TRUTH IS CONCRETE

By Bertrand Goldberg

The Marina City towers are visible along the Chicago River from atop the Aqua Building. Photo courtesy of Rex Donahey.

The following article is reprinted by permission from the September 1988 issue of American Concrete Institute's (ACI's) **Concrete International** *magazine. ACI Fellow Bertrand Goldberg (1917–1997) was principal and president of Bertrand Goldberg & Associates, Chicago, IL. At the time the article was originally published, he had been involved in the engineering and design of reinforced concrete structures for more than 40 years, had received many architectural awards, and had authored numerous publications concerning architectural design.*

It is not unusual to identify a lifestyle with a material or a technology: when we say Stone Age or Bronze Age or computer age, we identify ourselves with the material or technology that helped us to change our living patterns. But in spite of the long history in the use of concrete to build our world, we have never developed a "concrete age." Yet the importance of concrete in our world emerges in the way we use the word and its image. We say concrete when we want to stress the ultimate truth: concrete facts, or concrete reality. We never say steel facts or steel reality.

Our century has even brought the image of concrete into our newest philosophies: the *Encyclopedia Britannica* says, "A turn to the concrete has emerged as perhaps the most fundamental feature of mid-20th century continental European philosophy." In its philosophical usage, the word "concrete" signifies reality as contrasted with the abstractions of numbers and logic. I like that. I know of no other material I use to build my buildings that a philosopher would use to describe the reality of our living.

As engineers, we too know of a concrete reality: we see our world of space and shelter as divided into the bays of a post and beam system. As engineers, we see our reality as a system of right-angled boxes.

In the past fifty years, we have uncovered human societies that have neither the word nor the manmade right angle, but for thousands of years, our Western society has based its thinking and its structures on this form of manmade abstraction, in spite of the fact that we don't always agree about its value. Le Corbusier in 1925 called the right angle the perfect form for our buildings; Pete Seeger in 1965 called those right-angled buildings "ticky-tacky little boxes."

Look at our world of buildings—the rectilinear living spaces that we design using numbers and logic—as a man from a more organic world might see them: an endless cluster of right-angled boxes arranged in structural bays according to our engineering formulas of logic and numbers. And while you are looking at our box buildings and their kind of reality, remember that in the entire history of our structured world, this is the first time we can build whatever our minds dream up. Our technology, our skills, our development of materials—especially that wonderful plasma-like concrete that can retain any form we give it—for the first time can provide whatever reality we can design. Is the building of boxes the finest reality for our lives, for our cities, for our own work?

Vitruvius, architect for the Caesars, said that the architect had to know more about government than the king, more about health than the physician; and we might add, more about living and humanism than the social scientist. Now is the moment when the engineer and the architect must weave into their designs more about people and the way they live than the engineer can provide using abstract numbers or an engineering logic. The concrete reality for engineer and architect now includes the needs of our society and the rapid changes that we have seen since World War II.

Figure 1. Marina City in Chicago, IL, includes apartments, parking, a theater center, and retail suites. Photo courtesy of Tom Scully.

As both architect and engineer, I want to tell you what I have discovered in the past 40 years about the design of space and structure. The need in our buildings for nimble engineering, functional service, sometimes social programs, and the best forms to serve these needs, are given to us by fluid rather than rigid designs—designs which, though organized with care, are free from the limits of the post and beam. These are designs that welcome our human change—an image of growth that is a part of living.

Thirty years ago the Building Service Employees Union asked us to design a project in downtown Chicago that would bring people back into the city center to live. This was Marina City: the then highest apartment structure in the world, the then tallest habitable concrete structure in the world, the first mixed-use (residential, recreational, commercial) center-city project in America (**Fig. 1**).

We said it was a city within a city. The towers with their 900 radial (flower-like) apartments were an instant success. They could be built only in concrete. Each tower, containing 450 apartments, was built around a tubular core that provided the wind bracing. The lower 20 floors were designed as a helix for parking 450 cars and lifted the apartments above the city noise and dirt. The separate office building shielded the apartment towers from the underdeveloped area to the north of the apartments. The apartments were both economical and livable: they attracted tenants whose income

Figure 2. The concrete tubes of River City, located along the Chicago River, give a unique aesthetic to this mixed-use project. Photo courtesy of Emily Lorenz.

ranged from less than $10,000 per year to more than $100,000 per year. This was democracy in architecture.

Could we use what we had learned at Marina City to build housing for the poor? At Raymond Hilliard Houses for the Chicago Public Housing Commission, we designed 750 apartments using structural designs based on a concrete shell. The two tubular towers were designed for senior citizens; the two arc-shaped buildings were designed for growing families. These buildings of a radical new design cost no more per apartment than the boxes for the poor built by the Public Housing Commission adjacent to Raymond Hilliard. Raymond Hilliard is the only major public housing project in Chicago that has never needed uniformed police to keep order. Why?

Could the concept of grouping human activities in geocentric spaces be applied to hospitals where the welfare of each patient is strongly related to a nursing center? Yes: at Harvard Medical School's 750-bed Brigham and Women's Hospital, at Northwestern University's 300-bed Prentice Hospital, at the 750-bed Good Samaritan Hospital, at the 250-bed St. Joseph's Hospital, and at others across the country.

The new forms of space wove more closely the relationship between patient and nurse, increased the efficiency of care, and provided better organization patterns for medical care—all made possible by the flexible engineering inherent in concrete plasma.

Were the details of windows—the eyes of the buildings—restricted? Were they limited in form? In function? In location? No: so long as we had different needs, different ideas, different dreams, we had the flexibility of using different window and structural forms as they were best developed (**Fig. 2** and **3**).

Most recently River City has become another city within a city in Chicago (**Fig. 4**). Concrete tubes weaving snake-like along the Chicago River near the Sears Tower and the

Figure 3. The details of windows—termed the eyes of the buildings by Goldberg—are shown close-up for the River City complex in Chicago, IL. Photo courtesy of Emily Lorenz.

Figure 4. River City in Chicago, IL, includes commercial, residential, recreational, and educational spaces. Photo courtesy of Tom Scully.

new Financial Center contain the beginnings of a new mixed-use project of commercial, residential, recreational, and educational activity. Two rows of apartments face an interior street-like atrium above three floors of commercial activity. A new center of living for a future community to contain upwards of 10,000 people engaged in all the activities that an urban center can provide. Thirty years ago when my mother-in-law looked at the highest concrete apartment building in the world at Marina City, she said this is what we used to call "living above the store." I looked at it and thought I would call it a city within a city (**Fig. 5**).

We probably need both of those handles to lift the city of the future high enough to look at it. We not only need River City and Marina City—we need hundreds of new cities within our present cities to give us housing, and the neighborhood where we can remember our humanism.

We are now entering a period in the development of American cities when numbers and engineering logic are no longer adequate to keep our cities viable. In the past 10 years, we have built enormous numbers of the boxes we call our city centers. But the people who work in those boxes have chosen to move away from the city. And they have taken their lives with them. Their community, their culture, their education is no longer to be found in the city.

The president of the Population Institute has noted: "As recently as 1950, more than half of the world's 12 largest cities lay in Europe or North America. In a dozen years (2000 AD), only two cities from those industrialized regions—New York and Los Angeles—will rank among even the 20 largest cities. Europe, the cradle of Western civilization, will drop entirely off the list."

Figure 5. Designed to be a city within a city, Marina City was the tallest concrete apartment building in the world at the time it was built. Photo courtesy of Emily Lorenz.

As our cities shrink and atrophy, so does the life within them. Our cities have lost their humanism.

If our cities are to remain a center of civilization, they cannot serve as a 35-hour-a-week city inhabited by our poor. The original American vision of the city is one of synergy, growth, and community. The American city is not a museum to shelter the remnants of our democracy. The city for America has been the melting pot from which we made our civilization.

The fluidity of the building designs—of the engineering I have shown you—is a reflection of the way people move, work, think, and relate to each other in their daily lives, and can become the direction of development for the future. No material other than concrete has made possible this kind of vision.

Is a new architecture, new engineering invention, and a new humanism needed to continue the life of our American cities? If we are to draw people back to the centers where they make their living and their world, our buildings must deliver this new life we promise.

The plasma of concrete, the reality of the concrete forms that we have been looking at, is a reflection of our possible urban life. We as architects and engineers and even as planners have a new responsibility. We must think of what we shall build for a new humanism. Winston Churchill said it best: We form our buildings, and our buildings form us.

We, today, also can say, "Our truth is concrete." IIBEC

ACI Fellow Bertrand Goldberg was principal and president of Bertrand Goldberg & Associates, Chicago, IL. He was involved in the engineering and design of reinforced concrete structures for more than 40 years, received many architectural awards, and authored numerous publications concerning architectural design. More information can be found at bertrandgoldberg.org

NRC Releases Resilience Performance Standard for Low-Slope Roofing

Photo Credit: iStock.com/Jetclub

The National Research Council (NRC) Canada has announced the publication of a new performance-based standard, CSA A123.26-2021, *Performance Requirements for Climate Resilience of Low Slope Membrane Roofing Systems*. CSA A123.26 was published by the Canadian Standards Association (CSA) Group and is intended to be used by building designers, building owners, building code officials, product manufacturers, and installers. The project was partially funded by the RCI Foundation Canada.

"This is important research for the building enclosure industry here in Canada, and the Foundation is glad to have been a financial supporter of this project," said Albert Duwyn, chair of RCI Foundation Canada. "There have been so many collaborators in this project, and we hope IIBEC members will benefit from this new information."

The objective of CSA A123.26 is to provide additional requirements for climate adaptation in specified Canadian climatic zones for respective climatic loads. It also standardizes quality assurance requirements for installation, including requiring registered observers on projects.

Adds IIBEC President Ted Sheridan, "In particular, the field wind uplift testing protocol seems to have great potential as the basis for a field uplift testing standard."

The RCI Foundation Canada and RCI-IIBEC Foundation are now accepting donations to support industry research efforts such as these. For more information, visit https://www.rcifoundation.ca/donate.aspx or https://rci-iibecfoundation.org/donate.aspx or contact RCI-IIBEC Development Officer, Rick Gardner at rgardner@iibec.org or 919-859-0742.