



Sloan Career Cornerstone Center

Profiles of Civil Engineers



C. R. (Chuck) Pennoni, P.E.

**CEO
Pennoni Associates, Inc.
Philadelphia, PA**

Education:

B.S., Civil Engineering, Drexel University
M.S., Civil Engineering, Drexel University

Job Description:

"As Chairman and CEO of Pennoni Associates, Inc., my duties include the establishment and administration of corporate policy, business planning and budgeting, and the coordination and oversight of the programs and initiatives developed and implemented to achieve corporate goals."

Advice to Students:

"Learn a second language, work and study in another country and by all means acquire a master's degree. It is important to learn how to learn and to acquire as broad an education as possible, including work place and cultural experiences, and then to proceed to post graduate education in your area of interest, recognizing learning is life-long."

Video Transcript 1:

"We in our long range plan, look to do more work globally for a number of reasons and in order to support that, when we're hiring we try to hire people who are willing to travel, willing to work in other countries and other cultures and hopefully are bilingual or multilingual. There's not that large a work force in the United States today that will meet that criteria but we've been successful in getting some of the work force in our firm that would be willing to do that."

Video Transcript 2:

"When I graduated from college, I was trained technically and economically. And then I saw the environmental concerns come into the work place so I had to be sensitive to environmental concerns. And then the public started to get very involved in projects. When the public got involved, the politicians got involved because the public would turn to their, their government and say why is this being done and why is it being done this way? Or why is it being done here? And once the politicians got involved and the public and the legal profession got involved representing both sides, then aesthetics became a big issue as well, and because of tight budgets and government, financing. Not just the economics but the financing."

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Video Transcript 3:

"While in college, students should take the opportunity to work in the area where they think that they want to pursue a career...I can't stress enough the importance of getting into the work force and really experiencing what you think you want to do while you're in college."

Video Transcript 4:

"We are truly in a global economy, and the engineer going out into the work force today may be expected to work with people from other countries who are here in the United States or may be expected to travel to other countries representing the company, the United States company for which they would work. So they need to have an understanding of the differences in cultures, how people communicate, how they live, how they speak."

Video Transcript 5:

"So the combination of a degree in engineering, four years of internship, passing the fundamentals of engineering exam, eight hour exam, and the principles of engineering exam, another eight hour exam, then allows you to become a licensed engineer in whatever jurisdiction you were tested. Now in the 55 jurisdictions in the United States -- that's the 50 states plus five others which are Washington, D.C., Puerto Rico and so forth, there's a lot of portability with that. If you meet the basic requirements, you could essentially apply to other states and get a license in the other states. But that licensing is very important if you want to be in private practice where you are directly dealing with the safety, health, and welfare of the public."

Video Transcript 6:

"There are more engineers today or more students today that are getting that first degree in engineering and then going on to something else, whether it's law or medicine or getting advanced degrees to go into research or education. The financial world has discovered engineers in recent years and you find a lot of engineering graduates working on Wall Street and working in the financial world. I have a friend who is a graduate from RPI in electrical engineering who right out of college went to work for Chemical Bank and has moved up the ladder at Chemical Bank and is a vice president of Chemical Bank. And he says that his familiarity with numbers and his training to identify problems and solve problems is what helped him quite a bit in the financial world."

Interview:

Pennoni: Civil Engineers truly enhance the quality of life of the general public. You can actually point to the benefits of your efforts and your contributions to society. Students today should recognize that we are truly in a global economy and strive to broaden their education to include multicultural experiences. While not the only way to get ahead, graduate training can provide the critical depth of training some specialties require. The best sources of information about grad school are your professors and other practicing engineers. Money issues are always relative. It is not just how big a paycheck, but what you have to do to get it, whether you enjoy the work and the environment, how much you get to keep after your living expenses, and what intangible rewards you might also value. Choosing to work in the public versus private sector may also influence salary ranges. As in any profession, civil engineering salaries bear some relationship to the level of responsibility the employee takes on.

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If you would look back in five year increments, today, five years ago, ten years ago, fifteen years ago, you would see that the amount of work being done internationally increased quite a bit with the firms listed in Engineering News Record. Also what we're finding today in the United States is we compete for jobs in the United States. We have competitions from firms from other countries. It may be a waste water treatment plant in Kentucky and you would expect only U.S. firms to compete for that job, and we find that's not the case. There will be firms from other countries, European firms or Asian firms, also competing for that job.

Q: When was this firm founded?

Pennoni: Pennoni Associates was founded March 1, 1966 by me as a one person structural engineering firm to design structures obviously. And I designed it with all the idealistic purposes of an engineer, a professional engineer in that I felt the appropriate way to do a design as a professional was to do all the investigative work yourself, do the actual design, preparation of plans and specifications yourself and follow it through the instruction as an individual, as a professional. As I worked more and more for various clients and clients asked me to take on more responsibility, obviously I needed more staff so I added people to the firm and over the years the firm has grown from the one person, March 1, 1966, to the over 450 people that we are today.

Q: You have offices now in Philadelphia?

Pennoni: Pennoni Associates has offices in six states in the United States: New Hampshire, Massachusetts, New Jersey, Pennsylvania, Delaware and Ohio, and in addition we have offices in Mexico City, Mexico, Yokohama, Japan and Manila, The Philippines.

Q: What's your biggest project that you're doing right now? Or the most interesting?

Pennoni: The most interesting project we're doing right now is in Japan where we have an operations and maintenance contract on an air force base where we do all of the operations, maintenance, testing, repairs for a fuel depot. And that's jet fuel for jet planes. So that is a real high tech operation and it's really interesting and challenging.

Q: Where did you go to school, where did you get your training?

Pennoni: I have a Bachelor's of Science and a Master of Science in civil engineering from Drexel University here in Philadelphia.

Q: Is Drexel a really major supplier for this kind of work?

Pennoni: Drexel University is over 100 years old and the university is about 10,000 students, of which 45% are engineers. Engineering is the largest college at Drexel University. The area relies on Drexel quite a bit for a supply of engineers and Drexel prides itself in the fact that it places all of their graduates because of their cooperative program. Engineers who graduate from Drexel have essentially two years of experience upon graduation because they serve an internship in the cooperative program at Drexel and that really makes them very employable in the work place.

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Q: Tell me more about the importance of doing a coop. For instance, if you're evaluating a new hire or in light of your own experience with engineers.

Pennoni: When Pennoni Associates is looking for an engineer to add to our staff, we look for a number of things. Besides looking for the education, the quality of the education and the area or discipline of the education, we also look for someone who has experience. And that experience is usually gained through a cooperative program such as Drexel University's. Drexel is not the only a coop school in the United States; Northeastern and Cincinnati are also cooperative education schools. We find that that experience is very, very important in coming into the work force because it allows the engineer to be productive from the first day on the job as opposed to going through an orientation and training program. So although we don't hire exclusively from cooperative education schools because we recognize we should have a good mix in our work force, we do look to Drexel quite a bit for graduates because of that internship that has been achieved.

Q: Is this field, is it changing?

Pennoni: The field of engineering has gone through significant changes over the last several decades and some of the significant changes are in the way the work is being done in the work place. For example, the advent of design/build to a significant degree has changed the way the engineer works in the work place. Engineers used to basically be retained or hired by owners and would design, prepare plans and specs, advertise for bid. A contractor would come in and be the successful bidder and construct whatever was designed by the engineers. With the design/build process, the owners look more for a team and look towards the contractor as a team leader because the construction dollar is so much more than the design dollar. So the engineer now finds themselves either working for contractors as opposed to consulting engineers, or working as subcontractors or subconsultants to the contractor. In addition, the engineer is expected to do a lot more today than they had been expected to do in the past. Although we have a proliferation of codes, ordinances and standards and regulations to go by, the engineer, if the engineer is going to be in a leadership position, is expected to be able to communicate much better, is expected to have a broad understanding of all of the aspects of a project. For example, when I graduated from college, I was trained technically and economically. In other words, I would design something properly so it wouldn't fail -- if it was a bridge, the bridge would support the loads and not fall down -- and also design it economically so it could be built for a fair price and a good price. And then I saw the environmental concerns come into the work place so I had to be sensitive to environmental concerns. And then the public started to get very involved in projects. When the public got involved, the politicians got involved because the public would turn to their, their government and say why is this being done and why is it being done this way? Or why is it being done here? And once the politicians got involved and the public and the legal profession got involved representing both sides, then aesthetics became a big issue as well, and because of tight budgets and government, financing. Not just the economics but the financing, where is the money going to come from and how is it going to be structured became very important also.

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Q: All right, as the field changes like that, do you think the students have to do anything special to keep up with that?

Pennoni: Students in engineering today have to consider several areas for their career advancement. In addition to the foundation education in the technology of engineering, what they really need is a very broad education in cultural areas and in areas of communications. By culturally, I mean they have to understand the different cultures of the world because we are in a global economy. We are truly in a global economy, and the engineer going out into the work force today may be expected to work with people from other countries who are here in the United States or may be expected to travel to other countries representing the company, the United States company for which they would work. So they need to have an understanding of the differences in cultures, how people communicate, how they live, how they speak. And frankly, it would be good if the engineers would be bilingual or multilingual. And in addition to that, they need very broad communications skills. They have to be good listeners, good readers and good writers. And probably the most important part of that today is to be able to articulate what you're trying to do, to get into a forum, whether it's the team you're working with or a public forum or you must explain your project and the different nuances and aspects of your project. And sometimes being able to debate what you are doing because if you are in a public forum or even in a team environment someone may not agree with what you are doing and engage you in debate from both sides of the issue. And you have to articulate your side and why you're doing what you're doing and why it is in the best interests of not just the project but the public in general.

Q: Can you give me an example of when communication skills have played a real crucial role in a project or something where a project was saved or lost?

Pennoni: Well, some examples of being able to articulate what you are trying to do that I've experienced in my life are in the solid waste area and the transportation area. For example, I recall chairing a public meeting where Pennoni Associates designed a landfill. And as a matter of fact, we had a number of public meetings and it was necessary for me and my support team to get up in the public in a hostile environment and explain to the public why this landfill was necessary, how it benefitted the public and why the public should allow their politicians to endorse the project because it needed political approval, so that it could go ahead for the benefit of the community. And this particular one did not proceed. It was approved through several stages by all the governing bodies and at the eleventh hour in the last stage, one vote out of nine went the other way and defeated the project. And consequently it didn't proceed. From where we stand, it was to the detriment of the community because we're convinced it would have been better for the community, and frankly, now fifteen years later, the community feels it would have been better also. So somehow we were not capable of convincing a majority of the decision makers that this project should proceed. Now that's one where we weren't successful but we've had many others. In the transportation areas where we wanted to put highways in certain locations or widen roads or reconstruct bridges, we've had public hearings in each and every one of these situations where it was necessary for us as engineers to get up before the public, explain why the change is necessary or why the location of this highway is necessary, why that is the best location, and how it would benefit the community. And what it is, is a short term inconvenience to the community for a long term benefit. And I would say on a scale of 10, we've been successful 9 out of 10 times in articulating this benefit and communicating that to the public and to the decision makers.

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Q: Let's go back to this global job market. You had mentioned that you see this as truly part of a global economy and that has implications for what students do. Does that have implications for people looking for jobs? In other words, students graduate from school, evaluating where they want to go in their careers. What is the influence of the larger political and the larger globalization of this industry in terms of what kind of jobs are out there?

Pennoni: Globalization of the engineering industry is an interesting study. For example, if you would look in Engineering News Record for the top 500 firms, design firms in engineering, there is a preponderance of work being done today internationally. That's one of the statistics that Engineering News Record does provide. And if you would look back in five year increments, today, five years ago, ten years ago, fifteen years ago, you would see that the amount of work being done internationally increased quite a bit with the firms listed in Engineering News Record. Also what we're finding today in the United States is we compete for jobs in the United States. We have competitions from firms from other countries. It may be a waste water treatment plant in Kentucky and you would expect only U.S. firms to compete for that job, and we find that's not the case. There will be firms from other countries, European firms or Asian firms, also competing for that job. As a consequence, we in our long range plan, look to do more work globally for a number of reasons and in order to support that, when we're hiring we try to hire people who are willing to travel, willing to work in other countries and other cultures and hopefully are bilingual or multilingual. There's not that large a work force in the United States today that will meet that criteria but we've been successful in getting some of the work force in our firm that would be willing to do that. And as a consequence, in our three offices in other countries, we have people from those countries in those offices almost entirely, people who are bilingual or multilingual and people who understand those cultures and enjoy working in those cultures.

Q: Is there an impact of technology in your area that we should talk about?

Pennoni: One of the most significant changes in engineering in my career has been the introduction of the computer. The computer has significantly changed what we do and how we do it. For example, a basic bridge used to be designed by an engineer as if they were designing it for the first time with some reference to codes, standards and regulations. Today, a basic bridge is designed by a technologists sitting in front of a computer who pulls up this software and punches in the numbers that may be given to the technologist by an engineer and the computer cranks out the design of the bridge. And that's true not just in bridges but it's true in a lot of different areas of civil infrastructure systems, whether it's roads, whether it's sewer lines, water lines, water treatment facilities, pollution control facilities. The computer has permitted us to do so much more and do it faster. And when you combine the computer, the use of the computer, with codes, standards and regulations, you've taken the technologist of today and put them into the role of the engineer of yesterday in that they are able to do designs today, technologists can do these designs today that yesterday had to be performed by engineers.

Q: Do you see that trend continuing or has that already happened?

Pennoni: The use of the computer and the codes, standards, regulations and the applications therein by the technologists are very well ingrained in the engineering community today. I

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think the next biggest change in the engineering community, in the work force and in the consulting engineering community that I see coming on the horizon and it's already started to some degree, is American firms using firms or having satellite offices in countries such as eastern Europe where you could buy labor so much cheaper. And doing the conceptual design here in the United States, electronically shipping that to some country in Eastern Europe, having the plans and specifications, in other words, all the detail work, the bulk of the hours, being performed by engineers what are very capable and probably get paid one-fourth of what the U.S. engineer gets paid and then having that shipped back to the United States electronically to be polished up and then presented to the client. What happens there is you're doing the work much, much cheaper because labor is a vast part of our cost. In addition, if you look at the different time zones, you could be working two eight hour shifts in the same day or three eight hour shifts in the same day, shipping the information around electronically. So when you think of the elements of any engineering project, scope, schedule and fee, the scope will remain the same but you could really cut down on the schedule, you could do it faster and you can cut down on the fee. You could do it cheaper by employing labor in other countries and having these offices in other time zones.

Q: It sounds like bad news for the students in the U.S.

Pennoni: It is to a degree because the students graduating from the U.S. schools are now competing globally. They're not just competing in the U.S., they are truly competing globally. And the salary levels in other parts of the world aren't as high as they are in the United States so there will be a tendency to equalize. Whether that's an engineering or manufacturing, that's something that just exist in a free market economy. So they are competing with engineers from other countries, no question about it. But there's another aspect of engineering education today as well. I believe there's more of a recognition that engineering education is a good foundation for other areas. So there are more engineers today or more students today that are getting that first degree in engineering and then going on to something else, whether it's law or medicine or getting advanced degrees to go into research or education. The financial world has discovered engineers in recent years and you find a lot of engineering graduates working on Wall Street and working in the financial world. I have a friend who is a graduate from RPI in electrical engineering who right out of college went to work for Chemical Bank and has moved up the ladder at Chemical Bank and is a vice president of Chemical Bank. And he says that his familiarity with numbers and his training to identify problems and solve problems is what helped him quite a bit in the financial world.

Q: Did you do a coop when you were a student?

Pennoni: Well, my education is quite complicated. I actually went full-time for three years to Penn State. While I was at Penn State I worked for a construction company and I worked in research in the mechanical engineering department. I ended up getting married while I was in college and then went to school part-time. The only school at that time that offered part-time was Drexel University. So although I went three years full-time to Penn State, I went part-time to Drexel. So my internship was that I was working full-time for a consulting engineering firm while studying part-time for a Bachelors degree and a Masters degree. Frankly, that was excellent. It was purely by accident and not by design but I got all the basic engineering courses and foundation courses for engineering out of the way full-time and then had the opportunity to work in engineering while taking the senior courses and design courses and

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graduate courses. So I had the opportunity to really apply what I was learning in the classroom to determine if it was really what I liked to do. And that was not by design - that was by circumstance.

Q: When did you get your license?

Pennoni: The procedure in engineering for becoming a licensed engineer is quite simple. Firstly, you must have a four year engineering education from an ABET -- ABET is the accreditation board for engineering and technology -- from an ABET approved program. Then you must take a state board exam called the fundamentals of engineering and that exam basically tests you in the foundation courses for engineering and that is an eight hour exam. And once you pass that exam, you must have four years of internship or apprenticeship under a licensed engineer. Then you are allowed to take the principles of engineering exam which again is an eight hour state board examination. So the combination of a degree in engineering, four years of internship, passing the fundamentals of engineering exam, eight hour exam, and the principles of engineering exam, another eight hour exam, then allows you to become a licensed engineer in whatever jurisdiction you were tested. For example, if you were tested in Pennsylvania, you would be a licensed engineer in Pennsylvania. Now in the 55 jurisdictions in the United States -- that's the 50 states plus five others which are Washington, D.C., Puerto Rico and so forth, there's a lot of portability with that. If you meet the basic requirements, you could essentially apply to other states and get a license in the other states. But that licensing is very important if you want to be in private practice where you are directly dealing with the safety, health and welfare of the public.

Q: As an engineer, you're also an entrepreneur and that's part of what you need that licensing to do, is to be able to do your own projects as an entrepreneur? How do you think of yourself first and foremost?

Pennoni: Looking back over the career of Chuck Pennoni and the 31 years that I've been in private practice, I've really seen my practice go from the practice of engineering to a business-oriented practice to a practice oriented business to the business of engineering. And today more than anything I'm a businessman with an engineering background because in order to survive today in the business world, you have to first and foremost be a business person. You have to understand all the nuances and practices in business in order to be successful. So engineering has become a business. And that's happened in other areas also. For example, if you look at the accounting field, in the big six in accounting, Anderson Consulting, they do all kinds of consulting, they don't just do accounting. And in engineering today you find the engineering firms are getting into all types of work. There are firms that were purely bridge and highway design firms that now remove snow and plow grass and do maintenance of rest areas along highways. Pennoni Associates has branched out. We deal, for example, as I mentioned earlier, with the operations and maintenance of a jet fuel facility in Japan. We deal with hospital waste management and disposal in Mexico. So we get into related areas as well and these really are businesses. They're not the traditional consulting engineering that we know from 20, 30 years ago.

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Q: Do you find this life rewarding?

Pennoni: I've been fortunate throughout my career that I've enjoyed everything I've done. When I would sit at a drawing board and design a structure, I found it very self satisfying to be able to do that design, watch it constructed and see it put in use. Well, to jump to the other end of the spectrum as a businessman, to run a business, a very complex business in a very competitive world, and then see that business be successful, and to be able to pass benefit back on to your employees through various programs, whether it's stock programs, bonus programs or other perks, is very rewarding and self satisfying.

Q: What issues are there that engineers have to be aware of today and what would your advice to students be?

Pennoni: As an engineer/businessman, one of the things you must be very concerned about is professional practice and ethics. I always like to say ethics, like law and morality, change with time and geography. For example, at one time it was unethical for engineers to bid for work but that was taken out of the code of ethics in the seventies and today bidding is not unethical. It was unethical to advertise in a self laudatory manner. Again that was removed by the Department of Justice from the code of ethics of all the professions, lawyers, accountants, architects, engineers and so forth, and today you can advertise in a self laudatory manner. What is ethical in the United States or unethical in the United States may not be unethical in another country. And you've seen it with law and morality as well. Gambling is a classic example. Not many years ago, almost every form of gambling was illegal. Today states have their own lotteries and so forth and so on. So it is a very complex issue. Engineers focus an awful lot on ethics and professionalism. Where you find it is in the classroom. You find it in your state board examinations and you find it in your involvement in your professional societies and professional organizations. So engineers are bound by very strict code of ethics and code of conduct. And it's monitored, it's monitored by the professions. So you want to make sure you understand it, you should study it. There are courses available as you go through college. And you want to understand how to apply it and what to do and what not to do.

Q: Have you ever faced an ethical quandary?

Pennoni: Throughout my practice, I've been faced with ethical questions many times. Simple things like doing a job for a client and someone involved with a project wanting the information from you. Well, it is unethical to release any information without the approval of your client. That's pretty basic and pretty simple. But you also get into situations like supporting political parties or candidates of your choice. There's a right way and a wrong way to do it. If you want to support political candidates in a city and you're also interested in getting work in that city, if the mayor says if you give me X dollars for my campaign and I will give you some work, that's unethical and actually illegal. But if you are working in a municipality or a city and someone says to you geez, I'm having a fund raiser, could you help me out? And you choose to support that candidate or party, you have every right to do it. Because you work for government doesn't mean you disenfranchise yourself from the right to support a candidate or party of your choice. And that's a very complex issue and probably one of the most complex in business and that's why there's a lot of guidelines on how you would make political contributions. Over thirty years, you have a lot of situations that you're faced with regarding conduct and ethics. The black situations are easy, it's illegal, immoral, unethical, you walk away from it. The white

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is easy, you do what's ethical, legal and moral, it's very easy. But the real world operates in that vast grey area so there's a lot of judgment that's involved and you have to be very careful in how you do it. I've been fortunate in that ASCE, through the activities and their programs have helped also in many ways, because it's helped with the education and it's helped by putting you in touch with others and you could discuss situations and see what they would do and how they would handle it.

Q: Having a wide network of people you can talk to is important. Should students be building their network now?

Pennoni: One of the things I'd recommend to everyone on our staff and also that I recommend to students who are interested in pursuing a career in any walk of life is that they should become active in organizations that address the area of interest of their career. So if you are a civil engineer, you should become active in the American Society of Civil Engineers. Go to the meetings, participate in the programs. For many reasons. One reason and probably the best reason is the networking. You get to meet people at all levels. I recall as a young engineer in my early twenties meeting someone who was the head of a big company, sitting at the same table during a dinner meeting and having the opportunity to meet this person and talk with them. And you really learn an awful lot from that individual plus that adds to your network. Usually you'll exchange business cards and so you're building up a bank of people, information, in your network that you never know how you can use. When I changed jobs from private industry to government, I was able to do it because I met some of the people in leadership positions in public works in government. And they had told me about jobs and what they were all about and what they were like, and I ended up pursuing a job in government, all through networking at meetings of the American Society of Civil Engineers.

Q: Career and family?

Pennoni: I really feel fortunate in that I was able to balance my work place, what I was doing in the work place, my professional involvement, in addition to family and family involvement. I have a wife and four kids and we've been able to do a lot together. I coached baseball with my kids, I was active in Boy Scouts with my kids. We all go skiing. We now are older so we're into golf. We've had a home in the mountains which we used to use as a retreat and we now have a home at the New Jersey shore that we use as a retreat. And in addition, and I like to think that this occurred by example because I never dictated to our children what they should do, but I have three boys and a girl and the three boys are civil engineers. Our daughter married a civil engineer; she's a chemist working as an environmental consultant. So we have an engineering and technical environment at home. But my wife is more of an arts type person. She loves painting and opera and music and what have you, so we have a very good balance at home and I like to feel that I was able to spend enough time, certainly adequate time if not more than enough time, with my family while at the same time developing a career. And I think that's very, very important.

Q: What happens if the balance is knocked off center for a while?

Pennoni: We've had some interesting situations at Pennoni where we've had to work all night and sometimes all weekend and we've slept on the desks and what have you in order to meet schedules. But the one thing that you should do with people who work that hard and spend

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that kind of time is allow them then to take some other time and be off work so they can spend time with their families. The simple thing that we do at Pennoni Associates, for example, is if someone has a night meeting and they go to work in the morning and stay there all day and then go to a meeting at night and get home late at night or the wee hours of the morning, don't try and come in first thing in the morning. Be sure you see your wife and kids and spend a little bit of time with them and come in a little later the next day. So that the family has that connection, you're not just always working because that's not healthy. So we recognize that and we encourage that type of a practice here at Pennoni Associates.

Q: With those kind of pressures, how do people maintain balance in their life. Is it important to have a kind of a well rounded lifestyle, I mean, it seems to me that you're going to have people working 24 hours a day.

Pennoni: Well, it's very important for any individual to have a balanced lifestyle. As a matter of fact, at Pennoni we say the true professional is someone who not only has the education to be a professional and the ability to work in a professional arena but is active in the professional organizations, is active in the community, whether it's with civic or charitable or political organizations and has a balanced live with hobbies. As a matter of fact, we're very strong on people taking their vacations and pursuing whatever they enjoy to do because we feel they are a better person and they are a better balanced person.

Q: So how does that translate into decisions about people's careers? How are you aware of that in your work force?

Pennoni: Well, in our work force, we know pretty well what our people do because through our human services department we monitor the involvement of our people for a lot of reasons. For example, in this presidential summit that's being held in Philadelphia at this very moment, Pennoni Associates is a firm who has submitted all of the community work that our staff does to be part of that presidential summit. We have people who go into schools and tutor children. We have people who work with disadvantaged children. We have people who work with boy scouts and so forth and so on. And we are very proud of that and we encourage that and we support that. So the monitoring of what our staff does through our human service department helps us to determine that we have a good, broad based staff and we have people who are total people and not just focused in only one area.

Q: What about minorities and women in engineering? What are the issues there, what would you say to students about those changes in the work force?

Pennoni: One of the very significant changes in the work force is diversity. Back again when I went into the work force in the early sixties, I basically worked with white males. Today, if you look around an office, and our office is a good example, you'll see people from all walks of life and people from different gender. So today you're working with people from other countries, Asians, you're working with African-Americans, you're working with Hispanics, you're working with women in positions that were normally held by males. So there really is diversity in the work force today and you'll see it in the classrooms, particularly in northeastern United States. I recently had occasion to speak before the civil engineers at University of Pennsylvania and the minority in that group was the white male - by far the minority in that group. So diversity has really moved along at a very significant pace and it's here today.

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Q: Can you talk about how important it is for students to have continuing education?

Pennoni: We cover a lot of aspects regarding what a student should be doing both in their undergraduate study and considering graduate study, preparation for licensing through internship and examination, and one very important aspect of a career today frankly for many years in the past as well, is continuing professional development. Once you get out into the work force, you're going to do continue to learn. Things change and change rapidly so you must participate in seminars, whether they are seminars provided internally in the company you're with or seminars provided externally by some other educational type of organization. But continuing education is of paramount importance. And as an engineer and a licensed engineer, we're seeing more and more of the jurisdictions requiring minimum levels for continuing education for relicensing. If you don't participate and you don't have evidence of your participation, you will not be able to renew your license. But even more than that, it's important in the work force. Those that just cap their education and their learning and don't want to learn more and don't want to broaden themselves, also cap their career path. They're only going to go so far. So in engineering you have to continuously learn, continuously update yourself on what's happening in your profession and in your technology and the changes in your technology. So it's an ongoing, challenging endeavor for every engineer.

Q: Do you think people are motivated to enter this field by the inherent qualities of the work or the money or because their fathers or uncles are civil engineers? What do you think is the generating force behind someone going into civil engineering?

Pennoni: Civil engineering is an interesting profession. It's definitely a service profession. And I've had students and young engineers tell me that their primary concern in civil engineering is not the salary or the pay they receive but the service they're doing for others. If you look at what civil engineers do, we really help the public. We're doing transportation facilities to move people and goods. We're doing sewage treatment plants in order to take water and clean it up before it's dumped into the rivers and streams. We're finding water and purifying that water and taking it to the home so people could have potable water to drink and live in a healthy environment. We're getting rid of the waste, solid waste, by picking it up, carrying it and either incinerating it or lands filling it or what have you. So what civil engineers do is really focused towards the public. And I always remember one particular young woman, a civil engineer, and I were talking about salaries and I was saying how unfortunate it is that the civil engineer's salary isn't higher because we contribute so much to society. And she said to me that she looks at civil engineering almost like the Peace Corps, where you're helping other people and that salary is not that important to her. Now in reality, there's a balance between it. People do like to make money and like to live well but they also like to have a good feeling. So I think a lot of people who go into civil engineering have somewhat of that feeling of that same young woman, that they do like to do good and they do like to help people and they will take a little bit less money because of that reward they get for the accomplishment and the contribution to society.

Q: If I was an engineer and was evaluating job offers, what would you suggest that I pay attention to in terms of a company that I was looking at, a prospective employer? The reverse of what you are.

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Pennoni: If I as going out into the work force today, I would be looking for companies that were very broad. I don't think that, speaking for myself, I would want to work for a company, for example, that did nothing but design bridges. Because a company that does nothing but one thing will always be a small company and will have tremendous fluctuation in their work force because you can't sustain yourself with just one area today, you have to be very broad. So I would look for a company that was not only broad technically but was broad geographically because I would feel secure with that company. I would feel if I'm any good, there's a lot of opportunities. And if in the area I'm working in at one particular time starts to get a down turn, that the company would then give me the opportunity to shift to another technical area or another geographical area. So I would look for a broad based type company, both technically and geographically.

Q: Should students themselves try to cultivate a kind of flexibility in their own make up and their own approach to their work?

Pennoni: Students today need to have a very flexible mentality. They have to be flexible, as I mentioned earlier, not just in their course of study but their willingness to learn other cultures, other languages, and their willingness to be mobile, mobile in the work force when they get out into the work force. They could work anywhere geographically today.

Q: Why don't we talk about this idea of a career going in stages? What would you say to a student today that's just starting out and they have to make some decisions about their career direction. How is that important?

Pennoni: When I speak to students today or to recent graduates today, I try to explain to them what they could expect in the work force. When a new graduate goes out into the work force, many times their expectations are much higher than what really happens on the job. When a new graduate comes in, if they have no internship, if they've never served an internship before, they're coming in at a level where they really are given a lot of training. And they really need to learn an awful lot about what they have to do in the work force to be productive. These students sometimes will find themselves and they will realize where their natural talents lie and will be fortunate enough to get on the track that best suits them. For example, if a student comes into Pennoni Associates and we put that student in a structure design group and they really do enjoy structural design and they have the talent for structure design, they may follow the career path that just keeps them in the area of design itself. We have had several engineers retire recently that were in their seventies that for their entire career designed structures. That is what they liked to do. They didn't want to be in management, they didn't want to deal with administrative issues, they wanted to really design. And that's fine, that's a good track. There are other students who find they have talents in other areas and they may start out in design but find they like dealing with people, they like communications. They like the challenge of the different cultural aspects of individuals. They enjoy that and the emerge to team leaders where they work at pulling a project together and all the different aspects of the project dealing with the client and then proceed on into a managerial position as project manager and then later on, as maybe a group manager, a division manager or even a division officer or principal charge. So there are various tracks that can be followed and that is just in private industry. There are tracks in government, there are tracks in education and there are really many, many, many tracks. And I guess there's a little bit of luck involved with the student that gets into an area, into an environment where they're allowed to find themselves

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and find where their natural talents lie and have the ability and the opportunity to pursue that particular track.

Q: Is there anything they can do as students to make that process easier?

Pennoni: While in college, students should take the opportunity to work in the area where they think that they want to pursue a career. Because that gives them the opportunity and the advantage of learning what that work area is all about. If you never experience, no one could describe it adequately to you. So whether it's a summer job or a part-time job while you're at college or if you're in a coop program doing a coop period, I can't stress enough the importance of getting out into the work force and really experiencing what you think you want to do while you're in college.

Q: You're a real success story here. You started a one man firm and it's grown to being one of the top firms in the country. Did you feel that you went through distinct phases or was it like a straight linear progression. What's the big picture of Chuck Pennoni's career so far? I know you haven't peaked yet.

Pennoni: Actually, you're asking two different things. One is regarding the company and one is regarding me personally. You know, they may be intertwined to a great degree but they are really two different things. In looking at my own career, I often wonder what motivated me to go in certain directions. And I consider myself fortunate in that I relocated to the Philadelphia area from northeastern Pennsylvania, which was a hard coal region in Pennsylvania and in my time was depressed and didn't have any jobs so I went to the big city. In coming to the big city, I felt I needed to meet people and I was told there was an engineers club in Philadelphia so I went to the engineers club and fortunately joined the engineers club and joined the American Society of Civil Engineers. Incidentally, I was a student chapter member of the American Society of Engineers, Civil Engineers in college also, so that was not a difficult thing to do. And that enabled me to meet a lot of people in the Philadelphia area. And as a result, I got to meet some people who were in very significant positions, two in particular, Sam Baxter, who was the Commissioner of Public Works for the City of Philadelphia, for whom I worked at one time, and also a past president of the American Society of Civil Engineers, and Francis Friel, who was a consulting engineer, for whom I worked, and also a past president of the American Society of Civil Engineers. So these people, whether it was knowingly on my part or not, were good role models for me in the manner in which they handled themselves. They happened to be very successful, one in government and one in private industry, and they happened to be very ethical and very much involved in the engineering profession and, in particular, the civil engineering profession. So that helped my career quite a bit. And although I may not have consciously patterned anything after these individuals, and looking back, I'm sure that I have, just the fact that they were leading by example. So I was very fortunate in being exposed to this type of individual and being part of the American Society of Civil Engineers. Because although you get your technical education in a classroom, you really get your professional education outside the classroom. And where I got mine was through involvement in a professional society. So that helped me to grow significantly. It allowed me to expand my horizons beyond just a narrow structural engineering scope that I was involved with, and it also helped me develop communications skills. I had to work with other people, serve on committees, debate issues, make presentations, stand up before a group and that was very, very helpful in developing my professional career.

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