



Sloan Career Cornerstone Center

Profiles of Mechanical Engineers



Jose Ibanez

**Senior Mechanical Engineer
United Defense / FMC Corporation
San Jose, CA**

Education:

BS, Mechanical Engineering, San Jose State University
AS, Engineering, Foothill Community College

Job Description:

Senior Mechanical Engineer, working in a product realization group that includes structural design, stress analysis, materials, armor systems, and prototype development of military vehicles.

Advice to Students:

"Seek informational interviews with engineers in order to learn first-hand about their jobs. Also, written communications and verbal communications are very important. Any effort put to develop those skills will always be good."

Comments:

As a recruiter, Jose looks for grades, work experience, and capacity for teamwork. Once on the job, he feels that an engineer needs skills in computer, problem solving, and teamwork, along with an ability to cope with change.

Video Transcript 1:

"For me, my family is very important. When I have to work overtime, I'll work it. But at the end of the day going home and being with my wife is very important to set time aside just for the family, as well as for myself. Whether it's reading a good book or going for a hike or -- you need time for yourself. It's important to re-charge your batteries and not dedicate yourself fully to work."

Video Transcript 2:

"Don't be afraid to call a company that you're interested in and say I want an informational interview to talk to some of the engineers about they work they do, so you can have first hand knowledge of whether or not you're interested in doing that work or working for that company. One of the reasons why I like this company as a mechanical engineer is because there are many, many departments, different specialties such as suspension, power, transmission,

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structures. There are many opportunities to move around and not do the same job for more than a year or two."

Video Transcript 3:

"We have new technologies coming in all the time. Now we're trying to implement the use of titanium. Titanium has been widely used in aerospace. Now we're trying to make use of it in our vehicles and so we do have to learn constantly new materials, new ways, better ways to make a better, lighter, stronger, more effective vehicle."

Video Transcript 4:

"I think about it, that I might lose the job, but I've never been really concerned. I know that being in a technical field, unemployment is very low. And I have the skills to find other jobs. So I was never concerned of losing my job. I know some people fear that. Or have fears of losing the job; they have family, children and mortgages. Stay ahead of yourself. Have developed the skills required and apply yourself; that's the best thing you can do."

Interview:

"In the group that I work with, we do structural design as well as armor systems. This is not a so-called high tech company like so many around Silicon Valley. But we use the latest high technology CAD systems. We use the very latest computer systems to do stress analysis and to develop drawings and prototypes of the vehicles. We coordinate with other engineers, quality and materials people, welding specialists, and others. Once the design has been tested, it goes for assembly at our Pennsylvania plant."

Q: Jose, just for the record, why don't you just say who you are and what job you've got and with whom, where you are.

Ibanez: Jose Ibanez, senior mechanical engineer with United Defense, part of FMC Corporation. And BNY -- it's a limited partnership between the two companies, two corporations.

Q: And what does FMC mean?

Ibanez: It used to stand for -- when it first got established -- Food Machinery Corporation, but through the years it's transformed. Now it's just letters, it's just FMC Corporation.

Q: So now, talk about United Defense and what kind of work is done here.

Ibanez: Here at United Defense, we develop track vehicles for the U.S. Army and also for other nations. They're basically a "protected environment" in which the troops can go into combat. And so we do the development and, until recently, we were manufacturing the vehicles here as well. Now, we've moved the assembly line to York, Pennsylvania. So we have different facilities -- one at Akin; one at York, Pennsylvania. Steel products division in Anniston. And also, in Minneapolis, we have UNINTEL Systems Division. So we're located throughout the country.

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Q: And in the design work that you do as a senior mechanical engineer, talk about the work that you do that is design work and what design tools you might use, things like that.

Ibanez: The group that I work with, we do mostly structural-type design as well as armor systems. We're not a high-tech company like many of the ones around Silicon Valley. But we do use the latest high-tech technology for CAD systems. We always upgrade to the very latest computer systems. And we develop the drawings and the prototypes at our location here. So, we do stress analysis, we do drawing, creating, and support to the prototype building of the vehicles. We coordinate with a number of engineers on quality of materials, welding and such. And then, once the package has been proven, then we can move the assembly to the Pennsylvania plant where they can mass-produce it.

Q: What's it like doing the design work here and the production is on the other coast?

Ibanez: I suspect it's going to be a little bit more of a communication gap. But it's a new thing for us right now because it just started last year. Until recently, we had the assembly line here. And for me, having been here 10 years, I'm very intimately familiar with the assembly line. For somebody new coming in, it might be a little more difficult. We do build prototypes, so we know how they get put together. And on occasions, when an important topic comes up, we might have to travel across the country to solve problems in the assembly line.

Q: Talk about Jose. Where he comes from, and the different transitions that have resulted in his being here today.

Ibanez: I emigrated to the U.S. 19 years ago from Spain with my beautiful wife, Diane. She's native of Palo Alto and we met there. She was a summer student. Fell in love and came here the following year. I learned French in high school, so the first thing that I had to do after I got married was I took an intensive-English program and passed the TOEFL exam for foreign students that plan to attend the university here. And after I passed that -- which I surprised myself, in seven months -- then I attended Foothill College which is a two-year college. And I completed my basic education. You know, basic education. I enjoyed that experience, because many of the professors were very qualified Ph.D.'s from local universities such as Stanford and Berkeley. And the classroom size was very small, usually about 25 students. So it was a very enjoyable experience. After that, I transferred to a state university, where I attended and completed my mechanical-engineering program. Interestingly, at the time, I was only about one in two people that started the program and completed it. It was a tough program but it was well worth it. It's something that I liked. It was a very practical program. Very "hands-on" type. Lots of labs and very good experience.

Q: While you were working, did you have a family, while you were in school?

Ibanez: Yeah, I was married and I worked full-time during the summers. I had summer co-op jobs through HP and IBM, which I found very useful for two reasons. One, it gave me practical work experience I can put in my resume besides having good grades in my classes. People, when they interview you, look for some work experience that will say that you can work in teams and such. As well as make the transition from school to work a little bit easier.

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Q: Talk about your interviewing on campus.

Ibanez: Oh, that's good. For about three or four years, I was part of the college-recruiting team here at United Defense. I went to a number of universities to interview candidates. And that was a very interesting experience for me. I enjoyed it very much. Mostly, I was looking for candidates that would meet the culture of the company. Grades are important; everybody looks for good grades. And the work experience in the summer co-op type jobs, also very, very handy. And then look for candidates that would match the culture of the company, that would get along and be happy and have a long term type relationship with our company. We're a little more conservative than some of the other companies in the area. Many of the start-up companies in Silicon Valley are more laid back and relaxed. Even though now we have a new policy of casual dress everyday. The company 20 years ago was white shirts and ties all the time. Now, you only have to wear the ties when you see customers. But I think, what I was looking for in a candidate when I was interviewing seniors that were in mechanical engineering was the grades, the work experience and how they would match up with the culture in the company. Computers, teamwork, problem-solving, ability to cope with change. Those things are very important, I feel, for the future of anybody looking into getting into the work environment.

Q: Obviously, your life in Spain was a major influence on what was going to happen afterwards. What kinds of things have influenced what you've been doing since; both in terms of companies you've worked for -- full time, part time -- but also in the kinds of projects you've been working on?

Ibanez: I think -- if I understand the question correctly -- the thing in the Bay Area that affects the decision making, for instance, is the high-tech type environment. Lots of computers and such. That's a big impact. And I think that ability to cope with the fast-changing world of computers -- it impacts everybody's work environment.

Q: What makes the difference on whether you get on a project or not and what you do on it?

Ibanez: One of the reasons why I like this company as a mechanical engineer is because there are many, many departments, different specialties such as suspension, power, transmission, structures. There are many opportunities to move around and not do the same job for more than a year or two. I've had about seven or eight different supervisors and worked on different development projects, doing anything from suspension structures, armor, electrical systems, hatches. You can move around and get different work experience in a company such as my company. Which is a little larger than, say, the average company in Silicon Valley.

Q: Talk about the challenges of having seven or eight different supervisors.

Ibanez: You have to adjust to your supervisor's working habits and coping with their ways, understanding how they work; it's important, and the ability to adjust and do your job well. And I've been very happy with all of the supervisors that I've had. Each one of them has had a different personality and different ways that they work. And you have to adjust quickly to their ways so that you can do your work effectively and quickly.

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Q: Is the life of a mechanical engineer a life of adjustment?

Ibanez: Not as much as, perhaps, in the electronics world. But yes, we have new technologies coming in all the time. Now we're trying to implement the use of titanium. Titanium has been widely used in avionics. Now we're trying to make use of it in our vehicles and so we have to learn constantly; new materials, new ways, better ways to make a better, lighter, stronger, more effective vehicle.

Q: What's it like working for a company that's so heavily into defense contracts?

Ibanez: The most challenging aspect of it now is the downturn in spending -- reduced budgets in defense. Not knowing for sure. But of course, this is something that just about everybody else in the industry has to worry about; making sure the products are selling and doing well. So, now we're just basically becoming more like the rest of the industry. We have to worry about planning and making sure that we can do an effective good job of providing good products that will sell into the future, 10, 20, 50 years from now. That's been the biggest challenge. The criticism of people in the community that say, "Hey, we don't need to build weapons, we want to build schools and build freeways," and so on. So you always have to deal with that type of a situation.

Q: The reduced budget, how does that affect your life as a mechanical engineer?

Ibanez: Basically, with the reduced budget now, instead of working on one or two bigger projects, now we have to work on 10, 15, 20 smaller projects. So, instead of working full time on one project, you have to do three or four projects at a time, which is what I'm doing right now. And so, you have to have two different bosses. You have to serve two masters; working on the project for this master and a different project for another master, and juggle everything all at once. But, it gives you the skills and abilities to work with different people and different projects at the same time, which I feel is very important. I remember a mechanical engineer who could only focus on one project at a time. And several of us will come to him and say, "Hey, I have something for you," and it was, "No, no, no. Until I finish this, I don't want to hear about anything else." And that's narrow-minded. You have to have an open mind and make sure that you can work on different things at the same time. It's a very useful and a good thing to do.

Q: Talk about your undergraduate preparation and what do you still use? And also, what did school not prepare you for? Both of those.

Ibanez: Some of the weaknesses going through mechanical engineering school, I feel, were -- at the time that I went through school -- geometric dimension and tolerance, and preparing drawings, that was a weakness. I think that when I came into the work environment, that was something which is a very common language used by all engineers to communicate with the shop -- and how to build the component or a part. And I think that was a weakness that I would have liked to have had more classes in -- or more opportunity to develop a language of making drawings. Especially for an entry-level type engineer, it was a little bit difficult in the beginning. But in general, we worked in teams on projects and labs, and so working in groups -- which is something that you have to do in the work environment -- that was covered in school, by working in projects.

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Q: Have you used your French or your Spanish in any company projects?

Ibanez: Yes. Being from Spain, I know the language fluently. And there have been different opportunities here at the company to translate for them, official documents as well as meetings, high-level meetings, doing business with foreign nations. And I found that rewarding and very interesting. It was almost like a spy-novel type thing where somebody has a secret and they want to do business with you and I'm there translating in the middle of it. And it was very exciting. Long days, from early in the morning until late at night. But it was very enjoyable. I liked using the knowledge of my language to help the company do business abroad.

Q: With what countries does the company do business, or has the company done business?

Ibanez: We do business with just about every country -- almost every country. We do business with Japan, business with Saudi Arabia, with Israel. Our main headquarters office in Europe is in Belgium. But that's for Defense UNINTEL. Also, FMC has chemicals and pesticides, oil-drilling equipment and food machinery -- harvesters and so on. And we have FMC products in just about every country in the world. It's not difficult to transfer from division to division.

Q: Have you seen opportunities for ME's in all of those businesses?

Ibanez: Yes, I have. But I'm very happy at Silicon Valley. I like it here. It's very boring, 80 degrees every day, sunny skies. I love it here, and there are lots of universities, lots of parks; you can go hiking, and it's near the coast, near the mountains. So this is an area that I really enjoy. But yes, there are lots of opportunities. And so if there are other parts of the country, where you have family or you like to live, there are ample opportunities to move.

Q: What about your family? I know you're married, do you have kids? And what's it like integrating work and home?

Ibanez: For me, my family is very important. When I have to work overtime, I'll work it, but at the end of the day going home and being with my wife is very important -- to set time aside just for the family, as well as for myself. Whether it's reading a good book or going for a hike -- you need time for yourself. It's important to recharge your batteries and not dedicate yourself fully to work.

Q: You were on the fencing team?

Ibanez: Yeah, at Foothill College -- well, actually, I started in Spain. I was in training with the number one fencer in Spain, and he was an excellent coach. And then when I came to Foothill College, I was a member of the fencing team and I did intercollegiate fencing, which was very good. Because one of the things about fencing is, you have to do strategy and planning in your mind and then have quick reflexes. And so I guess you can compare that to the work environment.

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Q: What is your day like? Aside from today?

Ibanez: Typically, come in the office, make some coffee. [LAUGHS] Wake up. And of course, make sure that all the people that report directly to me -- designers, drafters, other engineers -- that they have enough information to do the job they have to do, and then prepare or guide them to create drawings. Do stress-calculations analysis, write memos, respond to questions from manufacturing. Answer telephone calls. Typically, once in a while, I do business trips to different facilities where we test our vehicles -- to help them with the tests. And I attend meetings, of course, like most everybody else has to -- to make decisions on the best way to implement new things like, say, titanium in the vehicle. So, I do just about everything.

Q: This is for, primarily, the freshman/sophomore engineering students. Can you give me some of the benefit of your experience, and some advice to those students?

Ibanez: I think the one single thing that I would tell them is to have a counselor at school that guides you with planning your classes and so on. Any adult person that has gone through the engineering program or has anything to offer you -- wisdom -- reach out and get that information from them. I also did informational interviews in corporations. I called companies and asked them, "Would you allow an engineer to spend a half-hour with me, an informational interview?" Or ask adults in your family that have gone through college. Don't be alone by yourself struggling with the world. Allow people that have the wisdom and have learned, to guide you and help you -- at least with suggestions. You can end up making the final decision, but search for those people that might be able to give you some wisdom. Whether it be your counselor at school, some family member that went through engineering or other college programs. Or working professionals. Don't be afraid to call a company that you're interested in and say, "I want an informational interview to talk to some of the engineers about they work they do." So you can have first-hand knowledge of whether or not you're interested in doing that work or working for that company.

Q: Have you ever been concerned that you're going to be let off?

Ibanez: I think about it, that I might lose the job, but I've never been really concerned. I know that being in a technical field, unemployment is very low. And I have the skills to find other jobs. So I was never concerned about losing my job. I know some people fear that, or have fears of losing the job; they have family, children and mortgages. Stay ahead of yourself. Develop the skills required and apply yourself; that's the best thing you can do.

Q: In the time that you've worked with engineers, you've seen engineers succeed and you've probably seen engineers not succeed. If you've seen any that have not succeeded, why was that?

Ibanez: Maybe perhaps narrow-minded or unable to accept different ways of doing things or become too narrow thinking. There's always money involved and time, and you have to compromise with manufacturing, and with other areas. And if you don't have the ability to compromise and find the best answer that everybody can be happy with, you'll find it difficult living in the technical world. The best technical answer may not be the best overall answer. And sometimes if you just think narrowly that this is the only way it can be done, you, you know, you'll find it difficult perhaps.

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Q: So engineers are contributing to a bigger business effort they have to realize?

Ibanez: Yeah. I think it's important to learn all the technical aspects in math and science, but I think the ability to be a well-rounded person in humanities and other aspects of life, and being aware of the community and other things, makes you a more complete person. The same thing in the business world. You have to think the best technical answer, but you also have to compromise it with the best financial answer, as well as the ability to manufacture or ability to make profit and so on and so forth. The primary goal engineers have is the best technical solution to a problem. But sometimes that's not obtainable today. So, being part of the team and understanding other people's thinking, or ways of making decisions and working with them to make the best overall decision, is what people should look forward to if they want to be successful. If you're narrow minded, limited in your thinking and you always say, "This is the only way to do it," you're going to find yourself stumbling and falling on your face often.

Q: How much of an engineer's time do you think is really spent doing calculations?

Ibanez: Technical stuff probably takes about one third of my time. The other parts are just telephone work; memos, writing, meetings and so on. About a third, technically.

Q: How about the engineers that work for you that aren't in such a senior position?

Ibanez: The drafters, designers and more of the entry-level engineers are working more like, maybe perhaps, 75 percent or more of their time doing actual drawings, calculations, tolerance studies and such.

Q: The international customers and so on -- do you see a connection with them in the job that you're doing? What are the influences when you've got a contract with Israel versus you've got a contract with some other company or country? How does that affect your job?

Ibanez: In minor ways. They usually specify different magnifications they want in the vehicle. Typically, if it's a foreign country with a foreign language, all the English descriptions on how to use the vehicle have to be translated to that language. And then they might specify some different requirements or additional work required to install new systems, radios or whatever it is.

Q: Also tell me what it's like if you're dealing with customers in other countries. What does that mean for you personally?

Ibanez: Normally, I don't deal with foreign customers directly. We have an international division that does the business decisions and agreements with them. We just do the technical work only, typically. We have some people in the defense international aspect of our office that deals with them and answers their questions and needs and requirements. We just focus ourselves on the technical aspect of the work. And once the product is built, just ship it to them. So we don't deal with them that much.

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Q: What kind of contribution do you think you're making to United Defense, the company?

Ibanez: I'm contributing, in general, quite a bit to make the company successful. I'm also very active in the community to improve the image of the company and I volunteer through Junior Achievement and other community aspects. I help with the technical decisions as well as with the community image of the company.

Q: What do you see as the contribution of the company?

Ibanez: The main contribution is as an employer, of course. But in the broader sense, many of the products that we build are used to defend this country and other countries, so that's the primary thing that the company does for this country and other allied nations.

Q: There's got to be a quite rewarding aspect to that.

Ibanez: Yes. You know, lots of people talk about Bosnia and the problems there. You know, think back to World War II. We did nothing. Lots of people died in Europe because this country did not really get involved. Sometimes you have to get involved. When the country, the nation, the government, thinks it's important to make a move that requires military equipment, you want to have the ability to get the job done.

Q: Inasmuch as you've had the experience of coming here, learning English as your third language...

Ibanez: Yes.

Q: Have you got any advice for students who are doing the same thing -- who come to the U.S. to study, or who are adapting to the culture or adapting to the new language, as well as studying engineering?

Ibanez: Interesting. My wife is getting a Masters in ESL, English as a second language. And she was observing a class a couple of days ago. And there's a student from Japan who says, "I just come here to learn engineering and I don't care about writing and reading in English and all the other aspects of it." Well, that's a bad approach, because you have to communicate. The ability to communicate with people, it's critical to the success of the company and the job you do, the work you do. Written communications and verbal communications are very important. So, if you've come from another country and English is your second language, you can never take enough classes or develop your reading and writing and communicating skills to a level where you would be equal to a native-born. So, any effort put to develop those skills will always be good.

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