



Sloan Career Cornerstone Center

Profiles of Civil Engineers



Vincent J. Ziparro, P.E.

**Chief Engineer, Vice President, and Director
Harza Engineering
Chicago, IL**

Education:

B.A., Physics, De Paul University
B.S., Civil Engineering, University of Notre Dame
M.S., Civil Engineering, University of Notre Dame

Job Description:

"As Chief Engineer, Vice President, and Director, I am responsible for engineering operations, reporting to the company president. I am responsible for hiring, training, and the professional development of staff. I also serve as Project Manager on major Harza projects."

Advice to Students:

"Get as much contact with the profession as possible. It's good to go to town meetings where they deal with engineering problems and hear the reaction and to listen to people, their complaints, and to get a sense of how people view the things that are happening around them."

Video Transcript 1:

"I have recently taken on additional responsibilities in covering from the board level, the Asian market, which encompasses the Philippines, Malaysia, and China and Korea and Laos. In that capacity, I will visit the various countries and various clients that Harza maintains in those parts of the world, and also the various project offices that we have there and maintain a liaison with both the client and with the Harza people on site with this office here in Chicago."

Interview:

Ziparro: My first Project Management assignment was the El Nispero Hydroelectric Project in Honduras. This assignment gave me the opportunity to develop my management skills along with utilizing my experienced technical skills. I learned to work with project teams from Harza, the client, and the contractor. Through this experience I learned how important it is to not only be an expert in your field, but to also have knowledge and skills in people management and project finances. Engineers are at the forefront of the global economy. Travel and relocation, both national and international, will become a way of life for engineers. While there are abundant opportunities to work internationally as a civil engineer, it takes some special

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preparation to do well abroad. Speaking more than one language is a major factor. Being able to adapt to new conditions rapidly is another. Although the international work force is becoming more mobile every day, traditionally big engineering firms tend to send experienced senior level staff on international assignments.

Q: Why did you decide to study civil engineering?

Ziparro: I studied civil engineering primarily because of the influence of my father who was a small contractor in Chicago. And he had always instilled in me that the most important person that showed up on the job was the engineer. Always dressed very nicely. And always working with the superintendents and in explaining how things are to be done. So he felt this would be a good profession for his children to enter.

Q: So when you went to school did you immediately decide to major in civil engineering?

Ziparro: I also was kind of a tinkerer, so I kind of felt I had a little bit of an aptitude for engineering, so with that in mind I kind of stayed with it and I enjoyed both math and science and again, talking to counselors in my high school, all indications were that, since I liked it and since I had the aptitude for it, engineering would be a good profession for me

Q: What was school like?

Ziparro: School was very rigorous, although I also participated in band, so there was some diversion. I took a combined course. My high school counselor felt that, at the time, engineers were spending too much time in numbers and science and not enough in the arts and letters, so at the time I graduated from high school, there was a three/two program, where you spent five years in college, three at a liberal arts college, and two at an engineering college, and ended up with a degree both in arts and a degree in engineering. So, because of that, the course load was always quite strenuous. I remember sixteen hours a semester being a light load. Usually it was eighteen or twenty-one hours per semester. And, of course, a lot of laboratories with the science -- physics and a chemistry lab, which took more time than you got credit for, of course.

Q: Did you zero in on a specialty?

Ziparro: I always felt that I wanted to be a structural engineer. In the summers I would work with my dad in the construction business, and we were always doing structural things - concrete foundations and steel erections. So I never deviated from that focus.

Q: Tell me how you got from school to work?

Ziparro: I had lived all my life in Chicago and never heard of Harza Engineering Company, but a fellow that had worked at Harza, came to our school to work on a graduate degree. And, he and I got to be kind of friends, and I was finishing up my graduate degree and he said, "Well, why don't you go look at Harza and give them a shot." And I liked what the company was doing, and I liked the people that I had met, so I joined.

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Q: Did you go to graduate school right out of undergrad?

Ziparro: Yes.

Q: What made you do that?

Ziparro: It was a little bit of a lark. I was asked by one of my professors to apply for a National Science Foundation Fellowship, and I had no intention of going to graduate school, but I did fill out the application, at his urging and then I was awarded a fellowship. So, my wife and I got married after I had finished my undergrad degree that summer, and then I went on to graduate school, and with the fellowship we made it through -- I finished in a year and a half. I didn't take any breaks and so that's how I got my graduate degree.

Q: What did you specialize in, in your graduate degree?

Ziparro: Structural engineering.

Q: Is grad school different than undergrad?

Ziparro: Much different, I felt. I felt at grad school there was maybe a less structured type environment, where you got to participate a little more with your professors and got to work more on an equal level, rather, where the professors have the upper hand, so to speak in a classroom situation in undergrad school, but there seemed to be a better working atmosphere with the professor at the graduate school level.

Q: Did you think that school prepared you, for the way the work gets done in the real world?

Ziparro: That's an interesting question. I think the academics are very important and prepare you for the work environment. I did not participate in the concrete canoe building, although our university did. I did participate in the American Society of Civil Engineers -- at the student level and we did have some meetings and invited guest speakers and did those kind of professional activities. Didn't have a lot of time for too many other activities. So as far as how the university prepared for the work environment, other than the academic preparation and knowing the subject matter, there wasn't a whole lot of interaction for team type activity. Although we did have, thinking back, we did have a seminar wherein we worked in teams preparing a presentation which was a very worthwhile experience.

Q: In terms of the courses that you were taking, what did you hate? What did you love? What were the good and bad parts.

Ziparro: I think the laboratories I disliked most. Especially chemistry lab working for hours on end and, of course, sometimes failing in your experiment and starting all over again, was for me, quite difficult because time was at a premium and you didn't have a lot of spare time to spend all those hours and not get full credit for the course, you do get credit for laboratory and it is necessary. But to me, it was the most difficult.

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Q: And what did you love the most, what did you enjoy most, course-wise?

Ziparro: Ah! In the course works, I really enjoyed the structural engineering courses the most. The mathematical modeling. At that time, computers were just coming into age, and the university had just obtained an IBM -- at the time it was an 1120. And that gives you an indication of my age. But we had to learn four-tran programming on our own, and that was very challenging and then, it was very exciting to take structural mathematical models and then program them and then actually have the experience to write the program and watch it work, and to see how quickly and what the potential there was for the computer. So that was really an exciting time.

Q: So you landed your first job from networking?

Ziparro: It was primarily networking yes. My first job was through this association that I had with this fellow grad student that had worked for Harza for about eight or ten years and decided to come back. He had a master's degree and was going to work on his doctorate degree. And he pointed me to Harza and I had interviewed with several aerospace companies, aerospace in those days was a very growing field. I interviewed with Pratt & Whitney Company in Connecticut and I enjoyed looking at what they had done and what they were doing was very exciting to me, also, because they too were starting to computerize and get into some very sophisticated structural analysis. And so, that was appealing to me, but I still wanted to stay in Chicago, if I could, so interviewed with Harza and the individual that I had interviewed with was, at the time, working on an arch dam, which is a very sophisticated structure. And so I felt that I could have just as much challenge here at Harza working on the type of structures that Harza was dealing with as I would in an aerospace environment.

Q: Can you give me an idea of the scope of Harza and its history?

Ziparro: Harza is a company that's 75 years old and has focused primarily on water resource projects. Many river developments related to both hydro-power, flood control and irrigation. We have had a major role in many of the major projects here in Chicago and also around the world. We are very much a complete company that has all disciplines. We do not go outside for any of the services. We have mechanical, electrical and environmental capabilities. The largest hydro-electro project in the world is a project in Brazil called Etipoo(PH), but before Etipoo, the second largest project in the world is a project called Gurrey(PH) in Venezuela which Harza had developed from its inception and it currently is producing 10,000 mega-watts. The Etipoo project produces 12,000 mega-watts. So they're fairly equivalent projects. This has been a project that Harza has worked on for the last 20 years. We are currently working on a project in China which is a major high arch dam, which is 220 meters high. The highest arch dam is, I believe 260 meters in Russia. This will be the second highest arch dam in the world. We are also working here in Chicago, on the tunnel and reservoir. We are completing a tunnel section for the Metropolitan Water Reclamation District called the North Branch Tunnel. And we are also working with the City of Chicago on another tunnel project, the 79th Street Tunnel. One of the most interesting things that Harza was involved with is the so-called Freight Tunnel Flood that occurred here in Chicago and caused the city to shut down for about a week. And we were a major player in helping to recover from that situation and to control flooding and to help the city in its rehabilitation from the flood.

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Q: Tell me about your career path.

Ziparro: OK. I joined Harza because I felt it was a company that was dealing with very challenging projects and very interesting projects. At the same time, I felt that I needed to obtain a structural license. Here, in Illinois, they distinguish between a professional engineer and a structural engineer and there are two licenses that are granted. One, a professional engineer's license and the second, a structural engineer's license. In order to obtain a structural engineer's license and a professional engineer's license, you have to take an examination after you have practiced in the field for four years. My focus after I'd joined Harza was to obtain that license and that license examination here in Illinois is pretty much based on building structures. And what I was experiencing at Harza was more in the water, hydro, type structures, dams and intakes and very heavy, massive civil projects. So I decided after a couple of years at Harza that I wanted to get some experience in the more conventional structures -- building structures. So I left the company and went to work for an architectural firm here in town that was designing commercial structures -- and worked for them for about a year. During that period I gained the experience that I was after, however, I found that the work became a bit repetitive and a bit, maybe boring. However, my former employer -- supervisor, kept in contact with me and said Harza was starting to get busy again and he kept urging me to reconsider returning to the company. So I did return and during the period, I also took the structural exam and did pass the structural exam. So I accomplished that objective. After working a few more years here, I have a brother who is also a civil engineer who was in the construction business and he convinced me to go into the construction business for a few years. That's what I did. I left Harza again, and we were working in the construction business for about five years. Again, I believe that any experience that you have, you can learn from. And it was a good experience. It was a very challenging experience and challenging work. However, I felt that it was more administrative and more a business type environment than I liked. It did not offer the technical challenges that engineering did. So after about five years I separated from my brother and again, came back to Harza and have been here ever since.

Q: So how many years?

Ziparro: This is -- if you discount the years that I'd left, this is about 30.

Q: Tell me what your roll is here now, and what your primary responsibilities are.

Ziparro: OK. As the chief engineer, I'm responsible basically for all the technical aspects of the engineering operation, which encompasses four departments. The electrical department, the mechanical department, the civil department, and the environmental department. All of those folks, through their respective department heads, report to me. One of the major responsibilities I have is for the technical quality of the work that the company produces. In addition to that, it's my responsibility to make sure that the company is properly staffed for the workload, we have the right capabilities and the right people and the right number of people for our workload. I also will be responsible for developing of Harza Standards. We have a set of standards that we produce and that we continually update and review. And it's my responsibility to make sure those standards are current and reflect both the Harza practice and world engineering practice. I have additional responsibilities as a director of the company. I am responsible for the well-being of the corporation and responsible to the stockholders for the profitability of the company. So I participate as a director in board meetings, on a monthly

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basis. I have recently taken on additional responsibilities in covering from the board level, the Asian market, which encompasses the Philippines, Malaysia, and China and Korea and Laos. In that capacity, I will visit the various countries and various clients that Harza maintains in those parts of the world, and also the various project offices that we have there and maintain a liaison with both the client and with the Harza people on site with this office here in Chicago.

Q: Could you sort of give me some examples of a typical day or a typical week for you, which might include travel etc? And give me specific examples of everything that you do?

Ziparro: Well, usually the trips are planned enough in advance that you don't get a call in the morning and have to leave in the afternoon. But you may get a few days of advance notice. Typically, we have a project -- OK, we can take yesterday for an example. In the morning there was a call that we'd received from a company in Egypt that is pursuing a major project in Egypt. And they have asked Harza to be their engineer. We had gotten some information and we had looked at the drawings and we are not initiating some discussions on the services that we would provide. In order to get that started I called a meeting with a civil, an electrical and a mechanical lead engineer and we set up a team that will start to study the project, look at the services that we would provide, and start to develop a methodology of budget estimates, and then go back to the contractor by the end of this week with a quotation of the services that we would provide and the costs for those services, and of course, a schedule for meeting their schedule. Subsequent to that I got a call from a client who has a project under construction on the Ohio River that Harza has designed, and the contractor has requested to move a large mobile crane onto one of the permanent structures, which was not designed for that load -- and the client has asked us to take a look at the structure and give an opinion on whether or not that structure can support the load or what needs to be done to modify it to support the load. So after that call I got a couple of the structural engineers together, we looked at the drawings and we went back to the client and said yes, indeed, we can do the work. Today we'll be talking to the contractor to get some details of the equipment that he wants to utilize and we'll do the analysis and give our opinion, probably next week sometime. We got another call -- again, most of my day is spent relatively unplanned although there are some planned activities on meetings, normal meetings. I meet once a month with my department heads and we meet once a month at the board level. And I do get drawings that -- for major projects that I review on a weekly basis. So the week is broken up into various segments of activities that break down into administrative client contact, and technical review, pretty much.

Q: Why don't we talk a little bit about the fact that you sort of move from technical to management, and do you miss parts of it and the new challenges?

Ziparro: Throughout my career and I don't think it's any different than most people's careers, you have choices at times and sometimes you feel that you're leaving something that you really enjoy for some unknown territory that you may or may not enjoy. I have always accepted the challenge and I accepted the new aspect of a different type of work. And always with mixed feelings. I do enjoy the hard basic engineering technical work. But as I move through the organization, the administrative parts become increasingly more consumptive of my time, to the point now where I think it's maybe 70 percent administrative, 30 percent, what I would call hard technical work. I do miss that technical aspect of the work in engineering. If you don't

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do it regularly and on a daily basis with the advances that occur, you tend to lose touch with the current practices. That's the difficult part of being more absorbed into administrative and technical activities. However, those activities at the administrative side or at the business development side or the client contact side, can also be very challenging. Making presentations to various organizations and various companies is exciting and challenging. And so there are trade-offs all the time.

Q: How has technology changed within engineering?

Ziparro: Well primarily through the use of the computer, which has opened up significant areas that were just not available when you working with a slide rule and a calculator and with mathematical models primarily. Computers just make things that were impossible, when I graduated from school, possible today in the way of modeling structures, for instance. In addition to that, all the drafting that we're doing today is done by CAD, by computer again. And when I first joined the company, I remember a major project we did in Virginia, the Bath County Pump Storage Project -- we had maybe two floors of drafts people working on that project -- 50 to 70 draftsman as the job peaked. We just recently completed a similar project in Georgia called the Rocky Mountain Project -- and that project, we had a handful of CAD operators producing as many drawings in maybe half the time. So I think that will continue. That process will continue. One of the biggest challenges we have is keeping up with the hardware and the software technologies. As soon as we buy a computer it seems that in three to four months there's some new speed or some new chip or some new advancement that requires us to invest more. And it's that way with software. And I think that will continue. Those are some of the things that are happening in the field and I think that's throughout engineering basically.

Q: Where do you see jobs for engineers in the future? What should students be doing to prepare themselves to take on those roles?

Ziparro: Several things. I think engineers will need to be a little bit broader in their background and I know engineer curriculums are pretty jammed as they are currently, dealing with the technical aspects. But I think an important attribute would be a language. I think a language -- if some engineer can take on some language, working knowledge, fluency, if possible, they will have a tremendous advantage. I think also to take on some financial type background is important these days. The most recent buzz word in our profession is privatization and most of the utilities are privatizing their businesses and they're looking toward engineers to opine on asset value, for instance. I never knew what that meant when I got out of school, but I think obtaining those kinds of skills and being able to present is also important. Make presentations. Communication skills. Again, engineer's curriculums are filled with laboratories and number crunching and there isn't a lot of time to develop those other skills, but they are becoming increasingly important.

Q: What about your specialty in particular, do you find that there's a great demand of structural engineering?

Ziparro: In our particular field, structural and civil engineering there is a continuing need for rehabilitation and of existing structures. There's constant concern over seismic activity. We see that in California all the time. It seems that we still have a way to go in developing seismic criteria and seismic designs that can withstand predictable -- not predictable earthquakes, but

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earthquakes that occur. Here in Chicago we have been looking for structural engineers, licensed structural engineers and we find that they are very hard to obtain. Obviously there's a demand for those folks in the engineering profession. It is very important, though, that you obtain a license. I found that some people have not paid attention to that and they get on in their career and find it very difficult to go back and take an exam to obtain that license. It is very important for a company like ours to have its people licensed. It's a form of recognition and in many cases it's required that they actually put their license on the drawing.

Q: What do you think the role of the civil engineer is today?

Ziparro: Basically to serve in the capacity that he's been trained for, as a public servant. When all is said and done, he's responsible for making sure people have clean water to drink and make sure that toilets flush and that the effluent is properly treated and safely disposed of. He's also responsible for electricity. It's a profession where it's not very visible but it's participating in just about every day activities that are performed by everybody. You drive a car, you drive on a road that's designed by a civil engineer, you wash your clothes or you wash a car and it's -- the water that comes out of that faucet has the influence of a civil engineer behind it and -- you turn on your TV and the power that comes through that circuit has a civil engineer behind it. The role has always been that and it will continue to be that.

Q: How about women and minorities, do you find that there are more women and minorities in this field?

Ziparro: We at Harza, have had -- not very good success. There are, firstly, not very many women that choose engineering as a profession. And when we do hire women engineers, they don't tend to stay too long, for various reasons, ranging all the way from changing careers and raising families, to starting their own businesses because there are advantages to being a women-owned business. I'm not sure what can be done other than to encourage them to enter the profession; because I think what's lacking primarily is numbers. There just aren't very many of them. I think the door is open to them. There has been no reason why they can't participate and do as well as -- as any engineer in the field. There's just not enough of them.

Q: What -- in terms of what you do every day, what are some of the more mundane aspects -- what don't you like to do as much.

Ziparro: What isn't so fun. On Monday morning I get to sign time sheets of all the people that report to me -- not all the people -- but a fair number of people that report to me, and I have to go through those time sheets and make sure that they're properly filled out and the proper project has been charged -- and it's pretty mundane and (LAUGHS) not easy for me to do. But those kinds of things -- you need to do, of course. I do get a lot of reading material that passes my desk and you have to make decisions on what to read and what not to read, and that is sometimes difficult, you want to be current on most material, but there's no way you can read all of the material. Those are pretty much the mundane things.

Q: What's the most interesting part of this job?

Ziparro: What makes it all worthwhile is coming up with a solution to a difficult problem and then going off to the job site and seeing it actually implemented and hearing the gratitude of a

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satisfied client. And those are -- we, from time to time get invited to dedication services of the major projects and it's very gratifying to be there. To know that you played a major role in the development of that project.

Q: Is your job financially rewarding? Professionally rewarding? Do you find it fulfills you?

Ziparro: Yes. I find that it has. Maybe I've been very fortunate, but it has provided me with financial stability. I was able to put three children through college. We don't want for anything. So financially it has been adequate. It's not a profession where you're going to become a millionaire, but it can -- it provides a good living, it produces some millionaires that are very fortunate, and maybe get into the business aspects of the profession.

Q: Do you think that this profession gives you an opportunity to balance your private and your professional life?

Ziparro: That's a difficult question, because I think it depends a lot on the individual. I think in any profession you can make it balance depending on how intense you want to pursue that profession. I've seen people, maybe defined as workaholics where they become all encompassing in their profession, and I think you have some control of that yourself. The profession will allow you to balance your life if you want it that way, but you have to work it, because it can also consume you entirely. It's -- again, I think you have to control that.

Q: What are some of the things that you do to balance your work? Can you talk a little bit about your running and, you know, your family life and hobbies and activities that you enjoy?

Ziparro: OK. Yes, I jog, generally every morning before I come to work. I find that very -- it kind of smoothes out the day. It gets me prepared to take on crises -- and I find it very relaxing. In fact, days when I don't jog, I don't think I function as well. So that's been kind of an outlet for me. I also enjoy cars, so -- which I share with my son who is working on a '55 Chevrolet. And I personally have a Ferrari that I tool around with on weekends. So I do have some -- some release of activities, but right now we seem to be speeding most of our weekends, my wife and I, with our grandchildren. So that, of course, is a lot of fun.

Q: What would change if you could do it all over?

Ziparro: That's a difficult question and you never know, of course, how you end up. There was an opportunity for me when I finished my master's degree to go on and work on a doctorate. And I passed that opportunity up because my wife had been -- we just had a child and we felt that it would have been too big of a financial strain to have done that. Of course, I'm sure we could have worked our way though it, had I done that. I'm not sure where I would have ended up had I pursued that activity, but maybe it's something I would like to do, but I don't really regret it that much that I didn't do it. I think that if I had to do it again, I'd probably do the same thing.

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Q: How have networking or mentoring affected your career?

Ziparro: Networking was really the way I got to Harza in the first place. Networking has helped in as sense that it maybe reinforces your decisions to stay in a certain career, on a certain career path of in some instances, it can influence you to maybe to deviate a bit from that. Mentoring is very important. I felt that I was quite fortunate in having excellent mentors that were pretty much hard nosed technical people that instilled in me, the importance of good, solid technical engineering. I think that's how mentoring helps.

Q: There's been a lot of noise about the fact that civil engineering is truly a global discipline. Do you think that's been overstated?

Ziparro: Not at all. I think that not just civil engineering, but possibly all of engineering will be a global environment. We have major competitors around the world, both in Asia from the Japanese engineers that are very competent and the European engineers. Now, third world countries are starting to develop engineers within their countries. They send their most qualified people here to the states or to Europe and obtain advance degrees and then those folks, of course, return to their countries and become generally, leaders within ministries and quite often you meet up with folks of that type, that have advance degrees from major universities either in the states or in Europe. And not only that, but the other folks that do obtain those kinds of capabilities, will establish from time to time, consulting firms within their own countries. And in many instances the countries want you as a foreign consultant to associate with a local consultant, to transfer technology along with accomplishing services that they've engaged you for. It is a global environment that's on the threshold and it will continue to be such.

Q: How does civil engineering improve the quality of life?

Ziparro: I can give you an example of Chicago's quality of life -- how it was improve by civil engineering. Years ago, as the city developed, there was less and less water absorption from major storms. And the city had a combined sewer out-fall system, which means that both storm water from streets and runoff water went into the same sewer line, where raw sewage would go. And that, of course, when there were no storms or there were minor storms, would all go to a treatment plant and would be treated and properly disposed of. However, when major storms hit the city, in order to prevent basements from flooding, the city would open up gates that would dump all of this material into the lake. And that, of course, caused contamination, and would also eventually lead to contamination of the drinking water because the city draws its drinking from Lake Michigan. So our company, along with another local company here in Chicago, devised a plan that involved a series of large tunnels that are constructed in the limestone bedrock, which lies approximately 200 feet under the surface of the city. And the city got EPA to participate in the funding of this project, and this project now has alleviated this dumping of raw sewage into the lake by storing it in this underground system of tunnels until the storm passes, and then pumping that material up and making it available to the treatment plants as they could handle it. So I think this was a major accomplishment that the civil engineering profession improved the quality of life substantially here in Chicago. Similar systems have now been implemented in the City of Milwaukee and other cities are looking at similar approaches to this problem.

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Q: Is there anything that you feel would be helpful for a sophomore civil engineer to know?

Ziparro: I think if they can get as much contact with the profession as possible. Go out to -- a lot of college towns have town meetings on -- and they deal with engineering problems. And it's good to go to those meetings and hear the reaction and to listen to people, their complaints, and to get a sense of how people view the things that are happening around them. As engineers, we always think we know exactly what's best for a community, for instance, to put a road or to widen a road -- but when you get into some of these town meetings, as we often do, as the expert engineer, and you hear about the lady who doesn't want that street widened in front of her house because she's fearful that there's going to be more traffic or that it will be more dangerous. I think these are the things that young engineering students should go out and get as much contact as possible with what's going on around them that is relative to their own profession. And you can do that with a little bit of effort.

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