On a Solid Foundation

Israel David

Interviewee

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Israel David is the General Manager, CEO, and Owner of David Engineers, Ltd. Since 1990, David has built up his engineering firm to become the largest in Israel, with more than 120 engineers and work in 25 countries. From a very early stage in his academic career, David chose to focus on the difficulties of high-rise and seismic engineering, allowing him to become a foremost authority in the field, with several appointments to government commissions and standards-setting bodies. A fellow of the CTBUH since 2016, David has also been the CTBUH Israel Country Representative since 2009. Despite the nation's small size, it has repeatedly sent some of the largest delegations to CTBUH conferences, thanks in large part to David's efforts. David earned a bachelor's and a master's of degree in civil engineering from the Israel Institute of Technology (The Technion) in 1981 and 1988, respectively.

Israel David, General Manager, CEO and Owner of David Engineers, Ltd., is the recipient of the 2019 CTBUH Fazlur R. Khan Lifetime Achievement Award, in recognition of his achievements in the field of high-rise structural engineering. He has also made significant contributions to CTBUH as Country Representative for Israel. CTBUH Editor Daniel Safarik interviewed David prior to the bestowal of the award at the 2019 Tall + Urban Innovation Conference.

What got you interested in tall buildings?

I got my first degree at the Technion, the Israel Institute of Technology. After I finished my bachelor's degree in engineering, I started to get my master's degree in science in 1981–82. I chose the topic of tall buildings because it was something different and new; I could see it would be something the next generation would have to work with. I was excited about being one of the first and taking the academic discussion up to a practical discussion.

How were things different then, in terms of how the engineering problems of tall buildings were approached?

In those days, there really were no personal computers; there was only one computer on campus, and you had to wait all night for it to do a calculation. It was the size of a car, and it could not do what you can do today on your smartphone. Everything was done by manual procedures and basic mathematics. When you study earthquakes, you understand in your stomach how to design; it's not about putting some model in the computer, so you don't understand the output. This way of studying allows you to really feel the building. This was very important for my engineering life, because I start by touching and feeling a building, not by having some pre-set procedure and putting a model into a computer. These tools I developed to become a creative engineer, and it has served me for the last 28 years in my office. I was open-minded and felt I could do anything, because I understood the basics in my stomach.

Was there already a program in place at the Technion that was emphasizing tall buildings?

No, it was a general study of engineering, but there were two or three professors who specialized in tall buildings and seismic engineering, one of whom was an Israeli who had taught at MIT. This was the first time we really understood and started to use finite element analysis. Today it is something obvious; we have systems that are automated, and don't "need" to understand

Figure 1. Tel Aviv skyline. © RaphaelQS (cc by-sa)

why and how. But I had to learn an innovative new system [manually].

What has changed about the built environment in Israel since you started your office?

In 1991, when my office was established, the Israeli population was four million people; 28 years later, we have almost nine million people. I don't think that there is any other country in the world that in a half-generation has seen this population increase of almost 200%. We are expecting by 2040 to be at 16 million. This means we have to work on infrastructure, such as trains, roads, hospitals. Our prime minister said in his election campaign that he intends to spend US$50 billion on infrastructure. Today our firm has more than 400 projects, and more than 50 of these are towers in Tel Aviv, which is booming (see Figure 1).

It seems that in such a rapid growth market, it is prudent to consider infrastructure before building a large agglomeration of tall buildings.

Yes, and there is another economic engine that is increasing our building production: technology innovation and the urban lifestyle that comes with it. Tel Aviv is a 24-hour city. We now have a lot of innovation and development in high-tech, natural gas and energy. This has brought a lot of international companies, such as Facebook and Noble Energy. I'm working on offices for both. We built a campus for Microsoft. All these high-tech companies are coming to Israel and hiring our people. Intel is building a second large project that will be subsidized by the government, with about US$10 billion worth of investment on a new site in the south of Israel. Tel Aviv is now completely out of office space. We have to build more.

What does the residential situation look like?

With the growth in population and entrance of high technology, young people want to live near a center of culture and lifestyle, as well as employment. If we are going to be able to accommodate this desire, especially as people want to live near the center, we will have to build many more high-rise buildings.

Fortunately, we don't have a problem with parking that we otherwise might have, because when you build a high-rise office building you need to build a lot of parking. There were a lot of restrictions, previously. Now regulations have changed, so that you don't have to build so much parking. We are developing a light rail network with two core lines, and along these, you can have a tower without too much parking. At the same time, a lot of high-rise building is much more sophisticated than previously.

What's interesting is there is competition between the developers to be iconic, if not especially practical. These buildings are much more challenging from an engineering perspective. The intense competition is drawing internationally renowned architects as well, which is exciting.

What role do you think your involvement in CTBUH has played in getting you to this point?

I've been a part of CTBUH for the past 20 years, and I've learned a lot about what has been done everywhere through my exposure to international colleagues and the sharing of data that CTBUH facilitates. I've learned from the conferences, the books, the newsletters. I don't think anyone [in Israel] is competitive with us, partly because of my history with CTBUH.

My first experience with CTBUH was at a conference in London, in a hotel near the center of London and not far from Heathrow.[1] It was an old hotel; we were sitting on chairs that were very uncomfortable, but everyone was so excited. I saw a presentation of an engineer from Kenya; he was talking about a high-rise building in Nairobi. Through that, I understood that, if I wanted to be an expert, that I needed to be involved with CTBUH.

The importance of acquiring information and knowledge from outside is very important. Twenty-five years ago, we didn't have the Internet, we didn't have the engineering journals we have today. We were in the dark. So, when you come to a CTBUH conference, be it London, Kuala Lumpur, New York or

[1] **Editor's note:** *Building for the 21st Century,* December 9–11, 2001, QEII Centre, London.

Chicago, you can get ideas, and then go back home and develop them, make them more sophisticated. Having met international colleagues, you will also have more confidence in your ideas. Before the Internet, CTBUH was the only practical place to share information and develop your practice.

And today, what can organizations like CTBUH and Israel Association for Construction and Infrastructure Engineers (IACIE) do for each other?

I have been going to CTBUH conferences every time since London in 2001. I think it is very interesting that you have structural engineers, people like [CTBUH Trustee] Dennis Poon speaking not only about structure, but about social issues. He spoke about how people are going to live in a vertical city. I really think it is important to be part of a community like that, so we have brought to almost every conference more than 100 architects, engineers, developers and contractors [from Israel].

Israel is recognized as a "start-up nation," and our government understands that if you are going to build the same buildings that were built 30, 40, 50 years ago, it will be a problem for the next generation. They understand that if we are to sustain innovations in water, green energy and tech, they need to put money and effort into construction as well. I'm involved in this effort, and I believe that we can share with CTBUH in the next one or two years, our progress and achievement in the construction/industrial field.

> "I felt I could do anything, because I understood the basics of engineering in my stomach."

Where do you think are the most interesting places to work, and where have you encountered the most profound challenges or lessons?

In 2004, the Israeli market was bad for construction, partly because of some political issues, but also the bulk of the population growth was young children who did not yet need apartments. The boom did not really start until 2010. Because of globalization, a lot of Israel's investment capital went overseas. Between 2004 and 2008, most of our activity was in Eastern Europe, India, and London.

For me the most challenging place was London, where we designed three or four hotels. One was the Westminster Park Plaza Hotel, one of the biggest hotels in London. It was very challenging to work in London because of the degree of regulation and the codes and practices.

It was also challenging working in Romania, because they have some seismic requirements that they don't have elsewhere. In 1977, they had a huge, destructive earthquake in Bucharest, and they were very afraid of that happening again. I learned a lot from them about safety design. Even today, in my work with the IACIE, where I'm now the chairman of the standards committee, I'm using a lot of knowledge that comes from Romania. They have very good knowledge on pouring concrete. Plus, I was born in Romania, so it is easy for me to work there as my second home. I think they have some of the best professionals in the seismic field.

Where do you see tall building engineering and construction going in the next 50 years?

The importance of manpower in construction will become less and less, because people don't want to work on construction. Ten years ago, I was in India, a country of 1.1 billion people, where I was consulting with one of the biggest construction companies on a convention center project. They said, "We need your help, we have a big problem, we don't have enough people to work on construction. Thank you for bringing me a system where I don't need so much manpower to do construction."

So, if this is the case in such a populous country, in the rest of the world it is even more acute. Very soon the construction industry will have to think like the auto industry, which now does much of its assembly by robots. There is mass customization, and they've been doing it for 15 years. We have the tools to do it, too. Everything is being done in 3D BIM software now; even today we could have 50% of a project constructed by robots. I believe in 10 to 15 years from now, buildings will be entirely built by robots.

Having said earlier that it is vital to have a physiological understanding of building dynamics, amid this automation trend, then, what do you think becomes of engineers?

A robot cannot design. It can perform tasks, but the thinking and the creation by the architect and engineer, no robot can do it. Released from repetitive, laborious work by automatic systems, people will think more and create more.

What do you think needs engineers' most focused attention?

I think that engineers need to put energy into using materials that really perform, and which are durable and safe. We need to follow the example of aeronautical engineers, who have switched many aircraft parts from metal to carbon-fiber. People can innovate materials, but they need to devise the criteria for the performance of these materials, and they need to test that performance. We need to plan for the life of a building, for 100 years, 200 years. And most importantly, to achieve this, we cannot work as isolated individuals. If we work today and in the future as individuals, we are going to die off very fast. We have to work as a group, and share with each other, to survive and manage change that comes so quickly. ■

***Israel David** presents in Session 8: Closing Plenary on Wednesday, April 10, 3:45 p.m. at the 2019 Tall + Urban Innovation Conference. tallinnovation2019.com/day-3-*