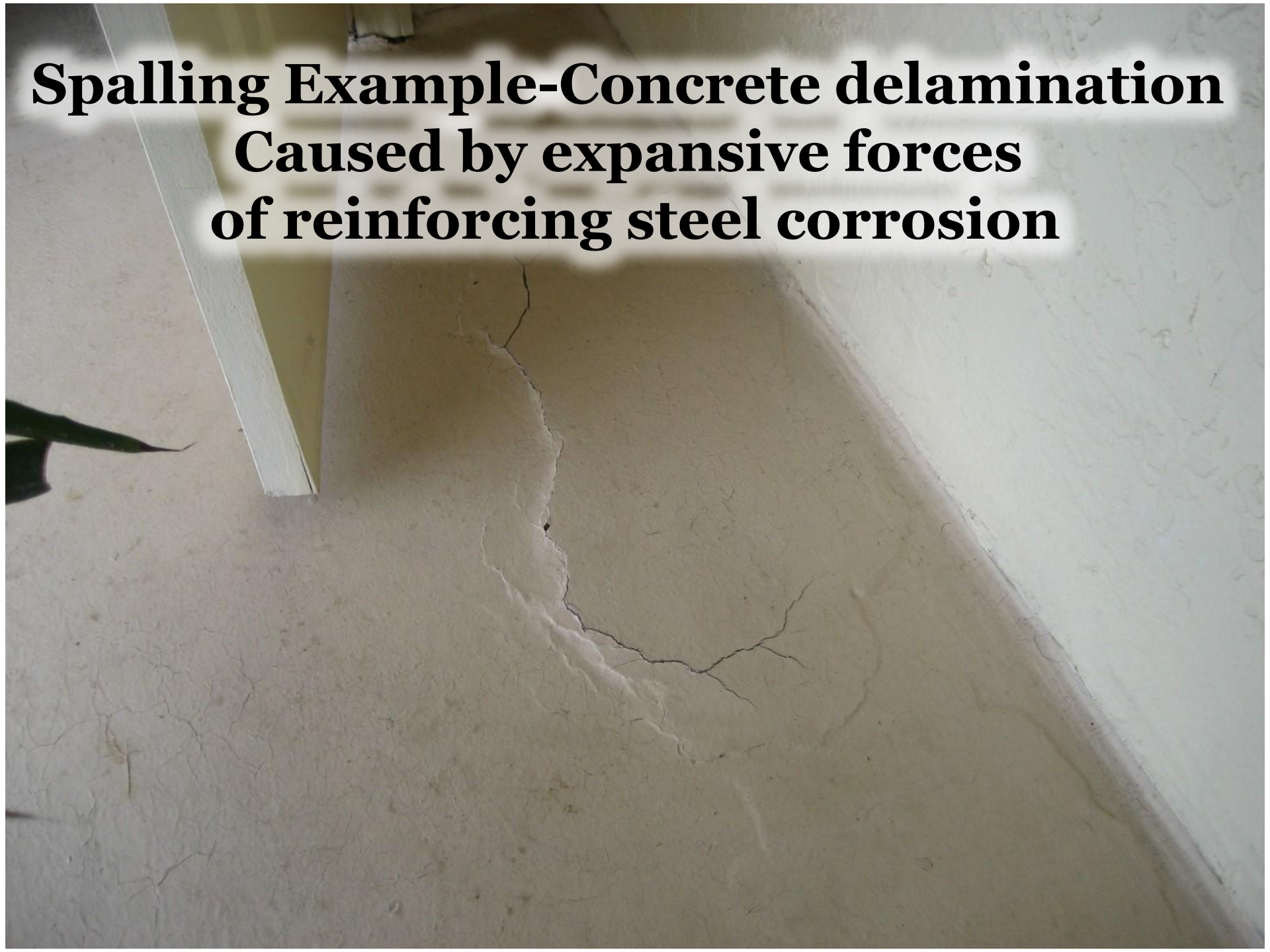
SCCA Meeting 11-20-2021
"The Importance of Proactive Structural Condominium Maintenace"

Keystone Engineering
Jim Emory, PE, SI, CGC

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 Engineerging


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

Precast-Prestressed Panels


CAUTION


Conventionally Reinforced
Poured-in-Place


WARNING
HARD HAT
AREA


NO TRESPASSING
THIS AREA IS A DESIGNATED
CONSTRUCTION SITE AND ANYONE
TRESPASSING ON THIS
PROPERTY, UPON CONVICTION,
SHALL BE GUILTY OF A MISDEMEANOR.


Post-Tensioned
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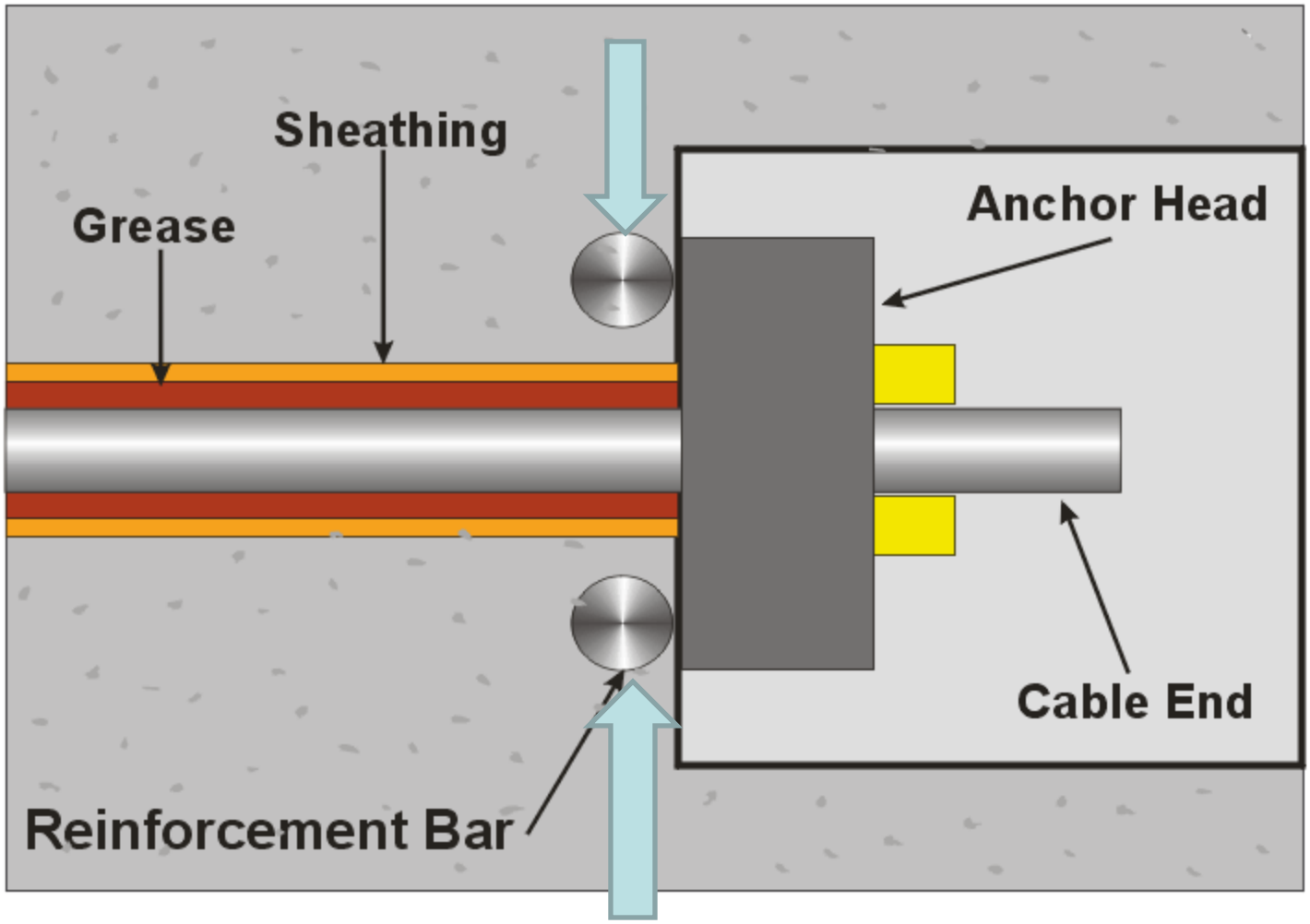
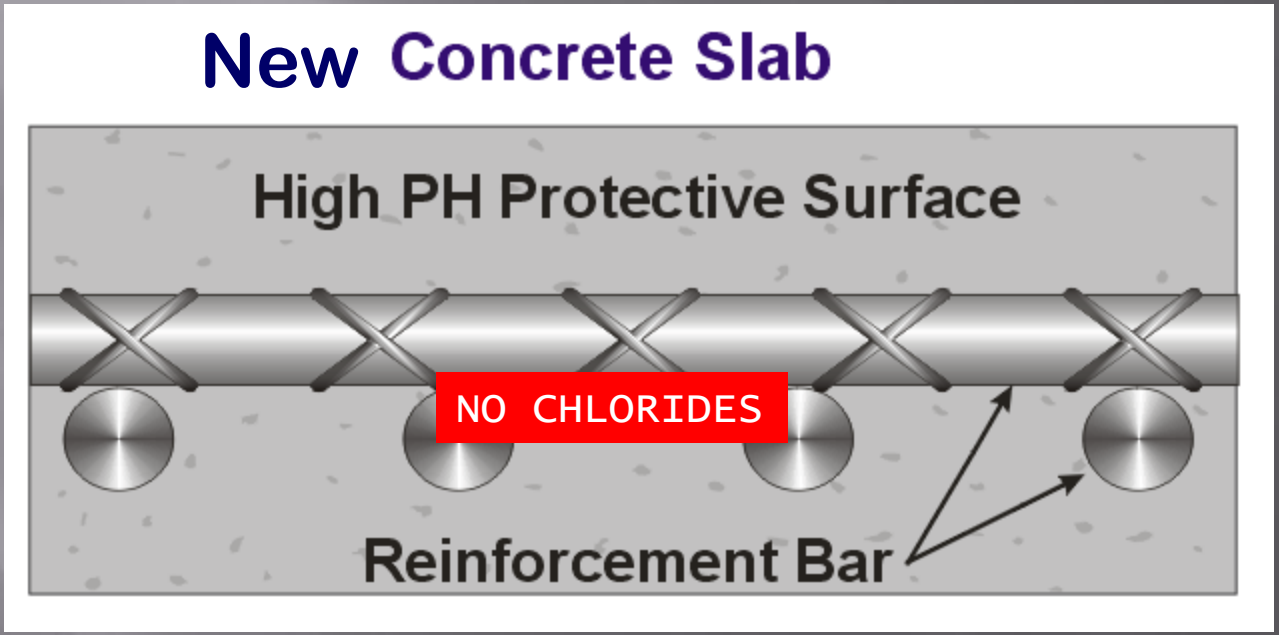
Post-Tensioned Anchor Head



Reinforcing Steel Corrosion

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

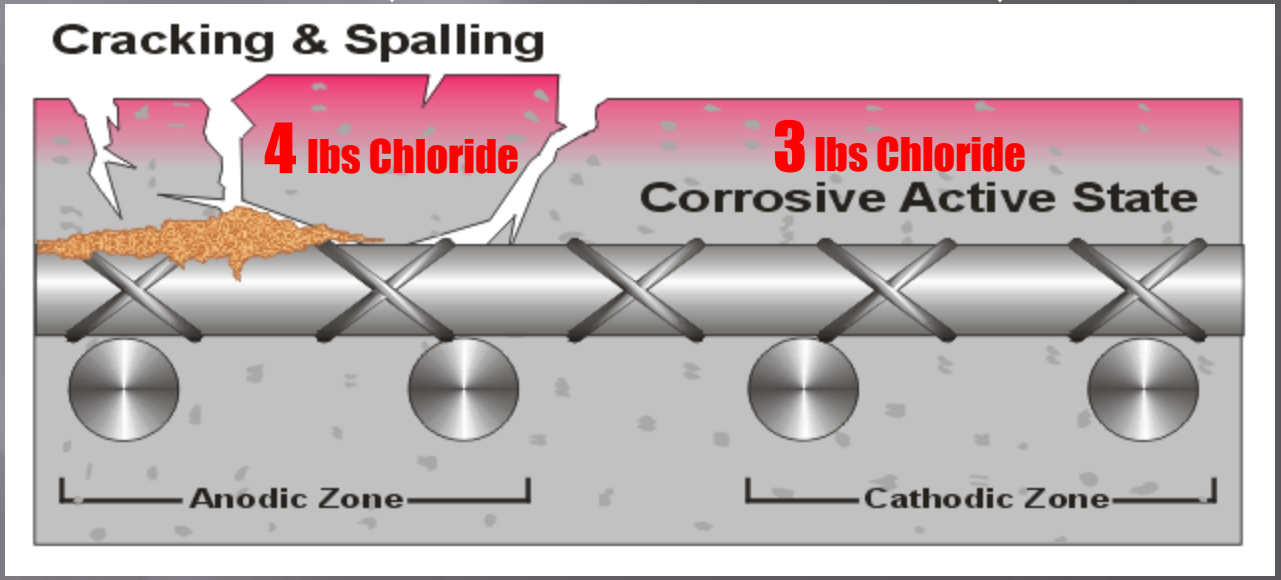
Corrosion Process



Corrosion Process

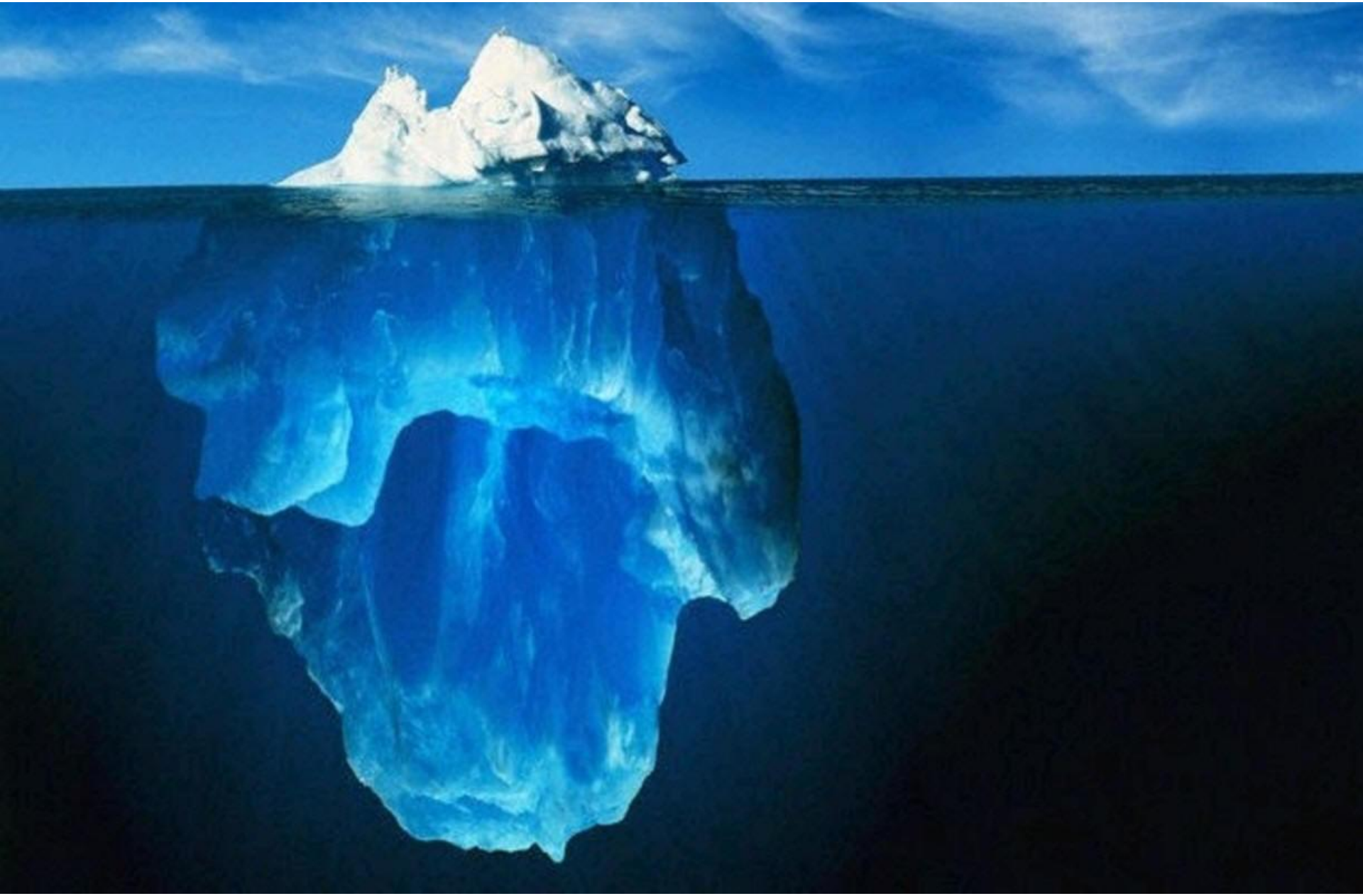
CHLORIDES

>Delta 1<



TYPES OF CONCRETE REPAIRS

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




Slab Edge Spalls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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


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


Use of Drainage Shims


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Spalling at Sliding Glass Doors
or Windows


Sliding Glass Doors
-Proper Coastal Design
-Proper Installation


Tile Flooring


302
2010/10/04 15:06


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

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