

Interview with Bertold Weinberg

Conducted by Geoff Goldberg

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BW: OK, education background, I gave you the information.

GG: Now wait a minute, not so fast. OK, what got you to Frank Kornacker?

BW: Yeah. I worked for Frank twice. Once from 1953 to '54 and then again from '56 to '58. In '53, the job I had I was let go....My background is as a structural engineer.

GG: Where did you get trained?

BW: At RPI. Frank's office was one of the very few just engineering offices here in Chicago, at least at the time I was here. It's coming on forty years since I left Chicago. The integrated A/E firm was the rule rather than the exception. Unlike the East Coast, where, unfortunately, it was just the reverse.

GG: Why were they integrated?

BW: Why? I don't know, that's the way it was. When I first came to Chicago, oh, not too long after I came to Chicago, I worked for Holabird and Root and Burgee...

GG: Were they integrated?

BW: Oh yes. A huge firm, the biggest A/E firm in Chicago at the time [1949-52], with a big architectural department and then big departments in structural, electrical, and mechanical engineering. SOM in Chicago was totally integrated. They were a totally integrated firm. Fazlur Kahn, when I was in the structural department...

GG: But in the early '50's, was integration...

BW: Oh yeah, that was the rule. That was the rule. For the most part. I mean, not 100%, but mostly.

GG: What were other firms of note at that time?

BW: Pace Associates...

GG: Pretty sizable?

BW: The size as I remember, yes. SOM, quite large. Several others, I don't remember the names. It's forty years since I left Chicago. I worked for Frank at that time—for about 8 months, and then I went to work for some construction firms.

GG: And how old were you at the time?

BW: When I—that would have been '53...I would have been twenty seven.

GG: How did you find him?

BW: I don't remember whether I looked through the employment ads or whether I went around to different engineering firms. I honestly don't remember.

GG: Did he have any reputation in your mind that you can think back to?

BW: I had not yet heard of him before. But I found out that he had an excellent reputation. He did all the structural engineering on Mies van der Rohe's projects. But not at that time, I had not heard of him.

GG: Not at that time. It was just a structural engineering firm.

BW: Right. Right. Let me think. I left in the following summer. [1954] I worked for some construction firms, developers. And then for a while I worked, for almost a year, for Herbert Greenwald, the developer. When I was working at Kornacker's, I had worked on the design of 900 Lake Shore Drive. Later I was hired by Herb Greenwald's office to be the owner's rep on the job.

GG: At 900?

BW: At 900.

GG: Really?

BW: Yes. At that time, that was the tallest flatslab concrete building ever.

GG: So 860-880 was up?

BW: 860-880 had been built some years before and Herb Greenwald had been the developer for that, and lived there. So I worked for Greenwald for almost a year.

GG: Did you know him?

BW: No, I had not known him before I worked for him.

GG: Did you know him when you worked for him, or was he distant?

BW: Oh, no, no, no. I knew him very well. No, he had a very small staff. Gus Cherry—Irving Cherry—was his number two person....Oh no, we had a small office. Every Saturday morning, we'd have a staff meeting in the office and then all would go to lunch together. And then very often—it was very interesting, Mies' office was working on Greenwald's next project and Greenwald and several of his staff would go to Mies' office. I was more than welcome to come along just to sit in there. I had no role in that project. My wife and I were fairly newly married—in fact we had our first anniversary while I was

working for Herb—but she agreed it was worth my being away Saturday afternoons for the chance to sit in on Mies' office where they were discussing Herb's next project.

GG: Which was?

BW: It was Lafayette Park in Detroit, I think.

GG: Did Mies' office ever join you for lunch on Saturdays?

BW: No. No, no, they were strictly Greenwald's office. And then those on Greenwald's staff who were involved with the next project went to meet in Mies' office.

GG: How many of you would have gone to lunch, roughly? About 10...

BW: Less.

GG: Same place?

BW: Yes.

GG: Okay. I'm just wondering if there was a ritual.

BW: Yeah, it was right in the Loop. It was downtown. A place on State Street, but don't ask me what place it was. Not far from Herb's office.

GG: What kind of a man was Greenwald?

BW: Greenwald? Uh, interesting, a bit of a highly self-confident guy. There was no doubt that he was in charge. There was always an interesting interaction between him and Mies. Anyway, I left Greenwald sometime in '56 and I went back to work for Kornacker.

GG: Not so fast leaving Greenwald. Just a moment. Was he a forceful man?

BW: Oh yes.

GG: Was he cautious around Mies?

BW: No, it was a very open...because he's the one who financed the office at various times when Mies' office was not doing so well financially. He kept them going.

GG: With work, or do you think he forwarded money?

BW: With money. Whether he loaned it or gave it to him, I do not know. But there were times that he just kept Mies' office going so that it could stay in business. Because Mies did all the work, was the architect for most of his projects.

GG: Do you think—was Mies friendly with Greenwald, or...?

BW: Oh, very, very.

GG: It wasn't a normal client relationship. Do you think...?

BW: I was twenty-nine years old at the time. It was a very open relationship. And if at the end of the session, I happened to be in the elevator with Mies, just the two of us, going down—his office was in one of the loft buildings on the near north side, on Ohio—he would talk to me just the way he was talking with Greenwald. You know, he was a very open, easy to talk with guy.

GG: Not so taciturn as people have remembered him?

BW: Not in my experience, let's put it that way. You know, my experience was somewhat limited, obviously, but

GG: We'll leave this shortly. I'm trying to get a sense of—your encounter with these people was rather unique. There are not so many now.

BW: I know, I know.

GG: Would Mies chat with you in those moments about the project?

BW: No, no.

GG: Just general stuff?

BW: Just general conversation. It was always interesting. During the meeting, we'd be sitting around in a circle, and he's trying to balance his ever-present cigar, his ever-present cup of coffee, which his daughter kept refilling, and his cane, with which he was pointing things—you know, his staff would place the drawings on the floor in front of Mies and Herb—what they had worked on during the past week. And Mies would take his cane, you know, to point out...it was very, very interesting.

GG: Anyone from Mies' staff you remember?

BW: Joe Fujiwara was his head architect. The man kind of ran the office. I think Japanese-American—and had a total lack of sense of humor. And while I was with Frank the second time, his wife was expecting their first baby. So the crack around the office was that when Joe became a father the design of all of Mies' apartment buildings would change. So one time, when he was in the office—he was in the office quite often—somebody told that to him, and he knew that he was expected to laugh, so he managed to crack a smile. (Laughter)

I left Frank in '58 because he was a heck of a good engineer, but a very poor manager. He had some very severe personal problems, alcohol-wise. I don't know how many wives he had—not all at the same time. For a while I was handling all the structural work for one of our architectural client's office. I don't remember the name; they were in the Loop. It was easier for me to do the work right in their office. And the top banana there

said to me, he had every confidence in what Frank would say, especially when he was drunk. I mean, you could depend on his judgment on structural problems, no matter how much in the cups he was. So Frank's office was folding.

GG: How many people were in the office?

BW: The largest we ever had when I was there, I would say about maybe ten people, including the secretary.

GG: Was he a meticulous engineer, or was he an intuitive engineer?

BW: I would say more intuitive. No matter what condition he was in, you could rely on what he—as a structural engineer you could rely on whatever he was saying. But he had severe personal problems, and was not a good businessman or manager, and his office was beginning to fold.

GG: Were there any notable projects that you worked on while you were there?

BW: Well, Crowne Hall. I worked on Crowne Hall. Before, when I was working for him for the first time, I was working on 900 North Lake Shore Drive, and the companion twin buildings up on Lincoln Park. In fact, they were being built at the same time. A good friend of mine, Sam Sit, practiced both as a structural engineer and as an architect, and was licensed and crackerjack at both. I worked with him at a firm back in 1952-53 for a few months. He put up his own office, and I'd been helping him out a bit in structural engineering in the evenings and on Saturdays. He offered me desk space in his office when I left Frank, if I wanted to start my own business, or he would have more than enough work to keep me busy. And after helping him out there for just a few weeks he told me about your father, that he had an ad in the paper for a structural engineer. Sam said, "You ought to talk with him. He does interesting work." Well, I wasn't really looking for a job, but I relied on Sam's judgment. He had had some dealings with your father sometime before, and may also have known him through the AIA.

So I went to talk with your father. The big project at the time was Astor Tower, and up to that point in time the structural engineering was being done by three fellows, maybe four, structural engineers who worked for the City and worked for your father evenings and weekends. The top guy among those three or four of them finally convinced your father that for Astor Tower he needed a fulltime structural engineer, and that's why the ad was in. So I ended up being the first fulltime structural engineer in your father's office, and this was around October of '58. At that time we had one other engineer in the office who handled both ME and EE. Ralph was there also.

GG: Ralph Bernadini.

BW: Ralph Bernadini...

GG: Oh my goodness! I haven't thought about Ralph in a long time.

BW: ...worked there. And he had a PE license in fact, because there was no PE law in Illinois and so by the end of World War II everyone who came, they had to grandfather in people. They had licensing laws in Illinois for architects and structural engineers since around 1900, but no PE licensing law. This meant that chemical engineers, electrical engineers, mechanical engineers, civil engineers couldn't be licensed. So the PE licensing law was passed around the end of World War II, but they had to grandfather in anybody who claimed to have been an engineer, because they couldn't deprive them of their livelihood. That's how Ralph had a PE license.

GG: Was he in fact an engineer?

BW: NO! A lovely guy! You know, I'm not trying to belittle him, but I don't know on what basis he trained, but he had a license. He was a draftsman, had been with your dad a long, long time.

GG: I think from before the war.

BW: I have no idea. All I know was that he was a long-time guy with him. Dick Binfield was hired less than a month after I came to work for your father, so I always called him the New Boy On The Block. It was a fairly small office...

GG: How many?

BW: Ten people, no more. Maybe eight, nine, or ten, I think. There was one engineer for ME and EE combined, I was the structural engineer. Anybody else was either an architect or a draftsman. We had one secretary. Oh! one reason your father told me afterwards that he hired me was on account of my experience working for Kornacker on the high-rise and then for Greenwald on the job itself. When he offered me a job, I said I'd have to think about it because I wasn't in a rush to take one because I wanted to see whether I could maybe do some consulting on my own. A few days later, your father called me—we were living in Wilmette at the time—and asked whether I had decided. I really hadn't—I said, "OK! I'll come to work for you."

Initially, he had me, the first thing in the morning, I would say almost half a year, go out to the Edelman factory addition on the Northwest Side, which was under construction at that time, to act as a field rep for him and then come in to the office. You know, I would spend whatever time I needed out there, couple of hours, three hours, whatever, and then come into the office from there.

GG: We don't know much about that job. We've seen some pictures of it. Was there much architectural design in that, or was it mostly the warehouse?

BW: No, it was an expansion of the existing factory, light manufacturing. And the history of it is interesting. For the original design of the addition, the bids came in over the budget. People who were promoting the use of multi-floor post-tensioned liftslabs came to your father and to Edelman offering to design a liftslab system for the project. There would be no cost or obligation. They would hire structural engineers with no obligations for either your father or Edelman. But if they did bring the project in within the budget,

Edelman and your father would be committed, which is what happened. When they took the design to the Building Department—obviously there was no provision for that in the Chicago building code—the Building Department told them “We have no way of checking this; you guys are licensed structural engineers, you signed it, we’ll give you the building permit. However, before we give you the CO, we’re going to load test it.” It was two floors. There were three slabs: first floor, second floor, and then the roof. All three slabs were cast on the ground, on top of each other and posttensioned. Then the lifting began. I had come to work at BGA just as construction was starting. [Fall of 1958]

GG: Were they all cast at the same time?

BW: No, no, no. One after the other, but one on top of the other.

GG: Before they started lifting, did they cast the others? Did they cast one, lift it...?

BW: No, no. They cast all three, one after the other, and then finally lifted all three together. They got the first floor in place, and as they were lifting, the second floor and the roof one of the jacks broke, and everything collapsed. It was found later that one of the jacks was too brittle, was too hard. So, with those two slabs falling on the first floor, they had to take everything out, because all the slabs were broken. They just went ahead with a simple steel frame, bar joists, and what have you.

GG: Oh really?

BW: Yes.

GG: And the manufacturer took it on the chin?

BW: After that I was no longer on the site. In fact, I was home in the evening when I was called...the liftslabbing had collapsed, and I rushed back into the city. There was nothing we could do. It just had to be junked. Who paid for what—that wasn’t my business. I actually, I had not even given it any thought. That wasn’t my job anyway.

GG: Do you have any recollection as to who looked into the embrittlement, who determined which jack it was?

BW: No. I just heard from your father that it had failed, and why it had failed.

GG: So then you go back to the office...

BW: Yeah, working on Astor Tower.

GG: And what state was Astor Tower in at the time?

BW: I don’t remember. The fellows from the city had started the design, but it just got to be too much for them to do on a part-time basis. In fact, for a while, after a few months, your father hired another structural engineer to help me out, move it along. But

it wasn't too long before he told the guy he was being let go. Your father never told me—I heard about it from the guy, that he'd been given his termination notice.

GG: Let me ask you a question, though. When you think about city engineering at this point in time, one doesn't think about them as the most progressive in their thinking, and certainly...

BW: The city Building Department at that time had the well-deserved reputation that they went through your plans very thoroughly. If you needed a variance you would get a fair hearing to make your case. And if you could make your case, they would grant the variance! The liftslab for Edelman was a good example of that. There was no provision for posttensioning or liftslabs in the Chicago Building Code in 1958. Their attitude was that we don't know how to check it. You guys are structural engineers and have stamped the plans. Fine! We'll give you a building permit and will load test before issuing a CO.

GG: So it was a performance standard.

BW: Well, it was a very realistic attitude. There were many things that were wrong in the city. If you wanted to make a curbcut for the driveway to your house, you had to get a resolution through the city council and you wouldn't get that unless your local alderman sponsored it, and obviously he would want something to be the sponsor. Although, interestingly, when Mr. Daley—old man Daley—became mayor, he cleaned all that up. He did away with that. So, the building department was, I thought, had a very realistic...

GG: But in hindsight, one tends to think of my dad's work as being progressive. I can understand from a practical viewpoint why he would be using them, but it seems like from the engineering sophistication, or the level of professionalism, or cutting edge he would need might exceed that capacity.

BW: Well, in fact, when we went for a building permit for Astor Tower, only his stamp was required, as an RA. He asked me to stamp it also, as a structural engineer, because he knew—it was the first building to be slip-formed—there would be questions by the Building Department, and if he had the stamp of the structural engineer as well as the stamp of the architect, it would help him get the project through the Building Department to get the building permit.

GG: Now let's talk about the slip-forming. Where did that idea come from, do you have any idea?

BW: That was already a given when I came to work for you father.

GG: Did he have a contractor on board that he was consulting with about that?

BW: I have no idea.

GG: So you didn't meet with contractors who might slip-form to learn more about how they might slip-form, more theoretical?

BW: No, no. So, for the first months I was working in the office on Astor Tower, and in the mornings up at Edelman. Then, it must have been around early September of '59, your father told us, "Boy, we are going to be busy now": Marina City. He must have been working on that outside of the office for quite a while before, because the basic plans, the basic configuration, had been done, using Severud's office in New York and I don't know who else. The first we knew about it, when it was ready to go into actual design, the basic configuration was set.

GG: So it had two towers?

BW: All that was already—the final shape of it was already settled.

GG: Was it called Marina City at the time?

BW: Oh yes. Well, the financing, interestingly, came from the International Service Employees' Union that was sponsoring it with their pension funds. They represented the people who worked downtown, the elevator operators, the janitors, and what have you. All of the, most of the expansion—mind you, this was only fourteen years after World War II ended, from '45 to '59—most of the developments since 1945 had been in the suburbs, and they were concerned about their jobs. And the laws governing their pension funds had been very restrictive. In fact, they could invest them only in treasury bills and bonds. This had recently been, at that time, modified to permit their investment in any government backed security, and that made FHA loans available for union pension funds.

The union wanted to build downtown. It was the first FHA commitment in the downtown part of any city, and it was the biggest FHA commitment ever, at that point in time. The union was not after the people who were moving into 800 or 900 Lake Shore Drive. They wanted the young professionals and the people who worked downtown to live downtown. That was their thing, they wanted to start the redevelopment of downtown. So, in fact I told my wife at the time, we lived in Wilmette and we had a young family, that after the kids are grown and gone, if I'm still working in a place like Chicago, there would be two things we would do. We would move into a place like Marina City, and, number two, sell the car. I think your father several times was quoting his mother-in-law, your grandmother: "It was like living over the store."

And that's when we expanded; the office was expanded tremendously. We grew from maybe a ten-person office, maybe twelve, to about fifty, or more than fifty people. From a one-man structural department to about ten or eleven. I don't know exactly when, but during the expansion, that is when Ben Honda and Ed Center and people like that came aboard. That was one of the questions you asked me. Exactly when, I don't remember. And that's when Frank Kornacker came on board. Frank had had to close up his office. When I left him he was literally in the process of having to close shop. He was hired by BG as the idea man. I, in fact, was running the department under him, the day to day management of the department. There was one way that Frank was a great help to me. When the bids came in on Astor Tower, they came in over the budget. So your father told us to add three more floors of apartments and reduce the total cost of the project.

GG: Now were these general contracting bids, or just concrete bids?

BW: The total.

GG: So you got total bids on the whole project.

BW: Total bids—electrical, finishes, everything. Complete, everything.

GG: So you were adding floors and cutting costs.

BW: That's what your father told us to do. Then, he was going to start building without revising the building permit...

[End of Tape]

[BW: He did not plan to submit the revised plans to the Building Department for a revised building permit. As he had asked me to stamp the drawings as the Structural Engineer, I was in a quandary. If we went ahead and built Astor Tower with 23 floors of apartments without revising the building permit, which called for 20 floors, I would be in serious professional trouble. If, on the other hand, I told your father that I was going to remove my stamp from the plans, and, of course, so inform the Building Department, I would probably lose my job.

This is where Frank Kornacker came to my rescue. By the time we increased Astor Tower to 23 apartment floors we were already busy with Marina City. Shortly before BG had hired Frank to head the Structural Department. When I told Frank about my quandary about the Astor Tower building permit he persuaded BG that the revised plans had to be submitted to the Building Department. That got me off the hook.

[ON TO MARINA CITY]

BW: We fast-tracked the design of Marina City. We completed the foundation design before we started the detailed superstructure design. We then awarded the foundation construction contract, and had the official groundbreaking the week of Thanksgiving, 1960. JFK, then president-elect, spoke on a radio hookup from Florida. Bishop Sheil (founder of CYO) said the prayers. Mayor Daley (Sr.) spoke.

While the foundation was being constructed we did the detailed design of the superstructure. We then sent it out for bids. McHugh Construction Company was the successful bidder as part of a joint venture. Some time before I had told BG that if he needed an engineer on the site I might be interested. I thought of that as a part-time thing, as at the Edelman's factory. One Friday afternoon in April, 1961, as construction of the superstructure was about to start, I was crossing Michigan Avenue from 721. (The engineering departments had been moved across the street as the office expanded from about ten people to over fifty for Marina City.) When I happened to pass your father in the middle of the street—he was going in the opposite direction—he told me that I was going to the field fulltime on Monday morning as the resident engineer—less than half a day's notice. That was typical.

We had designed the tower cores to be slip-formed. After the construction contract had been awarded to McHugh, they offered us a substantial credit if we would let them build the core chimney-like, one floor at a time. There was no reason not to. Very little redetailing had to be done on the structural drawings, none on the other drawings.

The Marina City site belonged to the Northwestern Railroad, part of the Land Grant Act of the 1860's. At one time there had been many railroad tracks at the site. (I believe, but I am not sure, the site had been a freight yard at one time.) At this time there were only two tracks, the only rail access to Navy Pier. The Service Employees Union had acquired the land north and south of these two tracks, but only the air rights over the tracks. The railroad retained ownership of the tracks. That is why I had to consult with the railroad about the vertical clearance they required above the tracks, at what depth below the tracks we could encroach with the bells of the caissons adjacent to the tracks, and the horizontal clearance required between the tracks and the adjacent columns.]

GG: There are two things I wanted to talk to you about. One was the flying wedges, the formwork, the idea of flying the forms from one floor to another, for the...whatever you want to call them. From the core out to the perimeter. And the second is, I want to talk to you about the office building with the bowling alley, about how that works. In the office building, you know—according to you—you have the office building sitting on these columns that are going down, and then you have the bowling alley. Was there any...

BW: I don't remember. I was not involved with the detailed design of the office tower. I was involved with some of the preliminary work on the office building, but when the detailed design was done, I was in the field for the construction of the towers.

GG: So there's nothing remarkable about how these two came together that sticks out to you?

BW: No.

GG: It wasn't like they designed that and added that later?

BW: No. I honestly do not recall. Well, I don't know who came up with the idea. The forms for the towers were made of plastic...

GG: Fiberglass.

BW: Fiberglass, yes, fiberglass forms. And we put up a sample panel on the site. You know what, when the forms were stripped from the test panel there was a very, very acceptable finish. So that's when the decision was made to go to these fiberglass forms.

GG: Had the contractor ever worked with them, do you recall?

BW: I don't know. You'll have to ask Jim McHugh. I think he's still around. No, I'm serious, because at the ACI convention here in Chicago two or three years ago, they [McHugh

Construction Co.] had a big exhibit. Jim is probably still alive. The cranes, the climbing cranes, were only the second time they were used in this country. McHugh rented them with the option to buy. Before we were halfway through he bought them and had bought another one for a high-rise he was building on North Michigan.

GG: They came from Europe, as I recall.

BW: These particular ones came from Denmark.

GG: Who found them?

BW: No idea. Because now they're all over the world. Last time I was in Israel [1998], I saw them all over the landscape. They were everywhere—never seen that much construction going on in any one place but there.

GG: So you've got the forming, you've got the fiberglass, you've got the cranes. What other construction items?

BW: We had a design for the concrete—normally it was reinforcing steel. The contractor asked us whether he could substitute welded wire mesh for the re-bars, reinforcing bars, in the parking ramps and apartment floor slabs. We said, "Sure." In fact, at that time, the Chicago Building Code said that if you used mesh, you only needed 80% as much cross-sectional area of steel as if you used re-bars. We told the contractor we would not allow that 20% reduction.

GG: So it was one to one.

BW: One to one. And I'm sure the material cost him more, but the installation cost him much less. I pointed out some of the benefits in that article of mine, so I don't have to cover that right now. It certainly helped make the job go a lot faster, very definitely. Obviously, even though without permitting that 20% reduction in area, it must have been making money for him, otherwise he wouldn't have made the substitution.

GG: It all has to do with where the mesh is located in that sandwich. Sometimes it gets stepped on or moved up and down or...

BW: Well, I would say much less so than re-bars, as I pointed out in my article.

GG: Any unusual mixes?

BW: No. Well, interestingly, we used lightweight concrete for the slabs and beams and regular weight concrete for the vertical members, the core and the columns. On the core, we started out with a design strength of 5000psi concrete at the base, and then to 3750psi concrete, and then to 3000psi concrete, as we went higher. As the core was going up a floor a day—five days a week, not seven days a week—we needed fairly high early strength in the concrete (2200psi in 24 hours), so that the forms could be lifted. So the contractor stayed with the 5000psi strength concrete on the core all the way up, rather than going to the 3750psi or 3000psi mix and using high early strength cement.

He just stuck with the 5000psi mix on the core all the way to the top. The crane went up with the core; it was always supported for three floors below where we were placing concrete. As I described in my article, we went up literally every 24 hours on the core. A floor a day, including the slabs and beams inside the core. We did the east tower first.

We had circumferential beams between the outer columns, and then radial beams coming from the core. They went right into the core. They sat on the core. Because we didn't want the beams to crack or to do any damage, we cast a recess into the core on which to set the beams. They were not tied into the core. The beams spanned across the inner row of columns to the outer row of columns. I described the construction for the superstructure, for the ramps, you know, where we went up a half a floor a day for the parking ramp. And then on the apartment floors we went a floor every other day: one day on one tower, on the east tower, the next day on the west tower, then on the east tower, etc. That's all described in that article.

[There were 40 caissons for each tower—eight under the core and one beneath each of the 16 columns in the inner ring and the 16 columns in the outer ring. The inner ring of columns is not far from the core (the width of the corridor in the tower). So, as we were doing the structural design I proposed that instead of having a caisson cap on top of each of the 24 caissons for the core and inner columns, that we call for a three foot deep mat to cover all 24 caissons. From the mat we would cast radial beams to the caps on top of each of the 16 outer caissons and circumferential beams between all 16 outer caisson caps. Thus all caisson caps would be tied together. This was done.

The east tower superstructure was started first. The tops of the caissons for the west tower were cut off lower than those for the east tower because the marina was beneath the west tower (unlike its placement beneath the east tower as shown in the model of Marina City). When we were ready to start the west tower superstructure (in the summer of 1961; the east tower had been started that spring) we found that the tops of several of the caissons (not very many, but I don't remember the exact number) were out of location a bit (not a great distance).

Obviously, we were concerned. We cored each of those caissons and found that they had cracked. This was remedied by pressure grouting. To correct for the eccentricity between the caisson tops and the supported columns and core I suggested that we deepen the mat from three feet to six. BG, however, wanted to call in some geotechnical consultants, including Mueser, Rutledge in New York, as most of the financing of the project came from East Coast sources. I do not remember what their recommendations were. In fact, I never saw them. BG then asked Ralph Peck, on the UI Champaign faculty, to come to the site. This he did on a Saturday when he was on his way to Paris. After looking over the site, the plans, etc., he recommended that we double the depth of the mat and outer ring caisson caps from 3 feet to 6 feet, exactly what I had recommended a month earlier. (A lot of consulting fees and time could have been saved.) So that is what we did.]

The 6 foot mat—this was in the summertime—we did it the night of August 31 to September 1 [1962]. We had to do it at night on account of the summer heat. This was one of the first uses of ice in concrete to keep the heat of hydration down. We started

after the regular day shift at 5:00pm and literally worked right through the night and were finished before daybreak the next morning.

GG: A lot of concrete.

BW: Yes. Yes. I'd just come back from vacation the afternoon before. My wife and I had been up in Wisconsin.

GG: Were you nervous at all in the construction of these buildings?

BW: Not at all. Not at all. You know, my job was to check everything. In fact, one time the ironworker foreman came to me and said: "Bert, there's a problem at such and such. I'm telling you right now, before you see it and come charging down to me. (laughter) We're fixing it." So, not too long after your father was at the job and he picked me up and we went back to the office. He asked me whether I thought that I had proper control of the job. And I told him, I said, "Yes, when the ironworker superintendent comes to me..." and I told him about the incident I just told you. So we finished the structural part, the concrete part, of the towers by the summer of '62. The east tower went up first. In fact some of the apartments were already being occupied, had been finished and occupied in the east tower, when we finished the structural work, the structure itself, on the west tower.

GG: How did you get occupancy for apartments on a construction site?

BW: When you find out, let me know. That wasn't my concern. And then we went into the construction of the office building. On the towers, the caissons went right down into bedrock, 2 1/2 feet, about 150 feet total. At that time, according to the Chicago Building Code you could increase the allowable rock bearing load by 20% for every foot you took the caissons into bedrock. So we went 2 1/2 feet into bedrock, and could increase the allowable bearing capacity by 50%.

GG: Wow.

BW: Of course we were required to drill into the rock to make sure that it could carry this higher load, you know, test it. And that had been done. But that was all done by the time that I came into the field. We had completed the detailed design for the foundations first and awarded a contract for their construction. We completed the detailed design of the towers while the foundation work was in progress. I went into the field when the superstructure work started. The caissons were in before the towers. When the structural work on the towers was complete we went into the construction of the office building. There the caissons were belled out at the bottom, bearing on hardpan, about 80 feet down. I had to check with, a couple years earlier, with the Northwestern Railroad as to how far below the tracks we could encroach with the bells of the caissons and the clearance required between the tracks and the columns adjacent to the two tracks.

GG: Did they need to keep that trackway operating?

BW: Oh, it was operating all the time, and we had to be very careful. Those tracks were the only rail access to Navy Pier—they had to keep them operating.

GG: So you were building around the different train lines.

BW: Yeah. Although there wasn't that much traffic. Periodically a train would come through there.

GG: I believe they delivered paper to the Tribune at that point.

BW: I had no idea. All I know is that we had trains coming through there. So the other guy out there with me all the time was Andy, Lou Anderson. He was looking after the finishing trades and I was looking after the structural part. So then when we were belling out the caissons for the office building, we had to go down and make sure that the soil at the bottom of the bell of each caisson was properly compacted. That was the warmest spot on the project that winter; the winter of '62 was a rather bitter cold winter for Chicago.

GG: How far did you go, how far down?

BW: Into the, down to the bottom of those caissons, in the bucket.

GG: Really.

BW: Oh yes. We had to make sure that the soil at the bottom of each caisson was properly compacted.

GG: How far down are you?

BW: I don't remember. About eighty feet.

GG: Eighty feet down there?

BW: Probably. Or something like that. You can check the drawings.

GG: Was that before or after lunch?

BW: Both. We'd ride the bucket down, and Lou and I took turns.

GG: Were those caissons dug out by hand, at that depth?

BW: I don't recall. Probably, but I wouldn't want to swear to that. I think they were dug out by hand at the bottom, but I don't want to swear to that. Then when we came to the superstructure, you know we flared out the columns, and we were concerned about the heat of hydration. The PCA, who were working with us very closely on this project, installed thermocouples at various elevations. So we measured the heat of hydration on the first pair of flared columns.

GG: On the first of the flared columns?

BW: The flared columns. And the readings we got gave us serious concerns. So from the second pair of flared columns on we had the contractor put ice into the concrete mix in place of some of the water.

GG: There's a curious combination of this, some sort of industrialized production going on, as these towers are marching along, and then this very beautiful handwork, with these forms and with these flared columns and the sort of special forms that they used for those have a delicacy to them. That seems to have been a tension between maybe the architectural sense of that...no?

BW: No. That was interesting because the mullions in that building are structural, so.... You know, I was involved in some of that early design, not the detailed design, you know—that was something done while I was in the field for the towers. Interesting also—your father was concerned, as we were starting the design of Marina City, about the wind effect of the two towers. If the wind should come right through the axis of the two towers, that this could have a negative suction impact on one of the towers. And he wanted to have somebody do a wind tunnel test. So I was phoning around to universities all over the Midwest, including Michigan and Wisconsin and Champagne, University of Illinois, to see whether somebody could do a wind tunnel test, and then spoke to one of the research professors in Ann Arbor, Michigan. He said he'd be willing to do it, but he wasn't sure that it was necessary. He would run a numerical model first, and he did, and he said actually, if there was a wind right down the axis of the two towers, it would have a slightly beneficial effect. Which obviously we didn't take advantage of. Your father was just concerned whether there would be a negative impact if the wind blew down the axis of the towers. But there wasn't.

GG: So you never ran a wind tunnel test?

BW: No. We didn't have to. The professor in Ann Arbor was saying he would run a numerical model, and then said a wind tunnel test was not necessary.

GG: And how about the forming of those mullions, those structural mullions?

BW: Oh, for the office building?

GG: Weren't they fairly unusual?

BW: Yes. Yes, to use mullions as structural members was unusual. Obviously, the job got a lot of attention and actually a lot of sidewalk superintendents. One time, as I was coming back across the State Street Bridge from lunch, going to the project, one tower core was way up and the other core was starting. I heard one elderly sidewalk superintendent explain to another how eight apartments were going to fit into the 32-foot diameter core. I told your dad about that and told him that was one time I thanked God for FHA minimum standards. Then of course I heard, on the best of authority, that the towers were sinking. The only way I could rebut this was: "Yes, we expected that. That's why we put in those circular ramps, so when the towers sink, they're going down

clockwise and all we have to do is reverse the motors and bring them back up counterclockwise.” Then of course I heard, on the best of authority, that the towers were leaning! I said: “Yes, we expected that, and we designed them so that they would start to lean towards each other and eventually they would touch. We developed a new structural theory for that; we call it ‘The Theory of Mutual Support’.” That’s the only way you could rebut some of the stories we heard.

We did have two bad accidents. On the core, one time, three carpenters were hoisting the platform they were standing on. One guy, the foreman, loosened the hook accidentally, and the platform with three guys on it came down over forty floors. They were gone. I went to the funerals. One of them was especially sad...his pregnant wife there, pregnant with their first child and married less than a year. And another time, when we were in the finishing trades on one of the towers, the East tower, one of the laborers hauling a piece of sheet rock stepped off the balcony backwards. (The guardrails had not yet been installed.) So we lost four people in all.

GG: On projects of this size, is losing people...

BW: I don’t know whether that was unusual or not. It was the only time, fortunately, in my career, that I was ever involved with serious accidents.

GG: Was anybody lost at Stonybrook during the construction?

BW: I don’t think so. Not that I know of, let me put it that way, because I was not involved in construction. I was involved with the master planning only, not even with the detailed design.

GG: We’re not going to get to Stonybrook, today, I don’t think—unless you have rollerskates on your—

BW: Well...you asked, why did I leave your father?

GG: Yes.

BW: Well, my wife, both my wife’s and my families were on the East Coast, and we had decided that the next time I changed jobs I would look for a job back East. I didn’t want to stay with your father’s firm, because your father was just—and I don’t say this in any negative way—a workaholic. Basically, it was a one-man operation. It was called Bertrand Goldberg Associates; there were no associates. And he was in his late forties, early fifties, a prime candidate for a heart attack or some other ailment, the way he drove himself. I realized that if something ever happened to your father the firm would close, the firm could not continue. And since I had a young family to raise, I just didn’t want to make my livelihood dependent on one person’s health.

GG: Now, people like Dick Binfield and Ben and Ed stayed with him. Did you ever talk to them about these kinds of things?

BW: No, no. That was strictly private. For example, you must think about your dad when I was his only structural engineer, because, you know, he was working seven days a week. One Sunday I was in a very long, intense telephone conversation with my father in Albany, 15, 20 minutes—I don't remember what we were discussing. I'd barely put down the receiver when the phone rang: "Ah, Bert,—” It was your father with a complicated question. You know, my mind was still on the long detailed conversation I'd been having with my father. The next morning I told your dad at the office, "You know, I have no objections to you calling me at home"—which he did not infrequently—"but please, next time, introduce yourself." Then, another time, we both happened to be in the men's room, in adjacent stalls, and right then and there he started to talk business. Another time, Shirley, the secretary, made reservations for your parents to go down to Florida, and she made them for first class, and he told her in no uncertain terms, "Economy!"

I left your father when the construction—the theater wasn't built until a few years later—when all the structural parts of construction that needed to be done at that time were done.

GG: Was there a hole where the theater was?

BW: We put in some foundation walls a little bit. It was just left open. That wasn't built for—I don't know, two, three, four years later. Sometime quite a bit later. So when we finished the structural part of the office building, that's when I left your father.

GG: And did the window mullions work?

BW: Yes! Oh yes. In fact, I know. Well, your father had his office in the building for quite a while.

GG: But you knew of no construction problems going on in that period.

BW: No. Not structural. I was there until the frame of the office building was complete.

GG: But given the radicalness of this whole operation—you hadn't seen towers like this before, you hadn't seen a wall structure like this in some time, with mullions. Alright, you've got the base conditions...was there some sense that excitement was tempered by caution? Can you recall any...there was just, get it done.

BW: Get it done. There were discussions with contractors at different times, you know, on how to handle some of the details. There was a lot of interest in the project. So if we had a special problem in designing or detailing, we had no problem calling some contractor: "Hey, what's a better way of handling this, construction-wise?" We did that quite frequently, quite frequently.

GG: Even if they were not involved in the job?

BW: Yes. Oh, before we went out to bid, as we were designing. The other good thing about being an integrated firm, as we were designing Marina City, every morning—Dick Binfield for architecture, Maury Cook for electrical engineering, the chief mechanical

engineer (I don't remember his name), and I for structural engineering—we would get together to talk over whatever problems we had. Sometimes it was a ten-minute meeting, sometimes it was a two-hour meeting. You know, this kind of coordination—we couldn't have designed the project, certainly not in the time that we did, if we hadn't been integrated and had this type of cooperation and coordination. And if somebody needed something, if you could accommodate that person, you would; if you couldn't, you'd say so. But if you had to say "no" to something, the other person would know that you weren't just being obstinate, that you genuinely couldn't.

GG: Did you ever appeal out of that meeting upstairs, or was that...?

BW: No, we'd settle it, we settled our problems. One thing about your father, though. He could never argue with me whether it should be two number seven bars or two number eight bars. But, conceptually, he was one of the best engineers I ever met. Structural, mechanical, electrical—time and again, he'd tell us to do something, and we'd say, after working on the problem, "I'm sorry, we can't do that." And he'd say, "Have you thought of such and such?" And eight or nine times out of ten, he'd be right.

GG: No, I know.

BW: Mechanical, electrical, structural—on an all around basis, I can truly say he was the best combination of architect and engineer I have ever met.

GG: He had an incredible feel for engineering.

BW: Yes. Yes. And a very nice person to work with.

GG: In that regard.

BW: Overall.

GG: Overall?

BW: Oh yes.

GG: Why?

BW: His personality.

GG: Fair?

BW: Yes.

GG: Demanding?

BW: Yes. But no more than he demanded of himself. He was a...you know, if I hadn't been so concerned about it being basically a one-man operation, I wouldn't have left him.

[Discussion about how long is left in the interview.]

GG: Let's talk about your relationship with him as a client.

BW: In the summer of '62, I was contacted by the State University Construction Fund in Albany, which had been organized by Rocky—Rockefeller—in '62 to build up the State University system of New York. Many, many brand new campuses and enlarging all the existing ones. As they were getting organized, they got my name from the RPI alumni office. They called me, asked whether I'd be interested in one of their positions. I said, "I don't know." Well, they'd like to talk to me. As I was planning a trip east to visit my family, not too long thereafter, I said, "Fine, I'll be in Albany." We set a date. And then they called me and cancelled it, because Governor Rockefeller was running for reelection and all of a sudden the word came out, "In-state hires, only."

[End of tape]

BW: In February, 1961, I happened to mention to your father one Friday that I was flying to New York for the weekend, for a family affair. He asked me to stay over until Monday and go to Severud's office: "I'll pay half your fare." Fine with me, because my father was paying the other half. So I was getting a free trip to New York. Your father wanted me to see HansKarl Bandel—

GG: At Severud's office.

BW: At Severud's office. And he was the—obviously, your father must have worked with him on some of the basic thoughts about Marina City before we started the actual working design. We talked about whatever problems or questions your father had wanted me to discuss with him, and then we went out to lunch together, HansKarl and I. And we kind of refought World War II, because we both came from Germany, I as a Jewish refugee and he came after World War II. We both served in World War II, he in the German Navy, I in the American Army. All in a very friendly way. Personally—we were about the same age, we got along; he might have been a few years older, no more than two, three years older than I was. He was in one major navy battle I knew much about. Anyway—

GG: And his name was...

BW: HansKarl Bandel. B—A—N—D—E—L. HansKarl, all one word. When I left BGA in the summer of 1963 I had a job with a contractor in New York, which, unfortunately, lasted only a few months. So I went to see HansKarl about a job with Severud. Oh yeah, they grabbed me. And I worked for Severud for about seven, eight months, but I wasn't making enough money there. So I went to work for another engineer in New York City. That didn't last too long, because he was having trouble and he had to close his office. So I contacted the State University Construction Fund in Albany, and they immediately offered me a job.

There were two major divisions—the construction division and the planning and design division. The person who headed the planning and design division, in which I worked, was

a man by the name of Tony Adanolfi. In terms of the early 60's, a two billion dollar program. So in terms of today's money, you're probably talking about an eight to ten billion dollar program. He was only in his thirties. But he was, in many ways—I thought he and your father were kindred spirits. They both thought out of the box. They weren't bound by just what had been done before. They both had realistic ideas, not wild daydreams, but very realistic ideas about how to go beyond what had been done, not just pipe dreams, but based on good thinking.

So, in the spring of '65 I was coming here through Chicago, on my way back from my first ACI convention, in San Francisco. I stopped over in Chicago because I wanted to have lunch with a nephew of mine. We met at Field's. And I called your father—I'd left him on very good personal terms—and I told him, "You should meet this guy. I think that you and he would hit it off." He thanked me. I didn't hear any more from him about it until the summer of '66, when he called me and asked whether that offer was still good. I said, "Sure." So I arranged an appointment for him with Tony Adanolfi. He came to Albany. I picked him up at the airport, drove him into town, and right then and there Tony offered him the job for the Health Sciences Center. Obviously, Tony must have checked your father out before, because he would have had to get approval from the State University itself. Right then and there, Tony offered him the job of the Health Sciences Center at Stonybrook.

GG: How could he go outside of state, for an architect?

BW: Oh, he could!

GG: Not a problem?

BW: Not a problem. At least at that time. Not a problem at all.

GG: Were there other progressive architects that he was seeking?

BW: Oh yeah. Most of our architects were in New York, but there was no reason—

GG: Can you name one that you might recall?

BW: I don't recall, no. I'm sure SOM must have been doing some work for us. But we had about twenty-five campuses we were doing, some of them brand new, and others being expanded. You know, four brand new university centers: Albany, Stonybrook, Buffalo, and Binghamton. And many new art and science colleges up to the masters degree. I mean, you spend 10 billion dollars today, it'd be quite a few projects.

GG: How long had you been in the office at that time? A couple years?

BW: No, no—when I talked with your father about coming from Chicago, I'd been there half a year. I started there in October of '64, and this was in the spring of '65. Then he contacted me June, July of '66. And that's when he met Adanolfi, and then I got myself assigned as the Project Manager for the Health Sciences Center—we had a different title, but, in fact, as the Project Manager. This was strictly during the planning stage. So I was

coming to Chicago, on an average, at least once every week or ten days, for quite a while. Sometimes twice in one week, other times every two weeks, but quite frequently.

GG: And who did you meet with when you came to my dad's office?

BW: Oh, with Dick Binfield; Ludwig Steiner was running the structural shop at that time.

GG: Al Goer?

BW: Al Goer was there, Ed Center was there, Ben Honda was there. Some people, such as Ludwig, came on board after I left in 1963, but the others were there before I left. They all came aboard—well, Dick Binfield came a couple of weeks, two, three weeks after I did in 1958. The others, Ed Center, Honda, Al Goer, all came as the office expanded to design Marina City.

GG: So you knew them.

BW: Oh, yes.

GG: And you were comfortable with them.

BW: Obviously. Obviously, and they knew me.

GG: And they were comfortable with you.

BW: Right. And your dad's office was in the Marina City office building at that time. It was very interesting to work with your dad in a different way, but it was a very professional, a good personal and a very good professional relationship.

Before we decided on a framing system, I wanted him to investigate three different framing systems: cast-in-place concrete, pre-cast concrete, and structural steel—to make some serious studies, and we would reimburse, you know, pay extra for those studies. I recommended Irwin Speyer in New York, who was on the ACI building code committee at that time, for the cast-in-place concrete. I recommended ABAM Engineering out in Tacoma—I'd met those people at ACI—for pre-cast concrete. I don't remember who we used for the structural steel.

Art Anderson, then the head of ABAM and a recent past president of ACI, stopped off in Chicago, on one of his trips through here, to meet with your father, and agreed to do the study. And they were so impressed by your father—Art was also on the board for St. Mary's Hospital. On Art Anderson's recommendation your father was hired to design the Tacoma Hospital.

GG: You understand you're in the middle of all this.

BW: I just—my recommending Anderson to him to do the study of pre-cast concrete construction for Stonybrook, and suggesting that ABAM would be a top-flight firm to do

it—that’s what led to the Tacoma project. But that was strictly your father’s doing; I wasn’t involved with that whatever.

GG: I understand. And I’ve seen the study books on Stonybrook. Those orange and red volumes that were done. My question to you is this, in the few minutes we have left today—and we can revisit this next time—there are several thoughts that come to mind in terms of how you might describe, or how one might describe the office: inventive, or rigorous...you mentioned serious and professional. Did you find that when you made suggestions, did they accommodate them?

BW: Oh...well, open. You know, it wasn’t that somebody made the decisions and this was the way you were going to do it. Oh no, it was a very open...

GG: You didn’t find it to be like a prima donna situation.

BW: No, no, no. No. As I have said, your father’s judgment on things was super. He was, on an all around basis, the best engineer I ever met...I maintained a very good personal relationship with your father.

I wasn’t on the Stonybrook project beyond the master planning stage. I was transferred to a different department. Then later, in 1972, I went to the Dormitory Authority of the State of New York.

But you know, I always stayed in touch with your dad. We’d talk on the phone once or twice a year. I visited with him when he was living in River City, and, as I was coming through Chicago once a year or once every other year, I would stop over and we’d get together for lunch, until he died. I met you a couple of times when I visited in the BGA office on the stopovers. That was when I got you that magazine with the Marina City articles.

One of the last times I spoke with him on the phone, no more than a year before he died, I asked him, “Bud, did I ever tell you my favorite definition of an engineer?” He said, “No.” “Well, he’s the guy who has to justify the architect’s guesswork.” And he began to laugh. “And do you know when I developed that definition?” “No.” “When I was working for you.” He got a kick out of that. You know, we could talk that way.

We had a very good personal relationship. He insisted one time, several times, that I stay at Astor Tower, when I was in Chicago for the Stonybrook job. Other times, he had an apartment, I think, in Marina City; I stayed there a few times. Most of the time I was staying in a hotel right near the Tribune Tower. But there were times that he didn’t want me to stay in a hotel and wanted me to stay in Astor Tower or Marina City. Also, a few times he wanted me to have dinner in the French restaurant your mother owned in Astor Tower—Maxim’s.

[End of interview]

