



Sloan Career Cornerstone Center

Profiles of Civil Engineers



James E. Davis, P.E.

**Executive Director (served through 10/2002)
American Society of Civil Engineers
Reston, VA**

Education:

B.S. Civil Engineering, North Carolina State University
M.S. Regional Planning, University of North Carolina, Chapel Hill
M.S. Civil Engineering, North Carolina State University

Job Description:

"As Executive Director of ASCE, I provide leadership on various initiatives including visioning, strategic planning, and long-range financial planning. I manage the day-to-day affairs of the Society and provide direction and support to a staff of 240 and an active volunteer leadership of over 7,500."

Advice to Students:

"To prepare for the challenges they will face, students must gain project management and communication skills, learn foreign languages, and be proficient with computers."

Video Transcript 1:

"Professional associations give students an opportunity to come face to face with leaders in the profession, and to understand the teaching side of it, the business side of it, the government side of it. And to choose which way they want to go."

Video Transcript 2:

"You can't have civilization without having civil engineers. We build the quality of life, we maintain the quality of life. And as long as people have a demand for higher and higher quality of life there'll be a demand for civil engineers."

Video Transcript 3:

"I decided to study civil engineering when I was a sophomore in high school. And it's sort of ironic, but I picked up a brochure that ASCE produced, and it said Your Career in Civil Engineering. And after looking at that, and reading through it -- and it talked about the different disciplines within civil engineering -- transportation, hydraulics, construction, design, structural design. And it was just fascinating. And I can remember now, I was in geometry class, and at that moment I decided I was going to be a civil engineer. Lo and behold, I didn't think that 30 years later I would be working for the American Society of Civil Engineers."

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Interview:

Davis: The best part about being a civil engineer is being able to make a difference in people's lives and solve problems in society. Engineers combat disease by bringing clean drinking water to communities in developing countries. We design buildings to withstand earthquakes and hurricanes. We build roads and bridges to connect communities and facilitate economic growth.

Q: When did you decide to study civil engineering?

Davis: I decided to study civil engineering when I was a sophomore in high school. And it's sort of ironic, but I picked up a brochure that ASCE produced, and it said Your Career in Civil Engineering. After looking at it, and reading through it it talked about the different disciplines within civil engineering -- transportation, hydraulics, construction, design, structural design, etc., it was just fascinating. I can remember now, I was in geometry class, and at that moment I decided I was going to be a civil engineer. Lo and behold, I didn't think that 30 years later I would be working for the American Society of Civil Engineers.

Q: Where did you go to school -- undergrad -- and talk about your course load, how you zeroed in on your specialty.

Davis: Well as I said, once I decided to be a civil engineer, there were a limited number of civil engineering schools. I think there are like 237 civil engineering schools in this country. But back in the 60's when I was picking a school there were probably 50 top schools. And I applied to about ten of the top schools, including MIT and Carnegie Mellon, but I ended up at North Carolina State University because it was financial. And it was also in Raleigh, where I grew up. And I have a bachelor's in civil engineering from North Carolina State University. I have a master's in regional planning from the University of North Carolina at Chapel Hill, which is another story. Also, I have a master's in civil engineering, again, from North Carolina State University. I worked on my PhD at the University of Maryland here in College Park, and I finished ... work, and got promoted and never finished school. But that's sort of my academic background. I had a lot of training subsequent to that in management at Harvard, and at the University of Pennsylvania.

Q: Was there anything throughout your education that you found particularly difficult, or, on the other side of that, easy?

Davis: Difficult? Civil engineering is difficult. It's very complex when you start talking about designing and building things that people use in their day-to-day lives and never really think about. Designing an airport, or designing a highway bridge, or developing water systems that you drink. Or sanitary systems. So it's all very complex, but it was a lot of fun. And under no circumstance would I think any part of it is easy, but I would say it was difficult but fun.

Q: Did you participate in any co-ops or internships while you were an undergrad or in graduate school?

Davis: Well, I think co-ops and internships are great, but during my time you've got to realize that the country was in war. We were at war in Vietnam even though we didn't declare war. If

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you didn't finish in your four-year time frame you were off to war. And we worked hard to finish in four years, which meant we had to take 18, 19 hours per semester, which was a really extraordinarily heavy load. And we had to finish within the four-year window. So a couple of summers I went to summer school in order to maintain that pace of graduating within four years. Civil engineers today graduate in about 4.7 years, so it was a whole different mix then, and we didn't have time for co-ops. I think a four-year program is all that was recognized at that point in time. A five-year program would have put you right as a candidate for the draft.

Q: So in lieu of, I guess, co-ops, what kind of engineering-specific activities did you participate in? Was it just mostly course work and taking the classes to get the degree?

Davis: When you have 18 hours a semester the most you can do is have fun in labs. We didn't have an opportunity to get out and work while I was an undergraduate. Not at all.

Q: Do you find that you use a lot of what you learned in college in the workplace?

Davis: For 20 years I actually worked in civil engineering, and my specialty was transportation. So we were designing and building railroads, airports, and I did a lot of highway work. And then finally I worked for a shipping company where we built ports around the world. One of the things that I learned in graduate school that I remember was Queue Theory. When you are faced with a situation where you have 20 lanes of traffic and 40-50 trucks backed up in each lane and you're trying to get those containers on a vessel, and you don't make money until the truck gets on the vessel, Queue Theory becomes very important. I think the planning that I went through in planning school comes through more often because we're now always trying to seek consensus. We have a lot of committees, seven or eight hundred committees, doing work at ASCE at any point in time. And our goal is to make sure that we can bring them to consensus.

Q: Do you think that there's anything that colleges could be doing in order to prepare students better?

Davis: I think that one, the bachelors degree cannot be the professional degree for any engineering discipline, especially civil engineering. I think the master's level is really where you should consider yourself a professional. Saying that, then, as an undergraduate, you need to take more courses. Especially civil engineers because we deal with the public on a day-to-day basis. And it's important that civil engineers know how to communicate, orally and in writing. And also be able to stand up at a public hearing and say things in a very simplistic way, versus giving all of the technical operational entities of a water treatment plant, just say that guys, we do things and give you clean water. You turn on your shower this morning -- you can take a shower thanks to us, versus telling them all the technical aspects of tertiary treatment at a water treatment plant.

Q: Is there anything that students could do to prepare themselves?

Davis: I think that students should get involved in the community that they're working in. I think that civil engineering students should get out and work with the city departments, the traffic departments, or the planning departments. And even give free labor. Because what they want to do is understand how they're going to fit into this whole work force at the appropriate time.

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Also, they can do a lot of activities for high schools. They can go visit high schools and communicate to students in the fourth, fifth, sixth grade about the importance of math and science. Around the seventh or eighth grade they can steer themselves. But if they don't do it early on they won't be able to do that. They also should be part of a debate club, and learn how to manage disagreement, because throughout their careers there will be a lot of people that'll be on the other side. And if they can work through those kinds of discussions and try to get win-win solutions I think they'll have gleaned a tremendous amount of knowledge.

Q: How about professional associations?

Davis: Professional associations give students an opportunity to come face to face with leaders in the profession, and to understand the teaching side of it, the business side of it, the government side of it. And to choose which way they want to go. Do they want to be a researcher, do they want to be a government official, or do they want to design and construct facilities, or manage the companies that design and construct the facilities, or just be a member of industry. Beyond that, we take a student from the time they graduate, after they've gone through the preparatory stage, to the time that they retire. And we have programs that help them every stage of the way. Because when they graduate one of the things they want to do is get some real solid design experience so they can get registered. Because it's only through registration that we then fulfill our mission to help people build a quality of life. And we have to be technically proficient, and that's sort of our badge to the public, is that guys, we're qualified to design and to build, and you can drive over it at 80 miles an hour on a wet night and feel secure. And so we have programs each stage of the way. When they move up to a project manager stage they can do certain things. When they move up to an owner stage they can do other things.

Q: How did you get your first job?

Davis: My first job was with Southern Railway, and I got my first job because in those days, a lot of companies came to universities seeking engineers. I went down to Atlanta and met with the Southern Railway people. Came to Washington. Met with some of the leaders in the Southern Railway. My first job was as a management trainee. Working as a management trainee was responsible for working with a tract engineer and a hundred miles of track, making sure that the track was aligned and straight and that we could run trains over it at eighty miles an hour. And the first big project I did there was to replace an open deck truss bridge. From Southern I went to work for Barton Ashman Associates as an associate in the firm. And this was after graduate school. And there we did a lot of work in Washington on three different urban renewal areas. I was the traffic engineer and transportation planner for those three urban renewal areas. And we had an opportunity to work with the people designing and building the metro system. We moved one station up on 14th Street from one location to another because we felt it would better serve the community. And in another area we took a sewer that was underground that was designed back at the turn of the century that had about a 20-foot clearance, and used it as a tunnel to get underneath one of the major intersections. So we did some novel things, and we built a ramp down at Michigan Avenue in Washington. So it was kind of exciting working for Barton-Ashman. And from Barton-Ashman we worked for the Mitre(PH) Corporation out of McLean, Virginia. And there we did a lot of work for the government, and with the Urban Mass Transportation Administration in particular. And I went to work for the Urban Mass Transportation Administration. They were gearing up -- at that

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time there were about 200 employees -- and they were gearing up to serve the country's mass transit systems. I had very little interest in mass transit at the time, so I said, why not. It's a new challenge. I went there, and fortunately for me, after about five years I became the National Director for Grants Assistance, which meant I was responsible for 4.1 billion dollars. We had a couple hundred employees in ten different regional offices. We had a chance to actually decentralize and build and make those regional offices. We were actually, making a contribution to the country. We built -- we funded and extended, the five years I was in that job, the system in Atlanta, the metro system in Atlanta. We started the construction of a system in Miami. We started a project in Baltimore, and put in a rail system in Baltimore. We started a project in Portland, Oregon, also in L.A. We started a project in San Jose, Sacramento. And we also had an opportunity to rebuild some of the old rail systems in New York, Chicago, Pittsburgh, Philadelphia, Cleveland. I left there to work for the Port Authority of New York and New Jersey. They needed to have a project put together for their system which links New York and New Jersey. And we put together for them a 600 million dollar capital program, got most of the project out. Got the subway cars out to bed, but we had a little bit of a twist. They normally would be built outside of the country because we didn't have any subway car manufacturers in the U.S. So we required them to build a subway manufacturing plant in Yonkers so that we could get that working, that experience in this country. And then from there I went to work for SeaLand, the SeaLand Corporation, which is the largest container ship flagship company in the U.S., and the first container ship company in the world. And there we had an opportunity to manage and work with their terminal facilities, and as I said earlier, to make them more efficient and more proficient in terms of productivity.

Q: How did you find your job here at ASCE?

Davis: Bud Carroll was president, and he was making a lot of statements about starting a research foundation. And I called up and said, I want to talk about this foundation job even though I'm doing well, traveling around the world. They said oh, by the way, we have a job, chief operating officer. We have some real problems here at ASCE, and we want you to address them. And I said that would take two and a half years. After two and a half years they said, we want you to move up. And a year or two later I was the executive director.

Q: Do you find your job to be personally rewarding as well as professionally?

Davis: Right now, civil engineering sort of is my life. And ASCE is civil engineering and a lot of civil engineers. So I get an opportunity to travel around, meet a lot of people, and discuss issues with them. Not only issues related to civil engineering, issues of the larger community. And it is personally rewarding. I like getting out and talking to people and seeing their eyes sparkle when I talk about the future that they can potentially move into. But outside of civil engineering and outside of ASCE I have daughters. I mean, the greatest thing in my life recently, though, is that my daughter just finished med school. My oldest daughter. So that was pretty exciting. And my second daughter -- I only have two kids -- is going to start at the University of Maryland this fall in civil engineering. So personally that's the greatest thing on my agenda. It was just, like dad, like daughter.

Q: Do you find that the field enabled you to balance family and professional life?

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Davis: Well, I think it's very difficult when you're in civil engineering because we work sometimes 24 hours a day on some projects. We also do a lot of work; I've done a lot of work, outside of the U.S. I've been out of the country six months. Being away from home for six months at a time doesn't make for a great home life. But fortunately, my family's always understood that we were working for the betterment of the family, and when we were with the family they got a hundred percent of our time. When we were at work, we actually had to get out and get the job done. Most civil engineers that work out in the field have some difficult hours. You know, we work 10, 12, 18 hours a day. A lot of civil engineers, I would say the majority of us, now work in an office environment, either as designers or as federal reviewers or government reviewers. We're not necessarily out in the field that often. And so consequently I think that civil engineers have been rated a highly ethical profession, and that's because people know who we are, to some degree, because we get involved in community activities.

Q: You mentioned earlier that planners seem to get more respect than engineers.

Davis: I think early on, 20 years ago, that was the case. If you go back to the fifties and sixties, engineers, civil engineers in particular, planned everything. We planned highways. We were city managers. We ran the cities. We were county managers. We were head of the Bureau of Public Roads. Any project that dealt with infrastructure development was headed by a civil engineer. The secretary of transportation in any state would be a civil engineer. The secretary of transportation for the country, who's now a good friend of mine and a lawyer, would have been a civil engineer. Today we lost out on that. I think part of the reason we lost out on that was in the building of the Interstate Highway System. And a lot of the plans took highways right through communities, and we broke up a lot of communities around the world. Unfortunate. As a result of that they decided, well we should get planners in here who could plan this thing a little better than these engineers. All they want to do is build some things. So I think planners got a lot of respect from the public as a result of that. Over the last few years, though, planners have gone off into their green ecology stance, and not that we have to continue to build, we have to continue to reinforce our infrastructure if we're going to survive and be a mainstream country at the turn of the century. I think as a result of that the pendulum's shifted. And I think civil engineers now are as respected if not more respected, and are being called upon to take on some of these policy and planning positions. I think the public image of the civil engineers is really improving. But at one point that was a major problem.

Q: I know you touched on it briefly before, the issue of women in civil engineering. Can you just elaborate a little bit on how you feel opportunities have changed for women in the field?

Davis: I can tell you this. In four years of undergraduate and two years of graduate school in civil engineering there was not one woman in our school. I went back there a few years ago, and we had a woman president of the student chapter, of ASCE student chapter, and the women were totally engrossed in all activity. I went over to university in Washington, and half their civil engineering students were women. I asked them, what attracted you to this. And a lot were attracted to environmental engineering. A lot of women looked at structures when they were growing up, watched things under construction. And they decided, I want to build something. Because at one point women were not allowed to be on a construction site. Now

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they're saying we want to take over the construction site, and we want to design and build something. Women have always been in the architectural area, and that's designing. Now they want to be on the other part of it, actually the engineering and structural design, and building it. So I think women are attracted. Civil engineering is a n attractive profession. And it's open, and it's gender, it's not a gender-specific kind of activity. Working in a water treatment plant, or running a water treatment plant, or designing and constructing a water treatment plant, has nothing to do with gender. Same thing with a waste water treatment plant. Without these kinds of activities we would have no quality of life. So I think women are realizing they actually can have an impact and help us all improve the quality of life by being a civil engineer. It's just a great profession.

Q: How about mentors? Did you have any along the way, and how did they help you? And are you, maybe, one --

Davis: We all have mentors. I don't think anyone can do anything without someone that they look up to and respect. I think one of the mentors that I had that I really sort of enjoyed was a woman that ran the Metropolitan Transit System here in Washington. Carmen Turner, died about two years ago. And it was right after I went to work for the Urban Mass Transportation Administration. Right before we met, I went out, and bought, I'll never forget, I bought a suit from Sears and Roebuck, and I paid 40 dollars for it. Now, this is back in the seventies. And I'm thinking, I just got this brand new suit. As a matter of fact, I think I bought two of them for 80 dollars. They were on sale. You're smiling too, but two suits are very -- for that time. And I walked in, and Carmen looked at me and said, you know Jim, this is a nice suit, but my scarf that I have around my neck cost more than your suit. And I thought about that. You really need to get a name suit. And ever since then I've had higher quality suits, and I dress totally different. I think if Carmen didn't just take the time and say, here it is, you know, who knows where I would have ended up. I think that's part of it. You can have all of the technical knowledge, you can have all of the ability to communicate, but if you don't dress the part and act the part you still have lost out in any career that you choose. So yes, you have mentors, and they've helped me technically, they've helped me professionally. That's just one story.

Q: Do you think that there's a big demand for a specialty in civil engineering as opposed to other areas?

Davis: here's always a demand. The funny thing about civil engineering is we're at a -- I call it a crossroads. A lot of people went into civil engineering in the fifties right after we got the Interstate Highways Act passed during Dwight Eisenhower's time as a National Defense Highway System. And a lot of people went into civil engineering because we were building this massive highway system across the country. At that time I think it was 40,000 miles. I think we ended up 50,60,70,000 miles. It took a lot of civil engineering. And now those people are retiring. But the Interstate Highway System has to be rebuilt. A lot of our nation's brigades are falling apart, and they need to be rebuilt. And so the demand for civil engineering in just rebuilding the infrastructure we currently have in place, is tremendous. Civil engineers now have stepped out on the environmental front of rebuilding and cleaning up a lot of the environment, a lot of the waste treatment plants and the hazardous sites that have cropped up in this country from industry disposal of their chemical waste. And as result of that a lot of civil engineers are involved in that activity as well, and as a matter of fact, we've engaged a lot of women in the civil engineering now. It used to be a man's kind of thing, with the hardhat, and

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out there in the field constructing. Now we have a lot of women coming into the profession. And that's because they see us as more environmentally sensitive. Around the world we look at sustainable development. And that is, trying to build a world that's ecologically correct, and a world that we can build civil structures and still maintain the quality of life for our generation as well as the future generation. And not just continually to tear down rainforests, and continually construct and not replenish. So I look at it like this. You can't have civilization without having civil engineers. We build the quality of life, we maintain the quality of life, and as long as people have a demand for higher and higher quality of life there'll be a demand for civil engineers.

Q: Do you think that there are any skills that would be critical for a student in this age of technology to survive in civil engineering?

Davis: Well, I think that the key to a civil engineer is creativity. When you start talking about people, they have to have a vision. And the technology can help you carry that vision to reality. But if you can't visualize how to cross a gorge, how to get from one side of the mountain to the other, you can't design it. All the technology in the world won't help you. So I think you still have to have a human touch. You still have to have vision. You still have to understand what it is you're trying to accomplish. And as long as that fact's there I think that you'll have a civil engineer. Beyond vision, you can get a technologist or a technician that can take technology that we have today and design anything. But the person required to have the vision, and what it is you should design and how it is you should design, is the civil engineering work. And I think the need for that will go on to the end of time

Q: Can you talk a little bit about the job market for civil engineers in the 21st Century? What should a student expect coming out of school with a graduate degree?

Davis: Well, I think that the job market for civil engineering and civil engineering students changes radically. As I said, I think in the fifties and sixties there was a lot of work in every city and every state in this country. We still were building dams for water power and dams for water supply. And we stopped doing that because a lot of things got environmentally sensitive. Denver, for instance, said that they needed a new water supply. They were going to build a dam, got it voted in, and then it got voted out. Without a water supply, Denver will not survive for so long. A number of cities are using wells that have 20-year lives. What will happen after the 20-year life? We will have to go back to building dams. Right now most of the dams are being built outside of the U.S. In China they're building a Three Gorges Dam. Major water supply for China. In Argentina they're building a major dam. Exxon is leading the way in building that dam. India has a very controversial dam that they're building. Ten years from now, or 20 years from now, when we need civil engineers in this country that understand how to build, design and construct dams, we may have very little knowledge. As I tell our students when I go out to the universities, the dam knowledge has moved outside of the U.S. Somehow, if they want to compete ten years from now they're going to have to move outside of the U.S. So the job market for civil engineering is worldwide. It's no longer a job market for the Washington area or a job market for the Southeastern U.S. or the Northeastern U.S., or Southwest or Northwest. The job market is universal and it's worldwide. Major civil engineering projects are being done outside of the U.S. The airport at Japan, the Kansai(PH) Airport outside of Osaka, or the new airport down in Hong Kong, the Chet Lak Kok(PH) Airport, a 25 billion dollar project. If Americans want to get involved in that they have to be out there.

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That's where the work is. They have a demand for civil engineers. And I think civil engineers who work in South America and Africa and Eastern Europe over the next 10 to 20 years are as smart, and that's where they get the experience. So the market is open. If someone wants to stay in Topeka, Kansas, they may be in and out of civil engineering because the work just may not be there.

Q: How would you describe your job?

Davis: As Executive Director of ASCE, I'm also the Chief Executive Officer. And like any Chief Executive Officer, you run a business. And our business is, we have about a 36 million dollar organization. We have 4.3 million dollars that we now have because we're relocating our corporate headquarters from New York to Reston, Virginia. We have a capital budget associated with this move of 18 million dollars. We now have gone out on the open market, and we have bonds, industrial revenue bonds, that are grade A plus rating we got from Standard and Poor's. So like any business we have to work with the financial markets. We have to pay our bills, and do other things. Given that, we have a board of direction. We have 28 members on our board. Our board's elected by our membership. We have an executive committee of seven people. My responsibility is to the board, and to ensure that the day-to-day operations of management and operations of ASCE is done as the board has dictated. To some degree they set the policy and budget, and my job is to implement the policies and the budget of ASCE. I'm also required to work with a staff of 240 people on a continuing basis, to provide products and services for our 123, soon to be 125,000 members. We have about 8,000 active volunteers on these 800 committees. We publish 25 journals, learned journals, scholarly journals that are peer reviewed. We have a monthly magazine, newspaper. Plethora of newsletters that we give out, that we publish for a number of our areas. We're a book publisher. We have a new book publishing company, the ASCE Press, that actually publishes a number of books. We also are a major provider of conferences for our members. We put on about 25 specialty conferences a year. We have 150 continuing educational seminars that we put on a continuing basis. So it's a major, major kind of business entity. We also are intimately involved on the education front in accreditation. Our members actually go out and accredit the civil engineering programs in this country, and some of our members even serve on teams that accredit universities or programs around the world. So, on a continuing basis we're involved in a lot of technical, professional, educational, and international activities on a day-to-day basis, and we're constantly involved in the production of products and services. We put a major convention on once a year. We also have a major membership activity where we're out promoting members on an annual basis as well. And with our membership moving toward 120,000 we have to constantly nurture that market. Our dues are about a third of our budget, which gives us about 10 to 11 million dollars from dues. The other money, 25 million dollars, we have to earn just like any other business. And that's selling the best products and the best services that hopefully our members and others will buy. We get about 40,000 non-civil engineers purchasing our products on an annual basis. It's a business. We look at the markets, and we make sure that we're market-driven, and that we, more importantly, satisfy the needs of our members.

Q: Do you find the field to be financially rewarding?

Davis: Civil engineering? Oh, sure it is. Civil engineers, I think, are some of the highest-paid individuals in this country. If you look at engineering, we're probably fourth or fifth on the list in

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terms of average income. But I think if you look at the population at large, we're probably in the top ten. As a matter of fact, a couple, three years ago, the U.S. News and World Report had the most desired, most admired or desirable professions. Civil engineering was in there, and our wages were in the top ten. We sent it out to some of our members that said, you know, I get paid enough. But we feel that, when you look at the population at large, civil engineers are well-paid.

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