

Multi-Family Construction Calamity

by Walt Keaveny, Risk Manager, MS, PE, PG

Why was hall-of-fame 49ers quarterback Joe Montana first an avid promoter of his new condominium building, but now engaged in a class-action lawsuit against the builder? Why are new multi-family buildings in cities like San Francisco, Seattle, Las Vegas and Corpus Christi being dismantled or even imploded? In recent years, there have been an alarming stream of large high-profile, multi-family structural failures. What causes these failures? What can smaller multi-family builders learn from these costly failures, and help to manage their risk?

Leaning Tower of South Padre (South Padre, TX)

Coined the “Leaning Tower of South Padre,” the Ocean Tower leaned

dangerously, due to settling 14-16 inches. One of the tallest buildings in the Rio Grande Valley, the tower stood 445-feet-tall which dwarfs the 183-foot-tall infamous Leaning Tower of Pisa. The luxury beach condominium was topped out with 100 units pre-sold at \$2 million each, when cracking and spalling began to appear. Deep piers used to support the building began buckling in clay soils resulting in dangerously over-stressed beams and columns. In late 2009, the building, declared a total loss, was the tallest and largest reinforced-concrete structure ever to be imploded. The losses are estimated at \$75 million. The engineers were sued for \$125 million.

McGuire Apartments (Seattle, WA)

This 272-unit apartment building was built in the trendy Belltown neighborhood in Seattle for \$32 million. Just 3 years after completion, the post-tensioned load-bearing cables supporting the concrete floors started showing signs of serious corrosion. Concrete chunks fell from the upper floors, slamming into the sidewalk below. It was estimated that 1/3 of the cables would fail by 2019. The cables corroded because cable ends were not properly grouted. The repair was estimated to cost \$80 million, over twice the original cost of the building. In 2012, the building was demolished floor

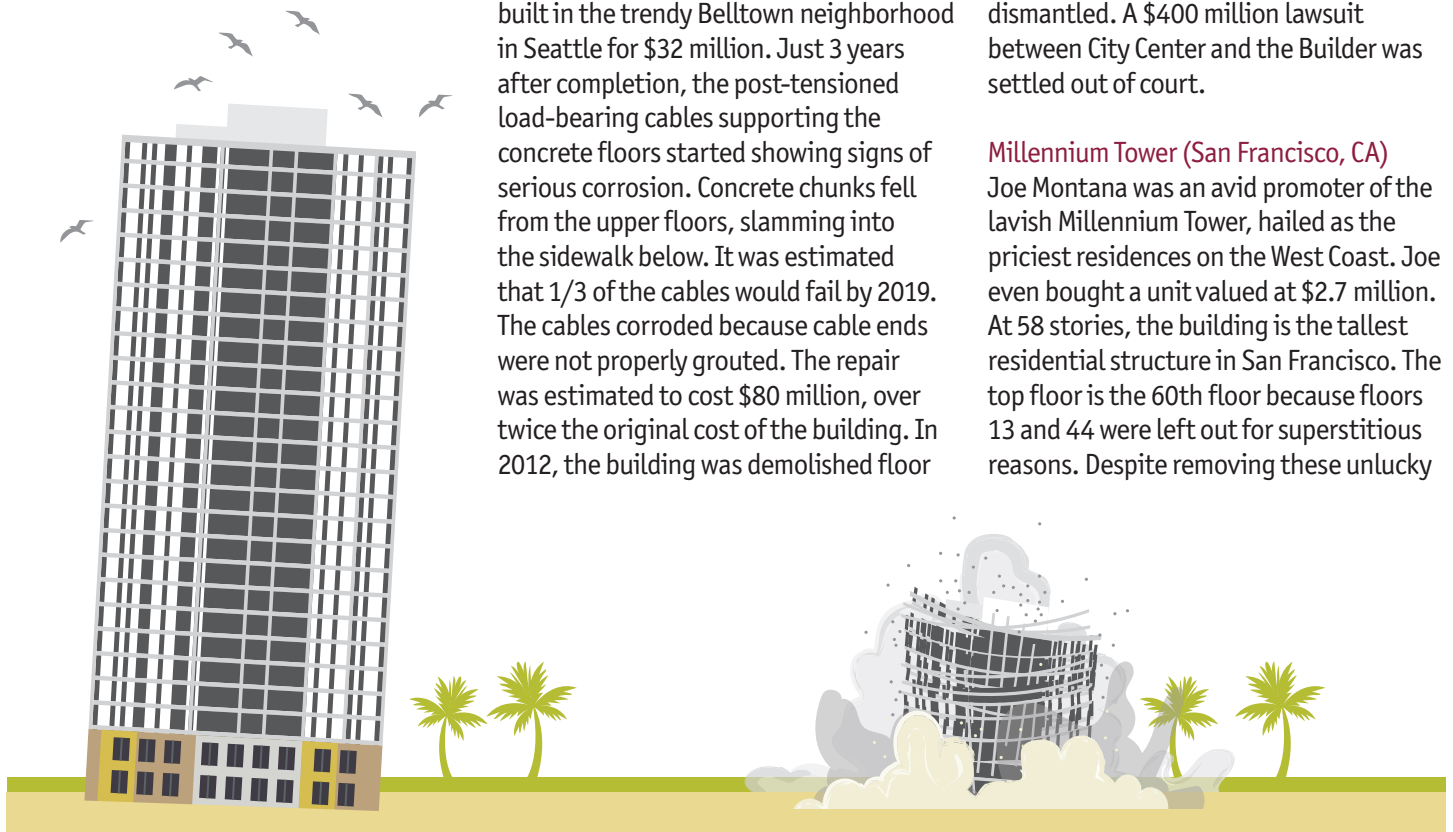
by floor. Sadly, a construction worker was killed during the demolition operations.

Harmon Tower at City Center (Las Vegas, NV)

Harmon Tower was to be a luxury hotel and condominium with a roof-deck pool on the sprawling 67-acre, MGM Mirage, City Center Complex. The \$9.2 billion City Center Complex consists of hotels, condominiums, casinos and high-end shops on Las Vegas Boulevard. During the construction of floor 26 of 49, with 88 luxury condos pre-sold, an inspection noted that rebar reinforcement was not properly configured. Engineers warned that this condition provides inadequate structural support and could result in a cataclysmic collapse. In 2015, at a cost of \$11.5 million the building was completely dismantled. A \$400 million lawsuit between City Center and the Builder was settled out of court.

Millennium Tower (San Francisco, CA)

Joe Montana was an avid promoter of the lavish Millennium Tower, hailed as the priciest residences on the West Coast. Joe even bought a unit valued at \$2.7 million. At 58 stories, the building is the tallest residential structure in San Francisco. The top floor is the 60th floor because floors 13 and 44 were left out for superstitious reasons. Despite removing these unlucky



Multi-Family Construction Calamity

floors, the building had its share of very bad luck. Soon after completion in 2009, the building started to show troubling signs of structural distress. In 2016, the building was found to have settled a startling 17 inches. Worse yet, the top of the building was leaning 14 inches. The city assured residents that the building did not yet represent an immediate risk of toppling over.

Engineers determined that the 900 concrete friction piles making up the foundation where settling excessively. The piles extended 60-90 feet through fill and mud into sand. In an apparent effort to lower costs, the piles were not extended to a depth of 200 feet to bear on solid bedrock. Ironically, the building won 9 major engineering awards, including "Outstanding Structural Engineering Project" and "Structural Engineering Project of the Year."

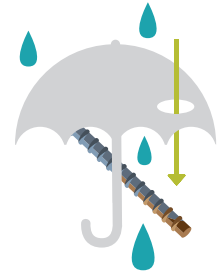
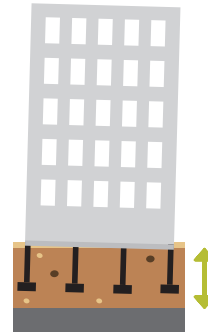
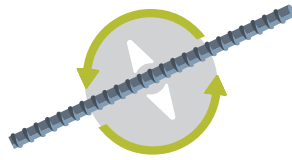
Forensic engineers hope to stabilize the building by installing 50-100 piles to bedrock at a cost of \$100-\$150 million. Joe Montana has joined the class-action lawsuit.

Lessons for Smaller Multi-Family Builders

The number of recent colossal multi-family structural failures is cause for concern. These high-profile well-funded developments have the best engineering teams, immense scrutiny by building authorities, and highly skilled builders. The examples cited were total losses due to seemingly simple causes, such as using an improper foundation depth, corrosion protection, or rebar orientation.

Builders often mistakenly believe that building envelope/water penetration deficiencies represents their greatest risk.

Total losses from simple causes



Rebar Orientation

Water penetration can be problematic, but rarely represents liability to the extent of structural failures. As cited, major unsafe structural failures are often newsworthy, reputation damaging, expensive to repair, and can result in a total loss of the building. If failures happen to buildings of this magnitude, think of the risk for much smaller projects with limited budgets.

For example, smaller buildings may lack a geotechnical investigation. A geotechnical investigation significantly decreases the risk of foundation failure. However, if the builder selects the least conservative foundation option proposed by the engineer, then there is an increased risk of failure. Smaller buildings may also lack budgets for critical construction inspections. The best design can result in an unsatisfactory structure if poorly built. Inspections improve the chances for compliance with plans and specifications. Lastly, smaller builders may neglect to purchase commercial general liability insurance, and insurance-backed new home structural warranties.

Multi-family builders can manage their risk of structural failures using the following best practices:

Foundation Depth

(1) Conduct a geotechnical investigation to explore unknown subsurface conditions, design a cost-effective appropriate foundation, and avoid costly construction delays.

(2) Implement an effective construction Quality Assurance/Quality Control Program to confirm compliance with plans and specifications, utilizing the engineer(s)-of-record and skilled independent inspectors.

(3) Purchase a Commercial General Liability Wrap Policy that includes coverage for all subcontractors, and use subcontractor agreements.

(4) Purchase an insurance-backed, 10-year structural new home warranty with written performance standards and legal binding arbitration.

Your small multi-family building may not have the glitz and glamour to attract buyers the likes of Joe Montana, but the inherent risk for a major structural failure is comparable to much larger buildings. Embracing a few best practices will improve your chances for constructing a building that performs well while managing your risk.



Mr. Keaveny is the Risk Manager and Principal Engineer for the leading new home warranty company, 2-10 Home Buyers Warranty. He earned a Bachelor's degree in Geological Engineering and a Masters in Geotechnical Engineering. He is licensed as both a Professional Engineer and a Professional Geoscientist, and has over 30 years of diverse engineering experience. He serves on the Construction Performance Standards Committee for the Texas Association of Builders, and is an invited speaker and author. Mr. Keaveny's work on the subject of structural claims has been published in major newspapers and has drawn international interest.



LONG LIVE HAPPY HOMES®