

SCCA Meeting 11-20-2021
**“The Importance of
Proactive Structural
Condominium Maintenance”**

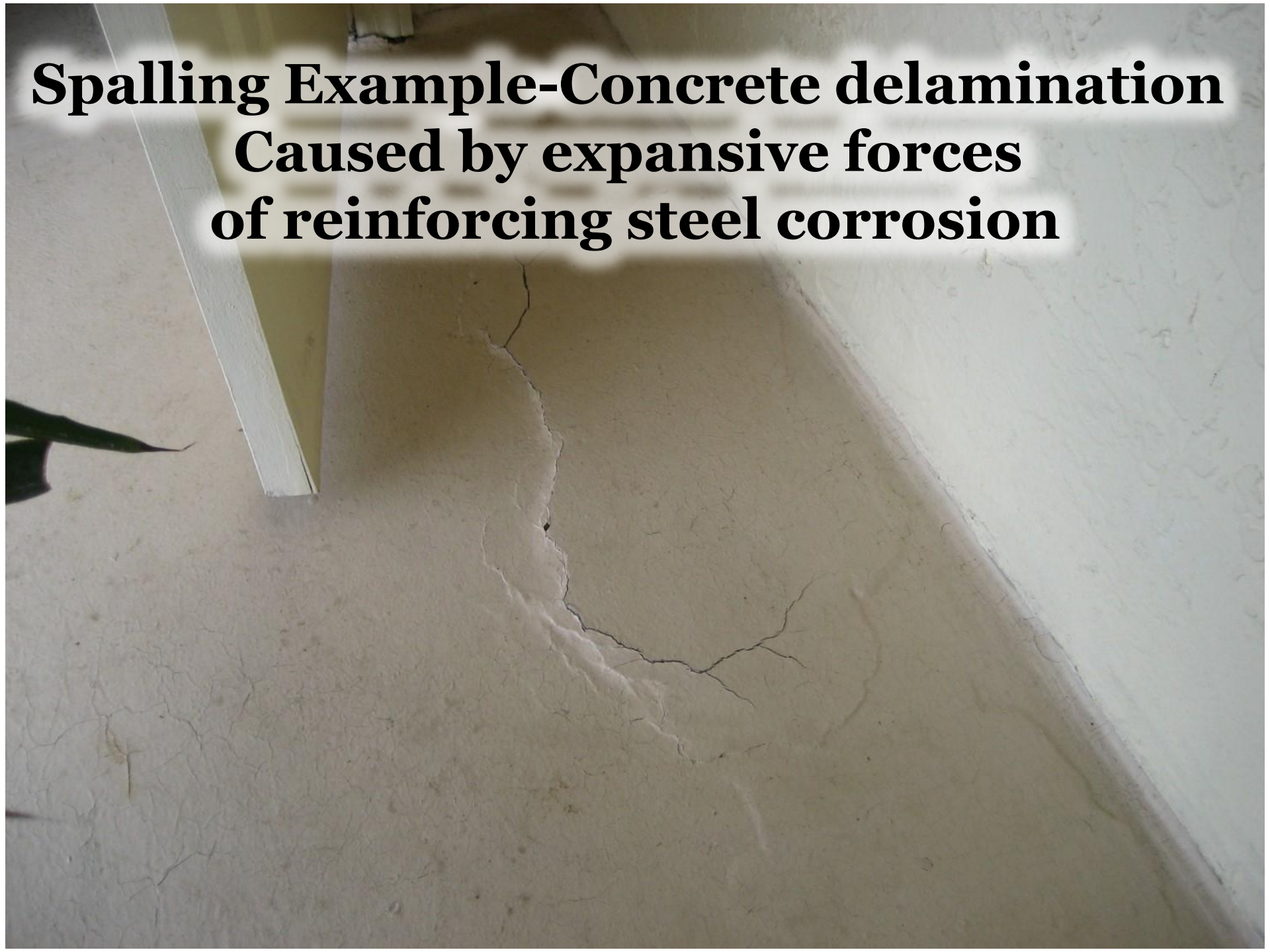
Keystone Engineering
Jim Emory, PE, SI, CGC

WARNING
HARD HAT
AREA
NO SUPPLY OF 1-800-WHITE-CAP
EMPLOYEES
ONLY

Introduction-Brevard County Restoration Professionals

- ▣ Jim Emory, PE, SI, CGC-Keystone Engineering
- ▣ Don Kosick, CGC-NAC Seaside
- ▣ Paul Dupree, CGC-Concrete Restoration Inc
- ▣ Mitch Emory, CGC-Chematics Restoration
- ▣ Melissa Lomax, PE-Beachside Engineering

**Spalling Example-Concrete delamination
Caused by expansive forces
of reinforcing steel corrosion**






**Example of Reinforcing Steel
Corrosion**

**Example
Of
Visible
Corrosion
Induced
Spalling**





**Detection
of Spalling
Indicated by
cracking, bulging
or acoustical
sounding
of
loose concrete**

TYPES OF BUILDINGS

- **PRECAST-PRESTRESSED PANELS**
- **CONVENTIONALLY REINFORCED, Poured-IN-PLACE**
- **POST-TENSIONED**

An aerial photograph of a multi-story building under construction. The building's structure is composed of grey precast-prestressed concrete panels. The roof is a flat slab with visible rebar protrusions and yellow safety tape. A large rectangular structure on the right side is heavily reinforced with a dense grid of rebar. In the background, a completed multi-story building with white balconies and a residential neighborhood with green lawns and houses are visible.

Precast-Prestressed Panels







Conventionally Reinforced Poured-in-Place







WARNING
HARD HAT
AREA
EXCEPT BY 1-800-WHITE-CAP
EMPLOYEES
ONLY



NO TRESPASSING
THIS AREA IS A DESIGNATED
CONSTRUCTION SITE & ANYONE
TRESPASSING ON THE
PROPERTY, UPON CONVICTION,
SHALL BE GUILTY OF A
VIOLATION OF THE LAW.

113





Post-Tensioned



10/21/2021 10:23



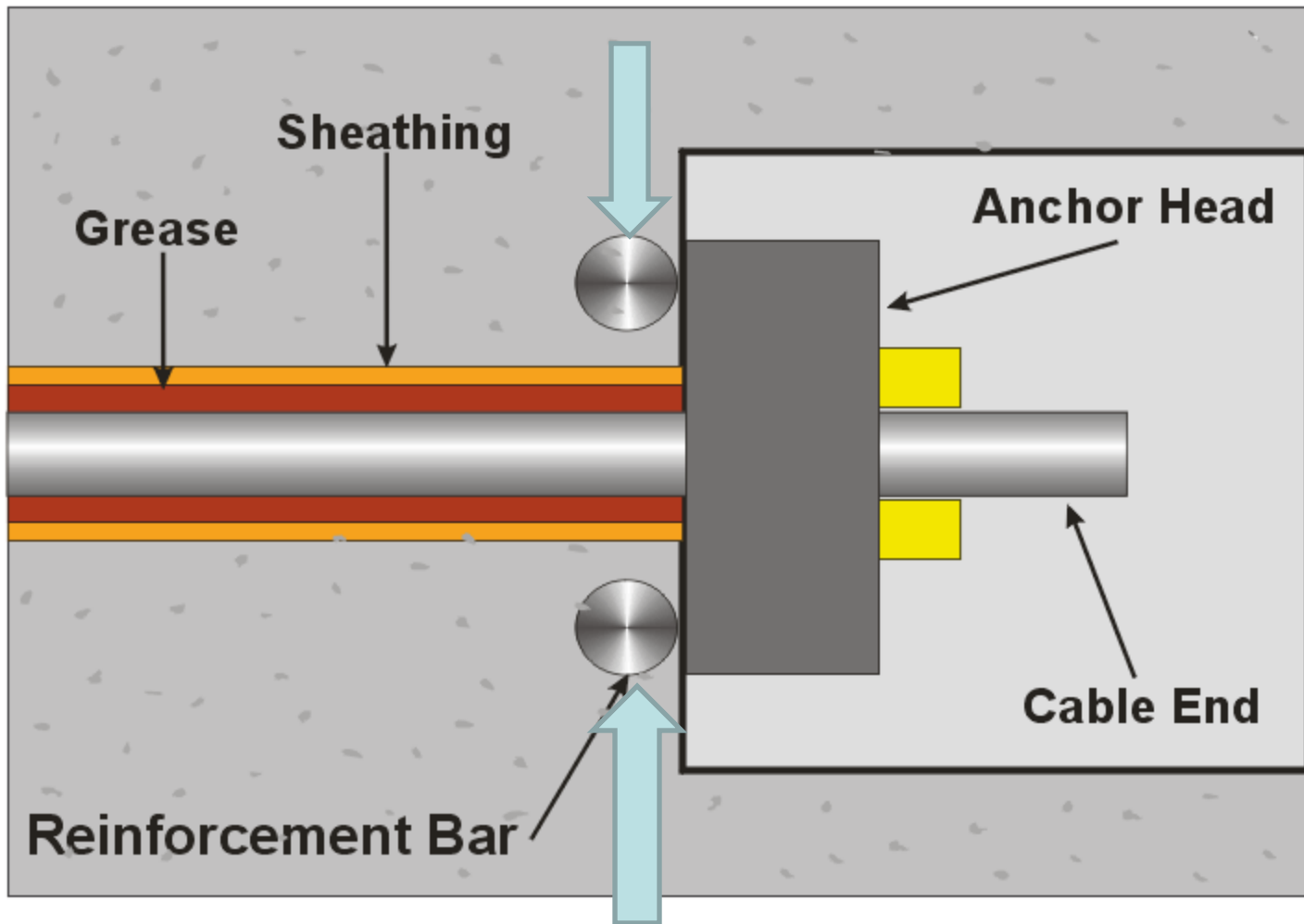
10/21/2021 10:24







Post-Tensioned Anchor Head





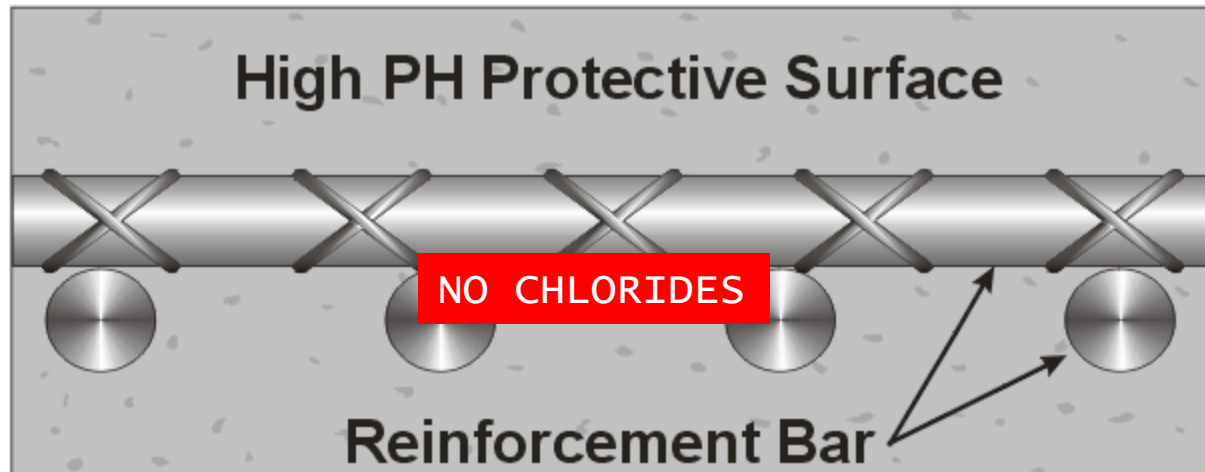


Reinforcing Steel Corrosion

- ▣ Caused by chloride (salt) contamination
- ▣ Changes concrete chemistry
- ▣ Creates corrosive environment
- ▣ Sources of water intrusion provide path
- ▣ Causes Spalling

Corrosion Process

New Concrete Slab



Corrosion Process

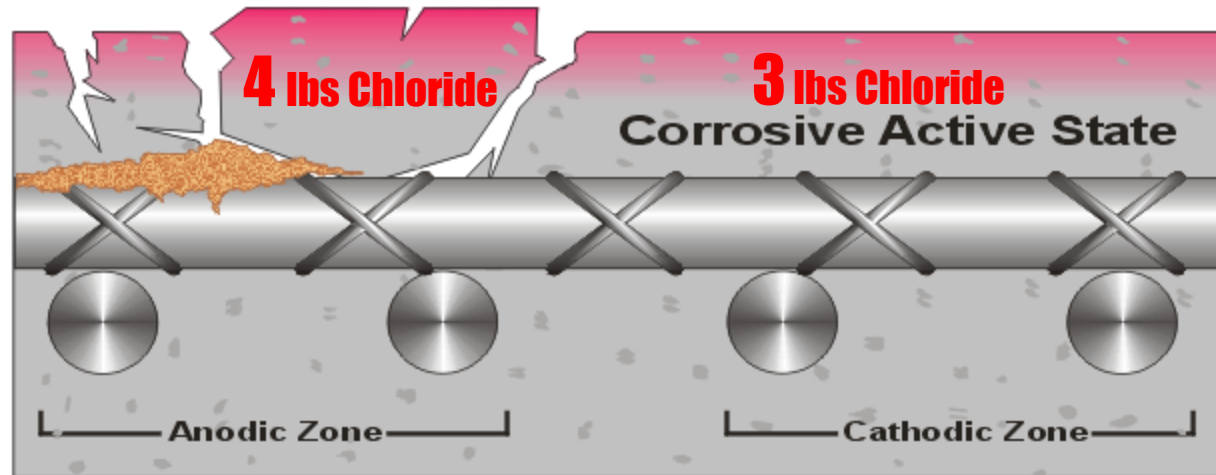
CHLORIDES



>Delta 1<

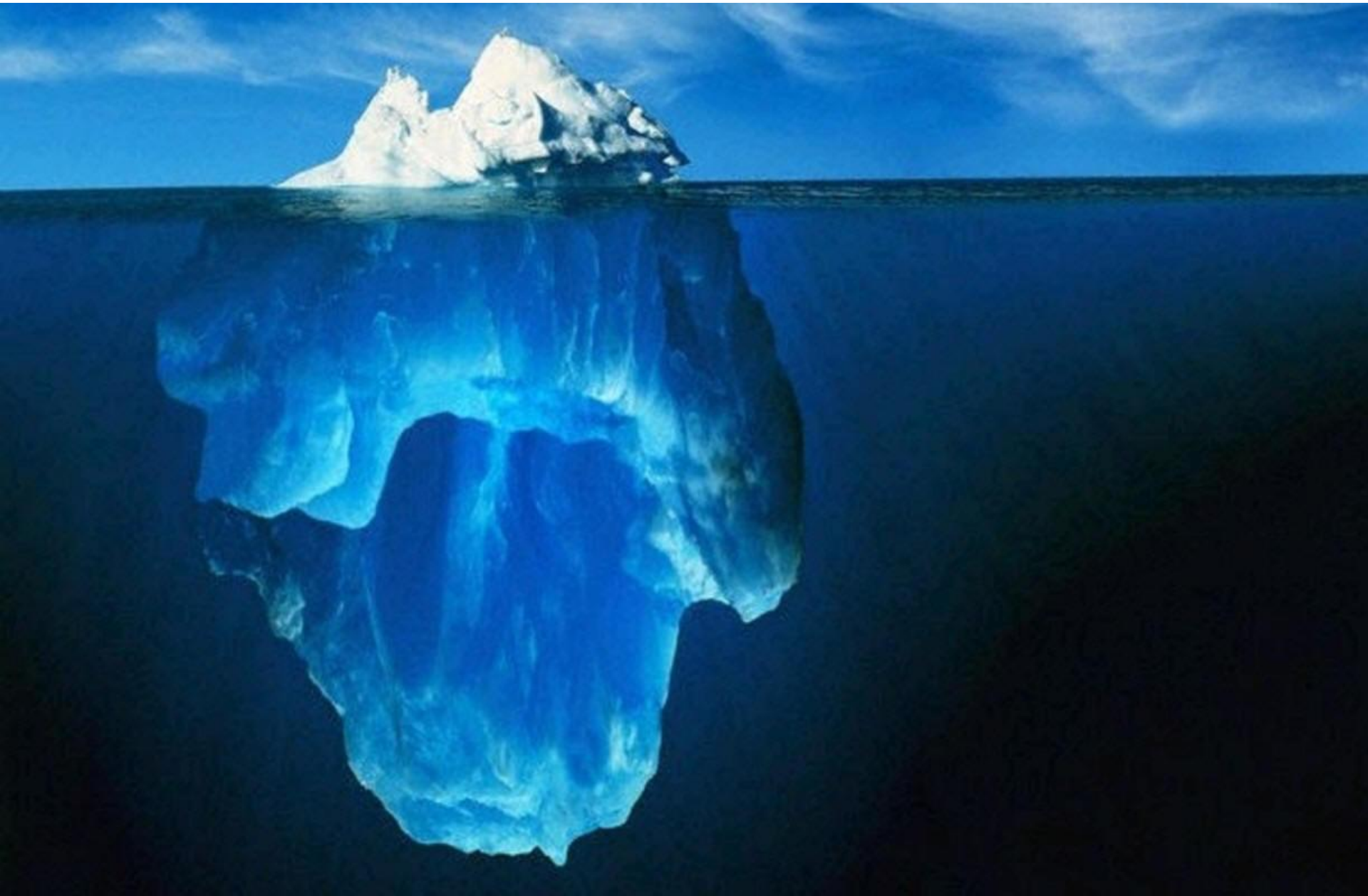


Cracking & Spalling



TYPES OF CONCRETE REPAIRS

- **SLAB EDGES**
- **SLAB SURFACE**
- **SLAB EDGE WITH POST TENSIONED CABLES**
- **NEAR SLIDING GLASS DOORS**





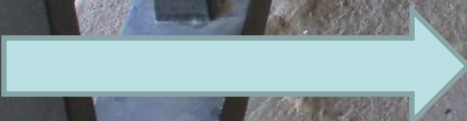
Slab Edge Spalls







04/29/2021 13:49



11/16/2021 11:22



11/16/2021 12:03



11/16/2021 13:22



11/16/2021 14:25



11/17/2021 12:32







A photograph of a concrete slab showing signs of surface spalling. The concrete is a light tan color and has several irregular, jagged holes and pits of varying sizes scattered across its surface. A metal railing with vertical bars is visible in the upper right corner. The text "Slab Surface Spalling" is overlaid in the center in a white, bold, serif font.

Slab Surface Spalling













Surface Spall Repairs

Ceiling-Full Depth Spalls





05/06/2021 11:52



11/09/2021 12:28

Column-Wall Spalls









11/17/2021 13:25

Window Sill Spalls

04/29/2021 13:52



11/16/2021 15:08

COMMON VULNERABLE ITEMS

- RAILINGS-CORED IN PLACE OR IMPROPER FASTENERS
- SHUTTERS-DRAINAGE AND CORRODED FASTENERS
- IMPROPER BALCONY FLOORING-TILE
- SLIDING GLASS DOORS AND WINDOWS
- SCREENED ENCLOSURES



Cored Railings

11/17/2021 13:48



413





11/17/2021 14:07



11/17/2021 14:08



11/17/2021 14:12



11/17/2021 14:20



01/27/2021 11:42

Shutter Fasteners and Drainage









11/17/2021 12:29





05/06/2021 11:43



07/13/2021 11:45









A close-up photograph of a window blind's bottom edge. The blind is white and has a series of small, dark, rectangular drainage shims installed along its length. The shims are spaced evenly and appear to be made of a dark material, possibly wood or plastic. The background is a light-colored wall, and the lighting is soft, highlighting the texture of the blind and the placement of the shims.

Use of Drainage Shims



11/17/2021 12:16



Spalling at Sliding Glass Doors or Windows



Sliding Glass Doors

-Proper Coastal Design

-Proper Installation















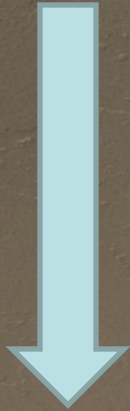




















Tile Flooring







302

2010/10/04 15:06



203

2010/10/05 10:18





Screened Enclosures



04/29/2021 11:52



Comprehensive Project-Recipe for Success

- ▣ 1. Properly Repair all Existing Concrete Spalling
- ▣ 2. Eliminate/Minimize Vulnerabilities
- ▣ 3. Employ Proper Repair Methods, Materials and Supervision
- ▣ 4. Improve/Maintain Aesthetics
- ▣ 5. Plan Wisely for the Cycle

Building Inspections

- ▣ First Inspection – 15 to 20 years
- ▣ Future Inspections – Every 5 to 7 years

Restoration Project Cycles

- ▣ First Restoration Project 15 – 20 years
- ▣ Future Cycles-Every 7 to 10 years
- ▣ Coordinate with Painting Cycle
- ▣ Smaller Magnitude and Cost

Decision-Making Process


- ▣ Education Process
- ▣ Understand Options and Life Cycle
- ▣ Board and Owner Transparency

5 Stages of Restoration Process

- ▣ Denial
- ▣ Anger
- ▣ Bargaining-Find a Lower Cost Solution
- ▣ Depression
- ▣ Acceptance-2nd or 3rd try

Industry Backlog

- ▣ Demand is high-More awareness
- ▣ Buildings are aging
- ▣ Resources are tight-Labor
- ▣ Costs are rising-Materials
- ▣ Patience is required
- ▣ Safety and Emergencies will be prioritized



SCCA Meeting 11-20-2021
**“The Importance of
Proactive Structural
Condominium Maintenance”**

Keystone Engineering
Jim Emory, PE, SI, CGC

WARNING
HARD HAT
AREA
NEEDS BY 1-800-WHITE-CAP
EMPLOYEES
ONLY