



# P E R S P E C T I V E S

by **Rinaldo S. Brutoco**

*Rinaldo S. Brutoco is the Founding President and CEO of the Santa Barbara-based World Business Academy and co-founder of JUST Capital. He's a serial entrepreneur, executive, author, radio host, and futurist who's published on the role of business in relation to pressing moral, environmental, and social concerns for over 35 years.*



## **Twelve Story Building Collapses** *Cloudy with a chance of chaos*

What on earth is going on in Miami? A 40-year-old, twelve-story building named the Champlain Towers South (the “Towers”) collapsed into a heap of rubble without any advance warning, a mile from Miami Beach in Surfside, Florida. At this writing, there are at least nine fatalities, many injuries, and more than 150 people still missing. Adding to the confusion, that building was relatively new compared with others on that stretch of sandy beach (formerly marshland).

On June 25th The Washington Post reported that the Towers were built on a porous limestone “plate” topped off with sand and organic fill. Just like its cousins in the Miami Beach a mile or so away, that mixture had proven stable and “good enough” historically to construct large structures upon. Unfortunately, these are not “normal” times in any sense of the word, and “good enough” just isn’t.

“Underneath its foundation, as with Miami Beach, is sand and organic fill —over a plateau of porous limestone — brought in from the bay after the mangroves were deforested. The fill sinks naturally and the subsidence worsens as the water table rises” (The Washington Post. June 25th). It has long been clear that South Florida has been on the front lines of climate change impacts in general, and sea-level rise specifically. The dangers to infrastructure of the region — from septic systems to aquifers to shoreline erosion have been dramatically felt far before the recent collapse.

The Towers building was recently found to have been sinking in the 1990s and may have continued to sink since then, according to Shimon Wdowinski, a professor at Florida International University’s Department of Earth and Environment. He co-wrote a paper published in April 2020 that said satellite imagery showed a 12-story condominium building in the eastern part of the Miami Beach area had sunk by about two millimeters per year between 1993 and 1999, and was sinking far faster since the mid-1990s. A similarly disturbing finding was reported by structural engineer Frank P. Morabito in 2018 when he alleged “major structural damage” had been discovered with evidence that bearing columns were being compromised by water. Finally, veteran engineer John Pistorino, who helped write the Miami-Dade County code that requires 40-year-old buildings to be inspected, has noted that saltwater and air had contributed to a similar building collapse in downtown Miami in 1974 (leading to seven deaths).

It is too soon to know for certain what caused the Towers collapse, but it is quite likely that sea-level rise was partially or fully to blame. As various attorneys begin to comment on the situation, including those who represent the Tower’s condominium association, they observed that it is quite possible the 40-year inspection (then recently completed for the Towers) doesn’t do enough to examine subsurface conditions. It is likely that the problem originated there.

One Association attorney, Donna DiMaggio Berger, specifically noted that a “subsurface, structural issue” likely caused the collapse. “This building was on pilings buffeted by the Atlantic Ocean and the Intracoastal Waterway,” she said. “We’ve got water coming at this thing from both sides.” Therein lies the connection between this one building toppling and the hundreds of others that are similarly vulnerable directly as a result of climate change (emphasis supplied). This observation is why the Towers collapse is of far greater significance than one building’s dramatic reduction to rubble.

There is no question but that every multi-story building in South Florida, particularly those along the shoreline, is subject to a catastrophic collapse with greater frequency over time as climate change accelerates. Why? Because all of South Florida is sitting on porous limestone which allows rising seas to percolate up to the surface even on a totally clear, non-rainy day. The Towers collapse is quite likely the “canary-in-the-coal-mine type event”, warning every coastal community that 1) climate change is real, 2) climate change is here now, 3) no one can predict all of the ways climate change will affect the environment in massively destructive ways, and 4) NOW is the time to take action to begin ameliorating the worst localized events.

The “canary lesson” isn’t limited to teaching Floridians. It is directly applicable to us here in Santa Barbara. What are the effects climate change might have on us and how can we address the remediation we require now? They are too numerous to mention, from adequately fire-resistant housing (the codes need to be changed to prevent Paradise, CA happening here). And, for another thing, we paid for a desalinization plant (twice as some residents point out) and it is sitting permanently affixed at current sea-level. That means, if we do nothing, sea-level rise will put it under water. Given the drought we are just entering, the desalinization plant was sold to us as the way to obtain adequate freshwater from the sea.

How do you get freshwater from a plant that becomes submerged? What can we do about it? Put the best minds we have on the problem and begin to analyze whether we should construct a pontoon suspension system that will articulate to higher heights as sea-level rises; or, better yet, relocate the plant up the hill where they intend to pump the freshwater for distribution throughout the city, so we pump seawater up to the plant and let gravity take it down. Will that work? I don’t know for sure yet. But asking what might work is the effort we need to make now if we want to address climate change issues before they become catastrophes.

Chapter 4 of the World Business Academy book, *Freedom from Mid-East Oil* (2007) is entitled: “Climate Change: Cloudy with a Chance of Chaos.” The word “Chaos” means “behavior so unpredictable as to appear random.” Unfortunately, there is nothing random about seawater incursion into Miami Beach, nor is there anything random about sea-level rise—both are currently unavoidable. Since we know what the biosphere is doing, the question is whether our human behavior, particularly those of us who love Santa Barbara, will remain chaotic in the face of the inevitable adjustments that must be made. The canary is singing. Are we listening?

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