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FINANCIAL FOCUS
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COMMUNITY PROFILE
BAHIA AT DELRAY

ABC's of a Concrete Restoration Project

CONSTRUCTION MANAGEMENT
- THE MISSING LINK

Concrete Restoration on Your Property

YOU KNOW THERE IS A PROBLEM, NOW WHAT DO YOU DO

BY DONNY MORELOCK

IMPORTANCE OF IDENTIFYING CONCRETE RESTORATION NEEDS

Concrete is one of the most versatile, cost-effective, and long-lasting construction materials in existence. That being said, if left without regular inspection, maintenance, and repair, it can be your building's biggest nightmare. I believe the biggest misconception with concrete restoration is that it is always a hidden problem and that there is very little preventative maintenance required. This is not the case. A simple $1000 repair left unattended over time can lead to hundreds of thousands in costly repairs.

Remember the inspection and maintenance of your concrete will always cost less than the repair!

WHAT IS THE LEADING CAUSE OF THE PROBLEM

Corrosion of reinforcing steel: Steel rebar is protected inside concrete because the concrete is very alkaline, which prevents rust. But if there are chloride ions present, such as from the presence of salt (Florida is surrounded by salt water), the chloride destroys the "passivating layer" of alkalinity around the steel, allowing it to rust. Rust has greater volume than steel and the expansion presses against the concrete putting it in tension and causing it to crack and pop off. Chlorides get to the concrete through cracks or by simply penetrating through the concrete's pore structure.

To put it in laymen's terms: The alkaline environment of concrete (pH of 12 to 13) provides steel with corrosion protection. For steel in concrete, the passive corrosion rate is typically 0.1 μm per year. Without the passive film provided by the concrete, the steel would corrode at rates at least 1,000 times higher (ACI222 2001).

Florida, while not having much freeze/thaw effect on concrete, is one of the harshest enviroments on concrete in the country. With our constant high humidity, rain, temperature changes, and salt environment, it can be a perfect storm for concrete issues in your building.

Fun Fact: Here's how reinforced concrete works: the steel reinforcement is completely useless until the concrete cracks.

PREVENTATIVE MAINTENANCE

My best advice is for you to be proactive more than you

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are reactive. If you practice this, you will save the owners thousands and thousands of dollars over the years regarding concrete restoration.

Areas of Concern:

1. Most buildings have "control joints or "expansion joints" built into the concrete. These are seen in both horizontal (walkways) and vertical (walls, etc.) concrete. All concrete expands and contracts with temperature changes, and these joints tell the concrete where to do this. These joints usually have a urethane-based caulk in them that allows for this expansion/contraction in the concrete without it damaging the concrete or allowing moisture into the building. These joints if not maintained can become hardened and brittle and thus lose their usefulness. This, if left alone, will eventually lead to concrete problems.
2. Railing post pockets. Railings are most often installed in post pockets in the concrete patio or walkway. The improper installation and/or lack of maintenance of these can lead to edge (eyebrow) spalls. Gravity is the enemy in this case as the spalling concrete can fall off the building and cause serious injury. These post pockets should be part of your inspection and maintenance program. If the rails are aluminum, they need a barrier between the concrete and the aluminum because the ph difference in the two materials can degrade the aluminum and cause additional problems.

In most cases, but not all, the concrete will show signs of deteriation and/or damage that needs to be addressed to include but not limited to the following.

- Exposed rebar: On a walkway, end of a balcony (nose brow), or on the side of a building
- Rust evident and coming out of the concrete
- Cracks are evident in the concrete
- Chipping or spalling of concrete
- Loose railings may indicate a concrete problem

These items and others need to be a "Call for Action".

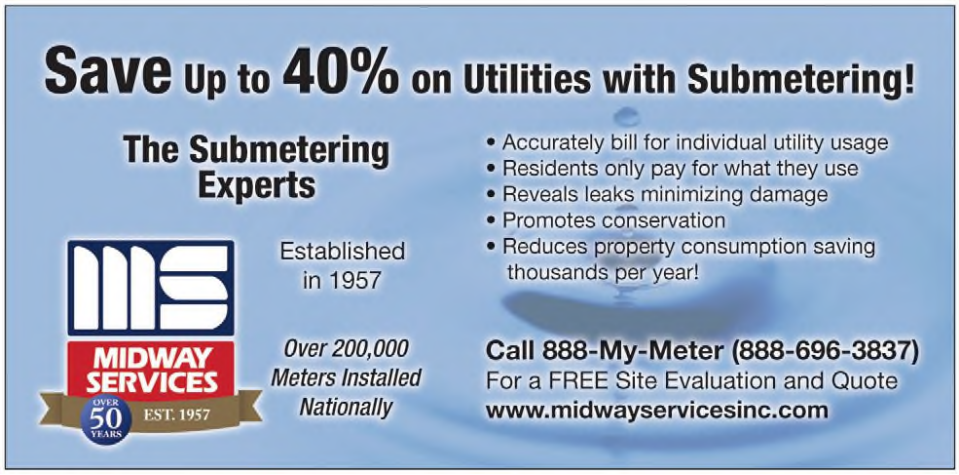
Fun Fact: Florida concrete temperatures can change as much as 25–30 degrees in a day!

INFORMATION NEEDED TO MAKE INFORMED DECISIONS

Is it Necessary to Hire an Engineer?

This answer is almost always "yes" when it comes to concrete restoration.

- If a problem exists and is above grade (not on ground floor),



it would be prudent to hire an engineer.
- If the repairs are significant enough to require a permit, an engineer should be hired.
- If rebar is visible on any vertical surface of your building, it would be prudent to hire an engineer.
- It may also be prudent to have your building inspected on a regular basis if you have any history of concrete problems or suspect any above grade issues. This is usually done via an "acoustic" inspection (sounding) of the concrete.

Fun Fact: Horizontal concrete is sometimes tested by pulling a "chain" along it, and as the sound changes, it will identify problems in the concrete. On vertical concrete surfaces, I had an engineer in Tampa show me how the use of a golf club can produce the same results.

Author's Note: Post-tension construction: Post tension is found in many parking garage structures and high-rise buildings and requires contractors specifically experienced with post-tension construction. Make sure your engineer and contractor are members and subscribe to International Concrete Repair Institute (ICRI) specifications. ICRI sets the standards on concrete repair.

DEVELOP AN ACTION PLAN

Decide how often to have your building inspected

- When the building tells you it has a problem
- Base it on prior history of the building and from the problems

you have already encountered
- Just before each paint cycle (usually seven years)
- As recommended by your engineer of choice

Select an Engineer

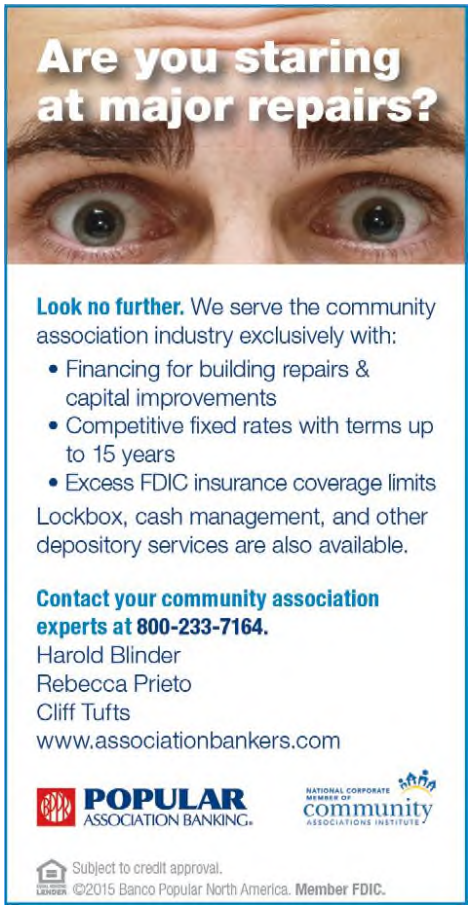
- Experience and years in business
- Provided references (Call them)
- Reputation in your marketplace

Select a Contractor

- A General Contractors License is mandatory
- Call references that closely match your job scope
- Reputation

Try to fit the contractor/engineer to the job. If you have a $100,000 problem, then match it with a contractor/engineer who does this size of job. If you have a $3,000,000 problem, then match it to a contractor who has the experience and financial stability to do this size of job. A contractor doing $3,000,000 jobs may not want the $100,000 job.

IN SUMARRY (IMR = NDC) INSPECT, MAINTENANCE, AND REPAIR

- Inspect your building regularly
- Provide ongoing maintenance
- Perform repairs when they present themselves (Do not wait)

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