

# ON Englot PARKING GARAGES

**INSPIRATION** I've been interested in engineering since I was a kid – I was always building things. My dad was the maintenance engineer for the building we lived in and he had this great workshop. I spent a lot of time in there with him. And I remember when anything was being built, I watched – I wanted to see how it was done. When they installed the storm sewer in the street when I was a kid, I went down and just sat there watching it all.

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**CHOICES** I knew I wanted to be an engineer since I was young. I just never knew that civil engineers did so much. One day at school, we had a career fair and I started talking to a guy. He was a construction engineer. I told him the things I wanted to do and he said, "You want to be a civil engineer." From then on, I knew what I wanted – to design buildings. I was 13 years old.

**EDUCATION** I stayed focused, graduated high school and looked into engineering programs in the area. Brooklyn Polytechnic offered me a scholarship to a specialized program where I earned my bachelor's and graduate degrees at the same time. It was a heavy credit load – I was taking my grad courses during junior and senior years. But I wanted to get into the world and find a job.

**PORT AUTHORITY** Working for the Port Authority was my first job – I've been here 31 years. Even growing up in Queens, I wasn't familiar with all their facilities. When I thought of the Port Authority, in my mind it was the bus terminal on 42nd Street. But when I interviewed, I learned that they managed so many other things – they really drive the regional economy.

**INSIGHT** If you look at old parking structures in New York or New Jersey, you'll see a lot of flat-plate construction with cast-in-place concrete and the resulting deterioration from corrosion. An example, there was a parking facility that we rehabbed in 1998 at one of our facilities with flat-plate construction. That's when I saw firsthand how quickly previous generations of parking structures deteriorate. Snow and chemicals would sit and penetrate the concrete. The shallow covers used for parking structures allowed it to corrode. We finally recognized that you can't design parking structures like you would a building. The deck requires special protection.

**PROGRESS** I've worked on highway bridges. The technology we began to use for bridge deck construction 10 years ago is now used in parking structures. A parking garage can be designed to include the benefits of steel frames and columns using pre-cast double-Ts. Micro-silica additives in the concrete Ts make the deck impervious to moisture and protect the entire structure from corrosion. We've found this saves hundreds of thousands of dollars in repairs over the lifetime of a structure – it's a better investment.

**SOIL** Both the Newark Liberty and the JFK International airports have poor soil. So we designed the structures to be supported on steel tapered tube piles and pile caps. These can withstand the bending forces even if the soil liquifies in a seismic event. Because steel is light and requires less of a foundation, it cuts the weight of the structure and is perfect for those locations.

**SEISMIC** For these garages, we moved the stairwells and elevators to the exterior and designed them to be self-supporting in case of a seismic event. This is unique – a lot of structures use shear walls in stairwells. Ours use ductile steel frames and have worked very well. Because of this, we could open the lower floors of the garage while finishing the upper levels and installing the elevator equipment.

**OPENNESS** We can use longer spans with steel – 60-foot beams. People passing through the garage don't have to navigate a forest of columns. Open grid facades replace solid pre-cast parapets. It's more user friendly – more open – and lets in more natural light, which increases security. With steel, we also have fewer columns, equating to more parking spaces. Basically, we can utilize more of the footprint for intended use.

**VALUE** Although Kennedy's Green Garage was driven by a tight schedule, it was the basis for Newark Liberty's P4 Garage— and is now the standard system. But because cost is always a tremendous concern, we performed a value engineering analysis. The results were great! The independent VE panel concluded that this is the most efficient design in terms of cost per square foot and space economy when compared to other systems.

**STEEL** In 1996, we had 18 months for the design/bid/build process for the Kennedy Green Garage and it had to fit into the location visually and functionally. So we fast tracked the design and concentrated on the foundation first. We issued that package and broke ground three months later. The design was quick to fabricate and to erect – we only used one crane and iron workers did both jobs. It went up so fast – it was unbelievable! We could have only accomplished this with steel.



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