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THE
BIG
QUESTION



LANCE LUKE AND LARRY KING

AND OTHER LEADING ENTREPRENEURS AND PROFESSIONALS FROM AROUND THE WORLD

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CHAPTER 8

HOW SAFE IS YOUR BUILDING?

BY LANCE LUKE

Here's the Big Question I have for you: *"Is Your Building Safe?"*

What makes this a Big Question? Humans need protection from the elements, and a safe building delivers that protection. How Big is this? Check out the statistics on Residential Building Fire Trends (2006 – 2015). Their national estimates for residential building fires and losses in 2015, the most recent year for which data is available, are 380,900 fires, 2,565 deaths from fires, 11,475 injuries and a total dollar loss of \$7,099,300,000.

The latest statistics available from the National Center for Health Statistics for other injury deaths (other than fire) amounted to 62.6 per 100,000 population (excluding the highest-ranking deaths for poisoning, motor vehicle traffic, and firearms). Accidental injuries (other than from traffic accident injuries) rank as the fourth highest cause of death in the nation. Unintentional fall deaths were 31,959 – that amounts to 10.6 per 100,000 population according to NCHS. These statistics emphasize the need for safety within the buildings where people live and work.

How about children? The American Academy of Pediatrics reports that falls from heights are a significant problem in urban areas, especially for children living in multiple-story, often deteriorating, low-income housing. In some metropolitan areas, falls have represented up to 20% of the deaths of children from unintentional injury, as compared to an average of 1% to 4% nationally. As a construction engineer and national

building expert, I have seen thousands of unsafe buildings in my thirty-seven years' career.

My goal is safety first. The safety rule applies to any building from high-rise condominiums and office buildings to townhouses and shopping centers. Let me point out some critical building components to drive home this point.

COMMON AREAS

Common areas apply to condominiums and cooperatives where each unit owner shares in the enjoyment and upkeep of the parking area, the walkways, the landscaping and recreational areas such as a pool or clubhouse. The following is a quick standard assessment of the areas commonly owned and enjoyed by owners:

1. Look for trip hazards near the buildings

Are there any lifted or cracked walkways that could be a trip and fall hazard? Sometimes, the lifted areas of the walkway may be due to eroding soil causing the ground to heave and the concrete walkway to crack apart. Similar conditions of rough areas may be due to tree roots uplifting the concrete, creating a difference in the pathway's elevation difference. Are the stairs even and are the riser heights the same level of graduation? Differences in the heights of the steps may cause someone to trip. All step heights should be uniform, and there should be no variation from one step to another.

2. Inspect hand-railings and guard-railings

Inspect if all railings are stable and safe. See if you can shake anything loose when grabbing a railing and look at the base of the rail closely if something feels loose which will usually point to corrosion at the base. Hand-railings at all stairs should be sturdy and free of corrosion. Guard-railings of walkways or lanais (patios) should also be free of corrosion and in a firm condition. All railing bases and intermediate pickets should be whole without penetrations and not broken or corroded.

Over time, the metal railing may be corroded at the concrete slab connection and loose. There are two main types of railing post construction. One is an embedded post whereby the bottom section

of the post is secured into the concrete slab. The other type is surface mounted where the bottom of the post is bracketed to the surface of the concrete slab. Be aware that corrosion could be covered with paint or caulking such that it is hidden from view. Use a tool like a painter's scraper or a flat head screwdriver to scrape the surface of the post to reveal corrosion and rust.

3. Spalling

At the locations where the bottoms of the railing posts have corroded, it may have caused cracks or spalling inside the concrete. Spalling is caused by corrosion of metal inside the concrete. From moisture and rust, the metal expands. When the metal or reinforcing steel corrodes and expands, it causes the concrete to crack. Cracks in the concrete and rust stains from the rusted rebar or reinforcing steel are telltale signs of spalling.

Falling pieces of concrete due to spalling is very much a safety concern, especially in high rise structures. Some of the various factors that cause concrete spalling are weather conditions, rain, humidity, salt from coastal areas and wind.

In many cases, both railing and concrete spalling areas need repair or replacement. Low rise and high-rise apartment buildings, condominium buildings and hotels historically need to be inspected more often. Buildings that are constructed with wood framing and stucco walls may have rotted wood balcony railings and rotted connections where the balcony structure is connected to the main building.

4. Parking lots and driveways

Walk around the parking lots and driveways and look for potholes. They will be easy to find every time someone cursed when driving over it. Notice any uneven surfaces which may entail squatting to eye the asphalt or concrete closer to the ground. Are there any lifted areas, loose gravel or other conditions such as a wide crack that may pose a trip hazard for a pedestrian.

5. Common Areas Interior

Adequately lighted stairs and walkways must always be available especially when it is dark. The surfaces of the walkways should

not be so smooth that it becomes slippery when it is wet causing someone to fall while walking. If there is outdoor carpet, it should not be torn, ripped, gathered or bunched up creating a trip hazard.

Any condition that could cause a trip and fall, or a slip and fall accident should be immediately remedied. Don't wait for a fall to occur. Fix it right away.

6. Concrete Spalling

I have seen dangerous conditions in concrete buildings due to spalling. Spalling is cracked concrete caused by corrosion of the reinforcing steel. The rebar (short for reinforcing bar) is also known as reinforcing steel. It is a steel bar or mesh of steel wires used as a tension device in reinforced concrete to strengthen and hold the concrete in tension.

When the rebar corrodes, it expands inside the concrete which cracks from the additional tension created by broadening rebar. Some cracks are so bad that chunks of concrete fall off the building. Imagine a piece of concrete falling off a forty- story building and hitting someone.

7. Roof Leaks

Roof leaks are not hard to fix, but not if building owners do not inspect their roofs to know when the roof needs to be either repaired or replaced promptly. I have seen roofs that were leaking for years having only stop-gap measures taken when it rained, that ended up causing thousands of dollars in further damages that were entirely preventable. A leaking roof causes water damage to items, damages electrical systems, and contributes to mold. In older buildings, the water damage can cause damage to the asbestos-containing material. In these cases, the cost for Hazmat (hazardous material such as asbestos) abatement exceeded the cost of a new roof.

8. Building Envelope

The walls of the building need to be painted every seven to eight years to prevent water infiltration into the walls. Additionally, all window frames need to be correctly caulked to avoid water intrusion. Dually painting walls and caulking window frames is preventative

maintenance for the damages wall infiltration can cause such as wood rot, spalling and mold.

9. Electrical

The electrical system should be inspected every five years. During an inspection, open all circuit breaker boxes and notice any overloading of power and look for any voltage drops. A certified electrician must do the assessment. He will be able to professionally inspect for any other conditions that may pose a fire safety issue. All electrical outlets close to water sources must be ground-fault protected. Don't worry; your electrician will know what I mean. It's simply protection from the 'hot' wires carrying the electricity.

It is especially prudent to have an electrician conduct a review if you have specific brands of circuit breaker boxes such as Federal Pacific, Electric Stab-Lok and Zinsco, because these names have a history of failure.

10. Use a Certified Electrician

Here's another electrician hint: check out if the branch wiring (branch wiring is the wiring connected to 15 and 20-ampere circuit breakers standard in most households) is aluminum. If there is any indication that the branch wiring is made of aluminum, and your electrician will know, then all devices (outlets and switches) should be inspected to see if any connections are loose.

Loose connections may cause arcing. GFCI or Ground Fault Circuit Interrupters and AFCI or Arc Fault Circuit Interrupters should be installed at the required locations.

An electric arc is a current often intense, brief, and luminous, in which electrons jump across a gap. Unwanted arcs in electrical circuits can cause fires.

11. Plumbing

Old piping corrodes the drain lines and causes sewage backups and a lot of problems. Piping problems in older high-rise buildings are known to cause flooding from the subject unit throughout many floors down. The dirty water contaminates everything from drywall to carpets, furniture, and personal possessions. In older buildings,

the water causes additional damage to ceilings and walls made of asbestos-containing material found in drywall and "popcorn" ceilings. When drywall gets wet there is the possibility of mold growth. The one water leak problem becomes compounded into invasive environmental issues unless addressed immediately.

12. Windows

Older buildings were built with louvered or jalousie windows that were usually designed from floor to ceiling. This design is unsafe due to the possibility of children falling out of the window at floor level. The design of the louvers was done so that each glass slat is held in place by metal clips. The metal clips become loose over time by corrosion of the metal or improper replacing of the glass slats after removal for cleaning, and the glass slat falls to the ground below.

Windows that are of the sliding jalousie type may be a hazard if constructed too low to the floor, because there have been cases of children falling out of the windows due to this unfortunate window design. Most older buildings did not use safety glass so that when the glass cracks, sharp shards become a hazard.

13. Fire Safety

A significant issue of concern is an updated fire alarm system. The alarm system must be working properly and tested periodically on a maintenance schedule. A properly functioning fire suppression system inspection includes inspecting fire sprinklers, fire hoses and standpipes. Inspect elevators and ensure that they have a current operating certificate. Walk through all fire exits and connecting stairwells and find the fire doors and firewalls to ensure that they are properly mapped out and posted.

Older buildings may not have the proper fire stops at the floor and ceiling penetrations where piping and conduits go through each floor and ceiling of the building. A firestop is built into a building frame to block a concealed hollow space through which a fire might pass from one part of the building to another. Fire stops, fire doors and all stairways must be in good working order and never blocked by foreign items that should be stored appropriately elsewhere.

14. Building Codes

Building codes are minimum standards and are used as a baseline standard. In my opinion, buildings should follow a higher standard for safety. Just because the question, "Is it built according to code?" is answered with a "Yes," does not mean it is entirely appropriate. Keep this bit of advice in mind. Safety goes beyond a building code.

I must admit that many buildings I have inspected are in violation of the building code in one form or another. However, the code specifies that a building is unsafe if any building has any conditions that affect the health and safety of people; such as, if a condition poses a fire hazard then the building is considered unsafe. The corollary is that if your building is in any way not up to code then your building is not safe.

Concerning condominium buildings and community association properties, the governing law mandates that the Association Board properly maintains and upkeeps the property. Each state in the U.S. has condo reserve laws that require Home Owners Associations of properties to collect money for the reserve fund to fix building components when needed. If any of the components noted here as safety items need attention; then there should already be in place the financing to address these safety issues.

In closing, I leave you with some of the answers to The Big Question: "How Safe Is Your Building?" and hope that this has been helpful.



About Lance

Lance Luke has been in the construction industry for over 37 years. He is a former general contractor and worked as a construction and project manager for real estate development companies. Currently he owns an independent construction consulting company, Construction Management Inspection, LLC.

His experience in design, home inspections, construction inspections, construction management, reserve studies and real estate development makes him a Hawaii building expert.

His specialty is in inspection and construction management for condo association buildings and commercial properties. Recent types of projects worked on include concrete spalling repair, painting, roofing, waterproofing, asphalt resurfacing, plumbing re-piping, electrical retrofit and structural wood repair. He provides construction oversight and progress inspections for residential and commercial projects.

Mr. Luke holds a Bachelor of Science degree in Civil Engineering, and his Masters and Doctorate degrees in Building and Construction Management. He has held the following designations for many years:

- CCI - Certified Construction Inspector
- CCPM - Certified Construction Project Manager
- CCC - Certified Construction Consultant
- CBI – Certified Building Inspector

Lance Luke serves as an expert witness on construction and real estate litigation cases. He was formerly an Advisory Board Member for the State of Hawaii Regulated Industries Complaints Office as an expert consultant (for over 15 years). His expertise was in helping to resolve complaints filed with the Contractors' License Board.

He has written numerous articles on construction and inspection, which are published in both local and national print media. He conducts up to ten presentations a year to the construction, real estate and property management industry including educational seminars.

Mr. Luke is an approved HUD inspector. He is also listed as one of America's Premier Experts and Marquis Who's Who in America – 70th Anniversary Edition. He is also a SCORE mentor, a business coach, a professional speaker and Best-Selling Author.

Lance Luke is a former member of the Structural Engineers Association of Hawaii and the American Bar Association serving on the Real Property/Probate Law Division

and the Forum for the Construction Industry, and is or was a former member of many Professional Associations.

