. We'll have mechanical and rotating equipment guys who put together all of the specs and standards and bids for pumps, vessels, exchangers, compressor spans -- you name it, any piece of equipment. Tanks. Then we have a furnace group which designs the furnace. We'll bring in some feed stock, run it through a catalyst, bounce it up and down some piping and eventually it comes out as a whole different feed. We also have electrical and instrumentation engineers, engineers, which keep everything running, put all of the valves and safety equipment on, and all of our analyzers, all of our temperature pressure flow instruments -- that's what our electrical and instrumentation guys do. Then we have project management, we have a couple of other specialty engineers. I've probably forgotten a department.

Q: You were talking about when you were pursuing a physics degree and people said, "Oh, you'll never get a job in physics as a woman." Have you found that that's not the case? Now that you're an engineer, do you find that there's still some sort of bias against being female in this profession. Are there a lot of women in your company?

Nalewaik: There aren't very many women at all in my company. No. However, it's not really -- not really a problem. Every once in a while somebody will fail to take me seriously, and then they learn pretty quickly that that was a bad idea. So that -- I think I've been there long enough now that I'm taken seriously enough. People know that I want things done, I want them done now, I want them done properly. And I don't get very much of an argument. I'm treated pretty much as one of the guys. I'd say, perhaps, ten percent of the company is female, maybe less. There aren't very many women in the company but the major of our female engineers are in chemical engineering. They put together the process, the figure out what it takes to deliver a particular product for the client, and then they ultimately make the presentation to the client, when we produce our bid. We have a couple of women in structural engineering -- a couple of drafters, by in large, not very many women. No women on sales staff. I don't think -- I don't think we have any female instrument, electrical or rotating or piping engineers -- so I'm a actually one of the few engineers on staff that is female. But I'm very much part of the group. Very much one of the guys. And I think that's largely attitude. People take me seriously, people know that I definitely am going to do whatever it takes to get the job done, and that's very well respected. I'm also, I think, the only female in the company who is invited out for beer on Friday nights. I think that's a real indication that I'm part of the team. I don't think anybody else has been invited.

Q: Well I wanted to see if you thought that there'd been an effort across the field or across your specialty or even in your company, to try and promote minorities and women? Do you think that it's changed during your experiences within the field?

Nalewaik: I think there's been some effort to bring women into engineering, but by in large, I think it's largely the choice of the individual. I mean, there aren't that many women who grow up thinking, "Gosh, I really want to be an engineer." I mean that's just not -- not your sort of usual career choice. So in terms of promoting civil engineering, yes, I think the promotion has

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done something to bring women into the field, but it's also a very obscure profession as far women go.

Q: Could you talk about your association with organizations like ASCE and how those societies have impacted your career and your life?

Nalewaik: As an undergraduate ASCE was useful to me because I never really got to see much of the practical side of engineering. I was taking all technical classes. So taking part in the bridge building competition or the canoe competition or should I say concrete submarine competition -- was probably most useful for me because it gave me a chance to see the practical side of engineering. The flip side of that is you don't get to see very much of that once you graduate and you stay with a professional society. After that the usefulness of the professional society is in the information which is available, the libraries, the publications, networking and conferences. So there's really, to me there was a complete change between life with a professional organization as an undergraduate, and as a graduate, as a graduate engineer.

Q: And how about in your personal or in your career, have you ever run into some sort of sticky ethical situation?

Nalewaik: I have never run into a large sticky ethical question. However, I think every day we confront the question of how good we make ourselves look to the client. How much we change the schedule, or in fact, anytime you re-baseline the schedule, you're just doing it to make yourself look better. So in a way that's an ethics question, but it's not as big as, you know, are we doing something really, truly evil. It's more a question of at what point do you stop trying to make yourself look good and actually say, "OK. We messed up. We're behind schedule. We're over budget. We ought to tell you the truth, even though you're going to be mad."

Q: And how about the professional exam?

Nalewaik: I don't need to take the PE exam. I've been considering taking it just because I'd like to see how I do. But it is not necessary for me. I'm not doing design work. In fact, the question of taking the PE has never come up for me. So -- of course I'm watching all of my friends take it at the moment, so I'm being challenged by them to come take it. I've considered it.

Q: EIT?

Nalewaik: I took the EIT. And I can say that it -- it was a fun exam for me. I answered all the chemical engineering questions, the physics questions, the nuclear physics questions -- all the civil engineering as well. But there was a lot on the EIT to challenge me. Some people take the EIT and concentrate on just what they know, which in some cases is just the civil or just the structural or just the environmental questions or the waste water fluid mechanics. In my case I had such a background in chemistry and physics that I actually attacked the entire exam. I didn't skip any questions, I answered everything and I had an awful lot of fun doing it, which probably makes me sound like a really sick person.

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Q: Oh. What are some of the rewards on the job. I mean, it can be financial, professional, etc.

Nalewaik: The rewards on my job are not financial. They're nowhere even close to financial. It's largely experience. The most rewarding thing about what I'm doing is gaining experience or the opportunity to gain the experience in all facets of a project. So I get the chance to see everything that goes on, instead of being stuck in a little cubbyhole designing the same pipes for it. So most of what I get out of it is the experience and the visibility which comes with what I do.

Q: So you think if a young kid who's coming into this ... do you expect him to see huge dollar signs and owning a Porsche.

Nalewaik: Don't expect the dollar signs. There's too much competition out there, way too much competition.

Q: What about your job today?

Nalewaik: What annoys me is data entry. A lot of what I do is just entering information, entering where every department happens to stand on their schedule. Entering dollar figures and quantities on material items and entering engineering hours. So it's largely data entry. That annoys me largely because I'd rather be held responsible for a judgment or a decision, then for a data entry mistake. There's no way to recoup from a data entry mistake other than, "Oops. Sorry. Won't do it again." I'd much rather be held responsible for a judgment than for simply hitting the wrong key.

Q: What makes everything worthwhile?

Nalewaik: Swimming at the end of the day. I think it's the interaction with other people on the project and it's the satisfaction of seeing everything come to a finish, hopefully on schedule, hopefully under budget. It's the satisfaction of seeing the job go from start to finish and knowing that we learned something from it, and knowing also that we satisfied all the client's requests. It's very nice to see a project actually come together. It's also kind of surprising to me, it probably shouldn't be surprising to me, but every once in a while I'm surprised that we can take all of these little instruments and cable and conduit and wire and all kinds of pipe, and somehow, come out with whatever we're supposed to be coming out with. It amazes me that we can put together all those pieces of equipment and the thing actually runs. It shouldn't surprise me in the least, but every once in a while I look at the magnitude of our projects and it's simply amazing that we manage to pull all together, I think. It's amazing that buildings stand. If you consider all the disciplines that go into it and all the different people that you have to organize and all the bolts that have to be set absolutely perfectly, and everything has to be done just right to make it work, and some in the end, it always does. And that's -- that's a real joy to see.

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Q: Is there anything you would have changed or done differently?

Nalewaik: I'd probably change my work experience while I was in graduate school. I would try to specialize a little bit more instead of doing what I did. But at the same time the competition was there so I was having a difficult time finding a position while I was in grad school. I'd also take more courses in petroleum engineering. And that sounds really strange but I'd take petroleum engineering and fluid mechanics courses so that I would know more about off shore projects. It's very difficult to get a job on an off shore project and especially as a woman, they don't usually look very kindly on sending women out into the middle of the ocean and let them stand on a platform for a couple of months. So I would have tried to get experience out there. That would be just about the only thing I'd change.

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