



Restoration Project Details:

Things You Need to Know
to Navigate the New Normal

Jim Emory, PE, SI, CGC

Jim Emory Credentials

- Florida Professional Engineer #60965
- Florida Engineer Special Inspector
 - For buildings over 50' tall
- FL Certified General Contractor #059844
- FL Reg. Roofing Contractor #RC29027436
- Post Tension Cable Repair-Level II
#00022426

Keystone Engineering

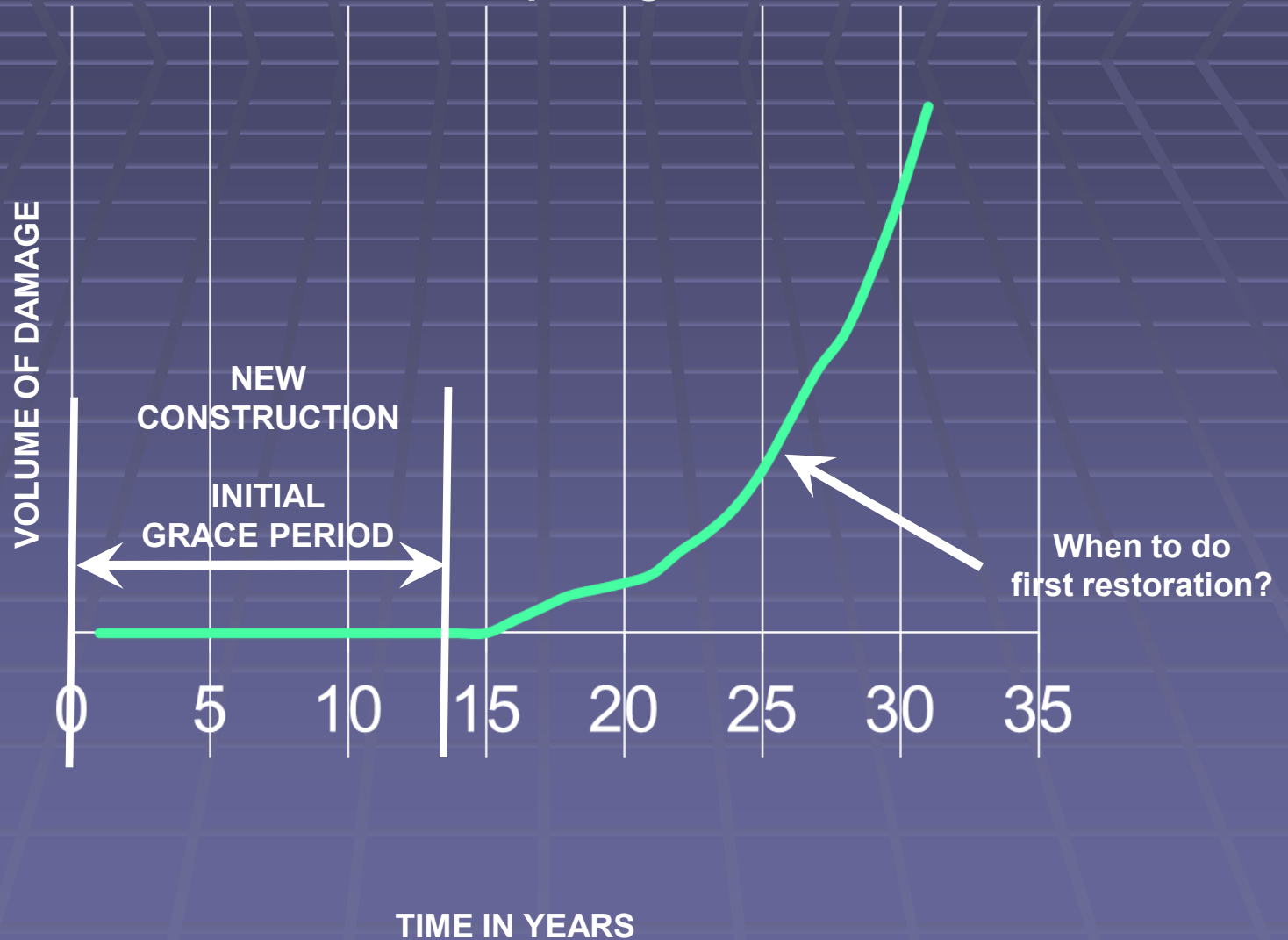
- Keystone has offices in Cocoa Beach and Daytona Beach
- Keystone covers from Ft. Pierce to St. Augustine
- Keystone currently has 15 full-time employees with 6 engineers
- Our core business is the structural rehabilitation and weatherproofing of coastal condominium buildings

Inspections

- **Structural Milestone**
 - 30 Years or Older (25 Years at Building Official Discretion)
 - Every 10 Years thereafter
- **Recommended Restoration Cycle**
 - Every 7 to 10 years
 - Coordinated with painting cycle
- **SIRS**
 - Structural Integrity Reserve Study
- **Insurance/Mortgage Companies/Roofs**

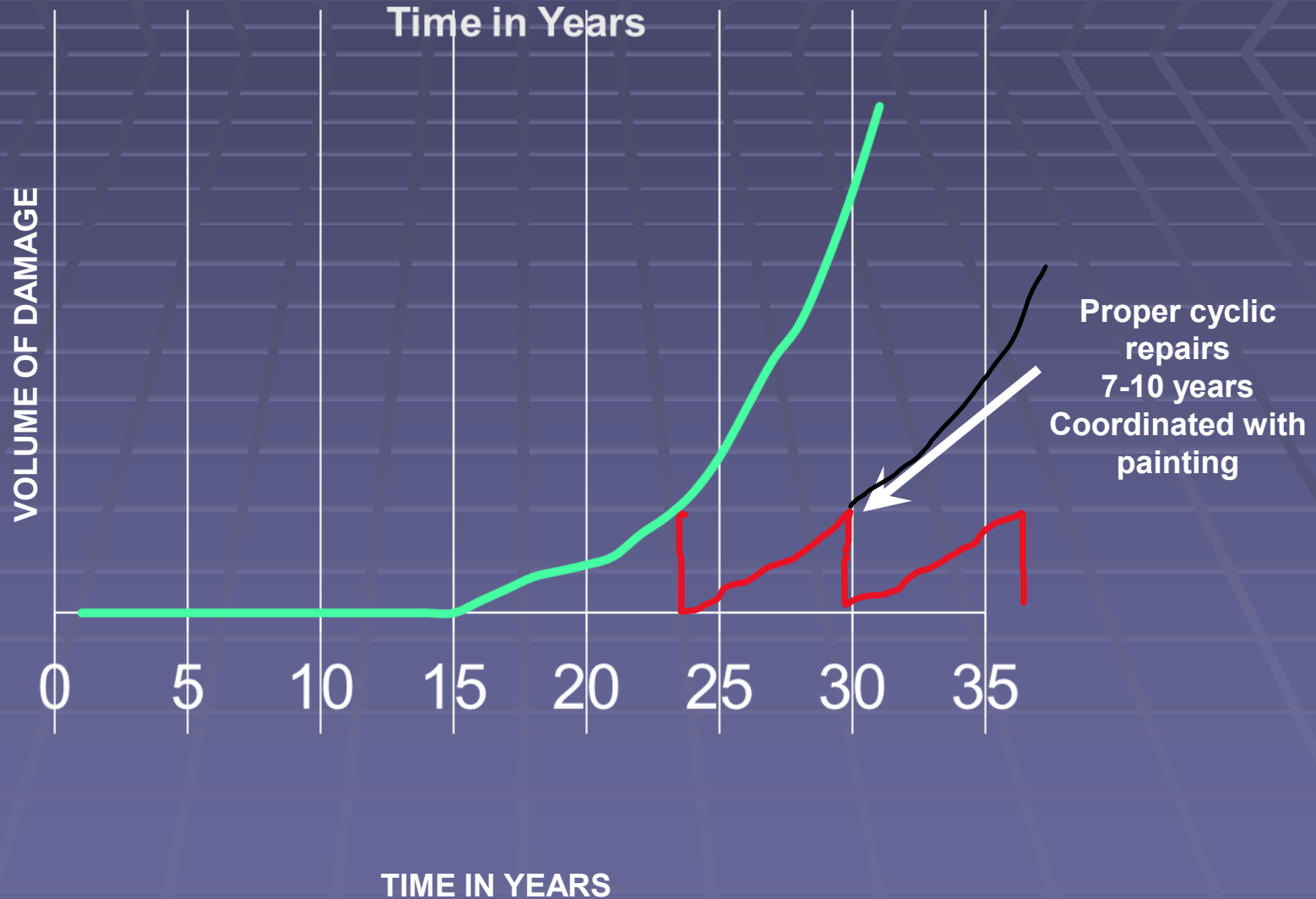
New Construction

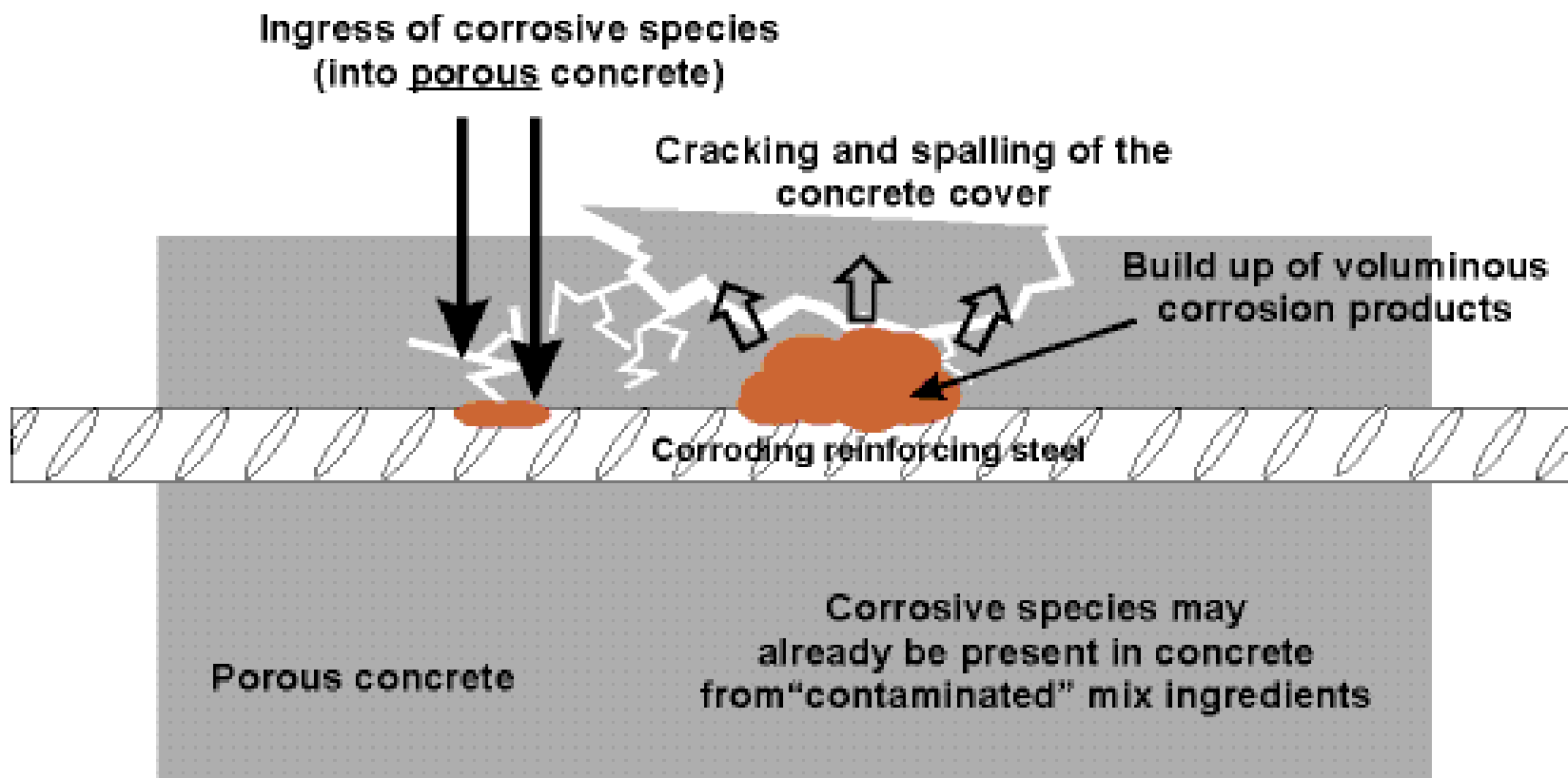
Corrosion – Spalling Timeline



Restoration Cycle

Corrosion – Spalling Timeline





Project Goals

- Properly Complete Needed Structural Repairs
- Minimize/Eliminate Vulnerabilities that exacerbate the Structural Damage
- Implement Solutions that consider Future Maintenance Needs
- Consider Aesthetics

Project Goals

- Properly evaluate building needs and condition
- Develop accurate scope of work and budget
- Educate board and owners for proper decision-making
- Secure an experienced, reputable contractor
- Execute project with a team approach between the association, contractor, and engineering teams
- Achieve a Win-Win-Win result

TYPES OF BUILDINGS

- **PRECAST-PRESTRESSED PANELS**
- **CONVENTIONALLY REINFORCED,
POURED-IN-PLACE**
- **POST-TENSIONED**
- **WOOD**
- **OTHERS**



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 & NO ONE
TRESPASSING ON
PROPERTY, UPON COMPLETION,
SHALL BE GUILTY OF A
VIOLATION



Post-Tensioned



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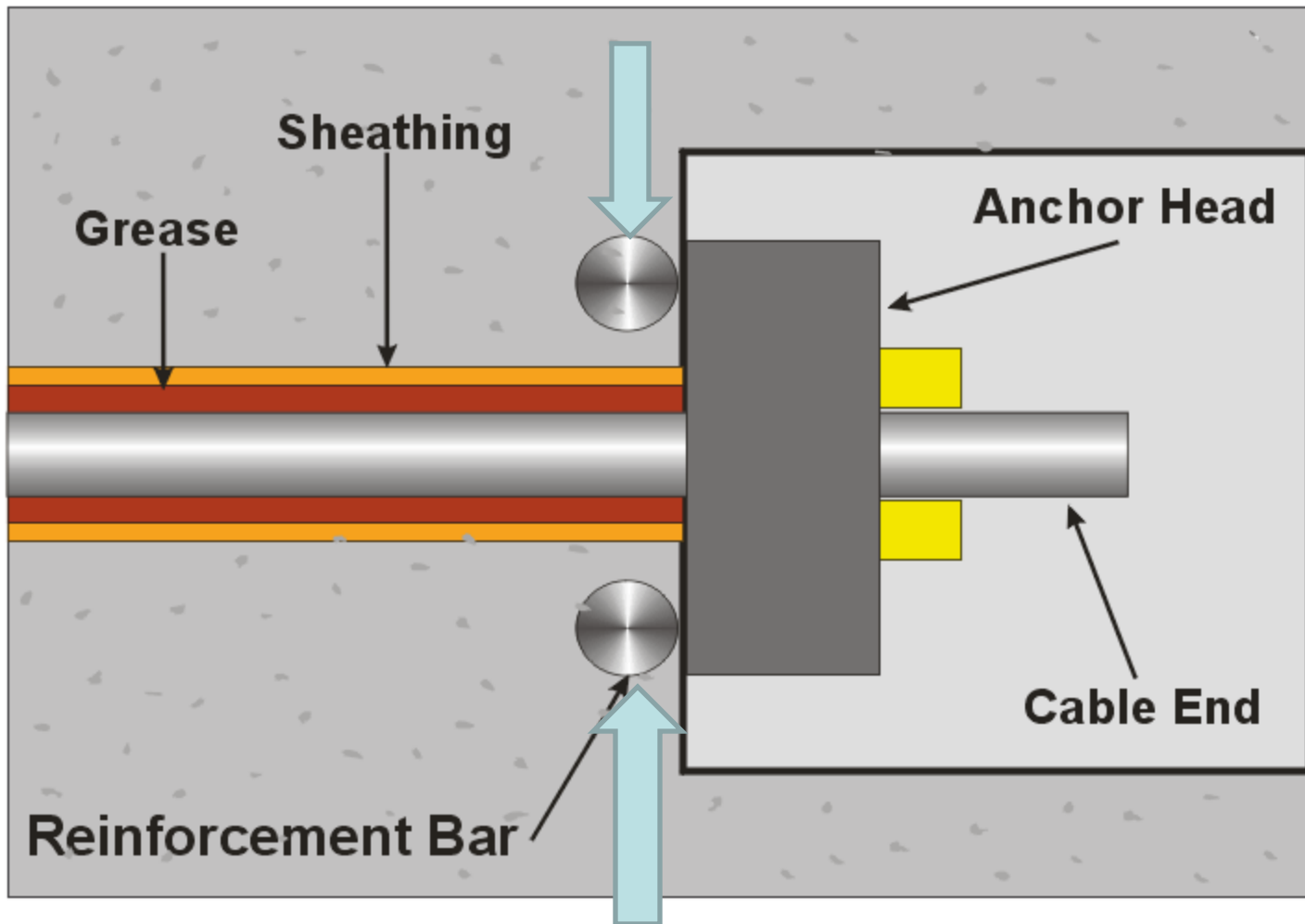
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Post-Tensioned Anchor Head









Filigree Slab

Corroded Reinforcing Steel



Types of Structural Concrete Damage

- Edge Spalls
- Surface Spalls
- Overhead/Full Depth Spalls
- Columns and Beams
- Window Sills
- Non Structural Cracks



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



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The image shows a close-up of a concrete slab with visible surface spalling and cracking. The concrete is a light tan color with some darker, exposed aggregate in the damaged areas. 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 serif font.

Slab Surface Spalling







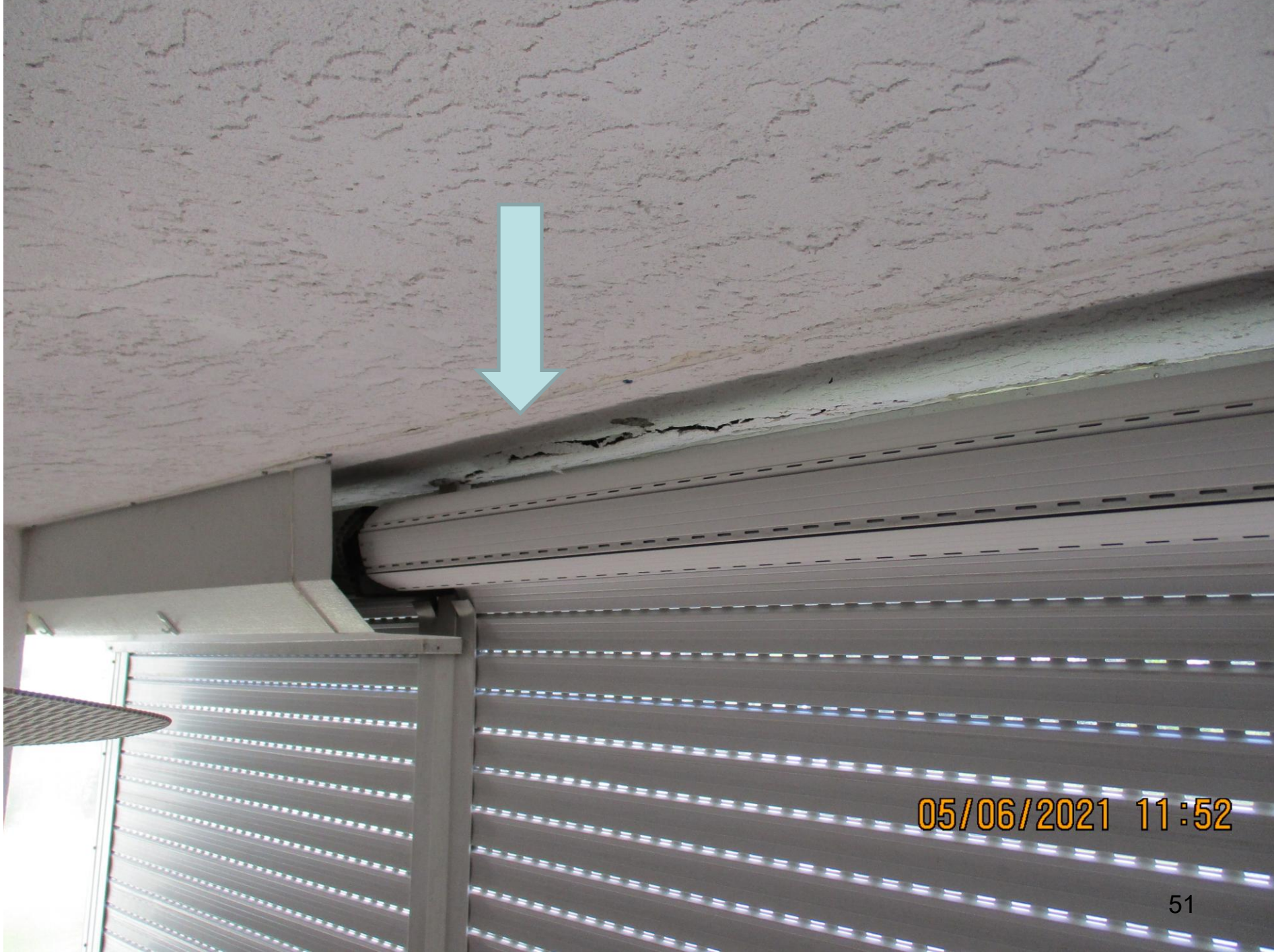




A photograph showing a concrete surface with several rectangular areas where the top layer of concrete has been removed, exposing a grid of steel reinforcement bars (rebar). The rebar is arranged in a grid pattern within each rectangular area. The surrounding concrete is light gray and appears to be part of a larger structure, possibly a bridge deck or a large floor slab. In the background, there are yellow metal structures, possibly scaffolding or part of a construction crane, and a paved area. The text "Surface Spall Repairs" is overlaid in the center of the image.

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



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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**



The image shows a close-up of white-painted metal railings on a concrete balcony. At the joints where the railings meet, there is significant dark, crumbly material, likely rust or decayed concrete, indicating structural damage. The railings are attached to a light-colored concrete wall. In the background, green foliage is visible. The text 'Cored Railings' is overlaid in white, and a timestamp '11/17/2021 13:48' and page number '60' are in the bottom right.

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



11/17/2021 12:16



Spalling at Sliding Glass Doors or Windows



A close-up photograph of a sliding glass door track. The track is made of a light-colored material, possibly aluminum or plastic, and shows significant signs of corrosion and wear. There are several small, dark brown spots of rust or corrosion along the length of the track. The track is set into a white wall. The glass door is partially visible on the left side of the frame.

Sliding Glass Doors

- Proper Coastal Design**
- Proper Installation**

































Tile Flooring

A photograph showing a close-up of a white tiled floor. The tiles are square and arranged in a grid pattern, separated by dark grey or black grout. To the left, a white wall or baseboard is visible. In the upper center, a dark, possibly black, door threshold or frame is present. The text "Tile Flooring" is overlaid in white, bold font across the upper part of the image.





2010/10/04 15:06



2010/10/05 10:18





Screened Enclosures



04/29/2021 11:52



Project Goals

- Properly Complete Structural Repairs
- Minimize/Eliminate Vulnerabilities that caused Structural Damage
- Implement Solutions that consider Future Maintenance Needs
- Consider Aesthetics

**Example
New Railings and Floor Coatings**



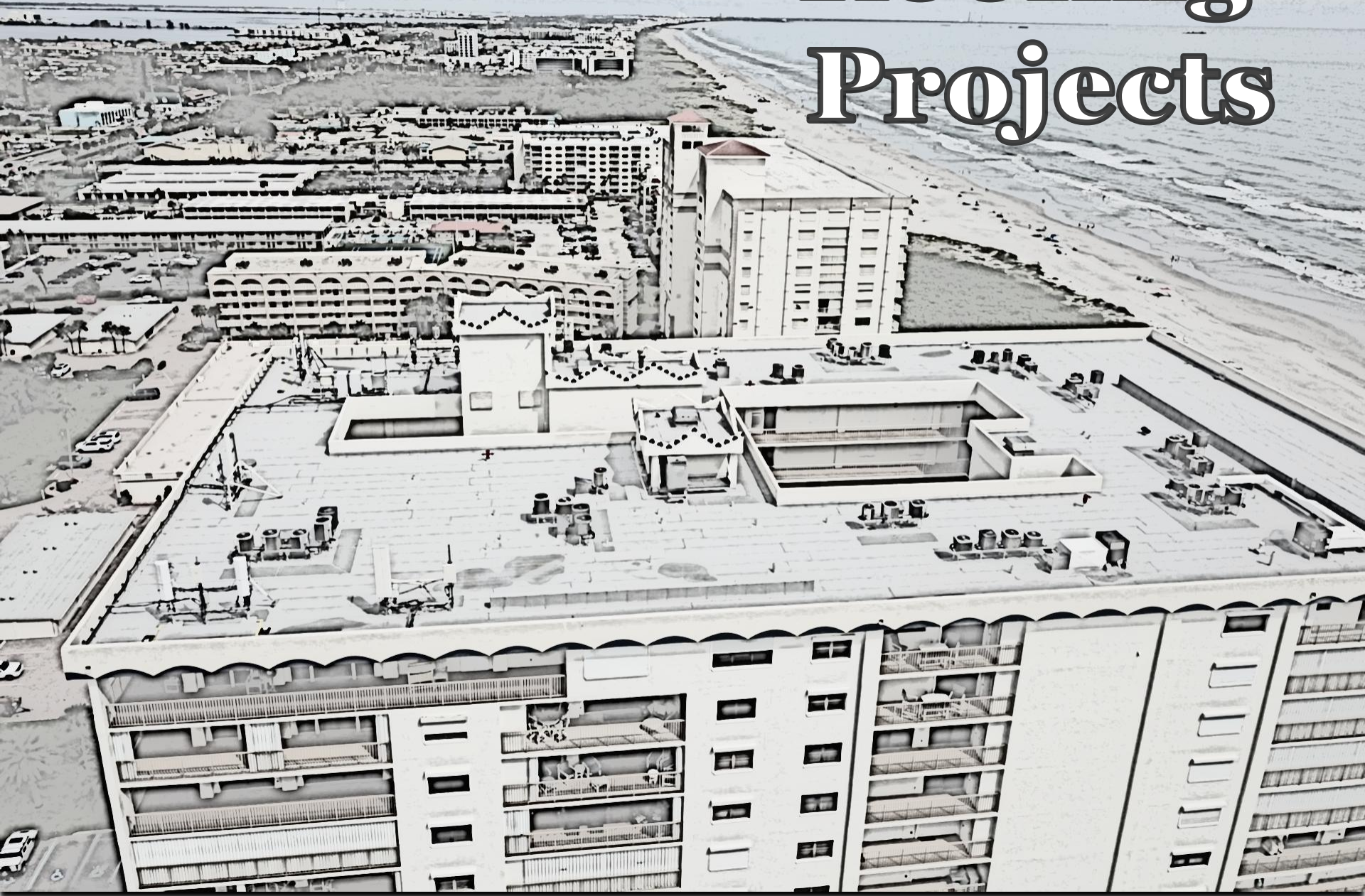








Roofing Projects



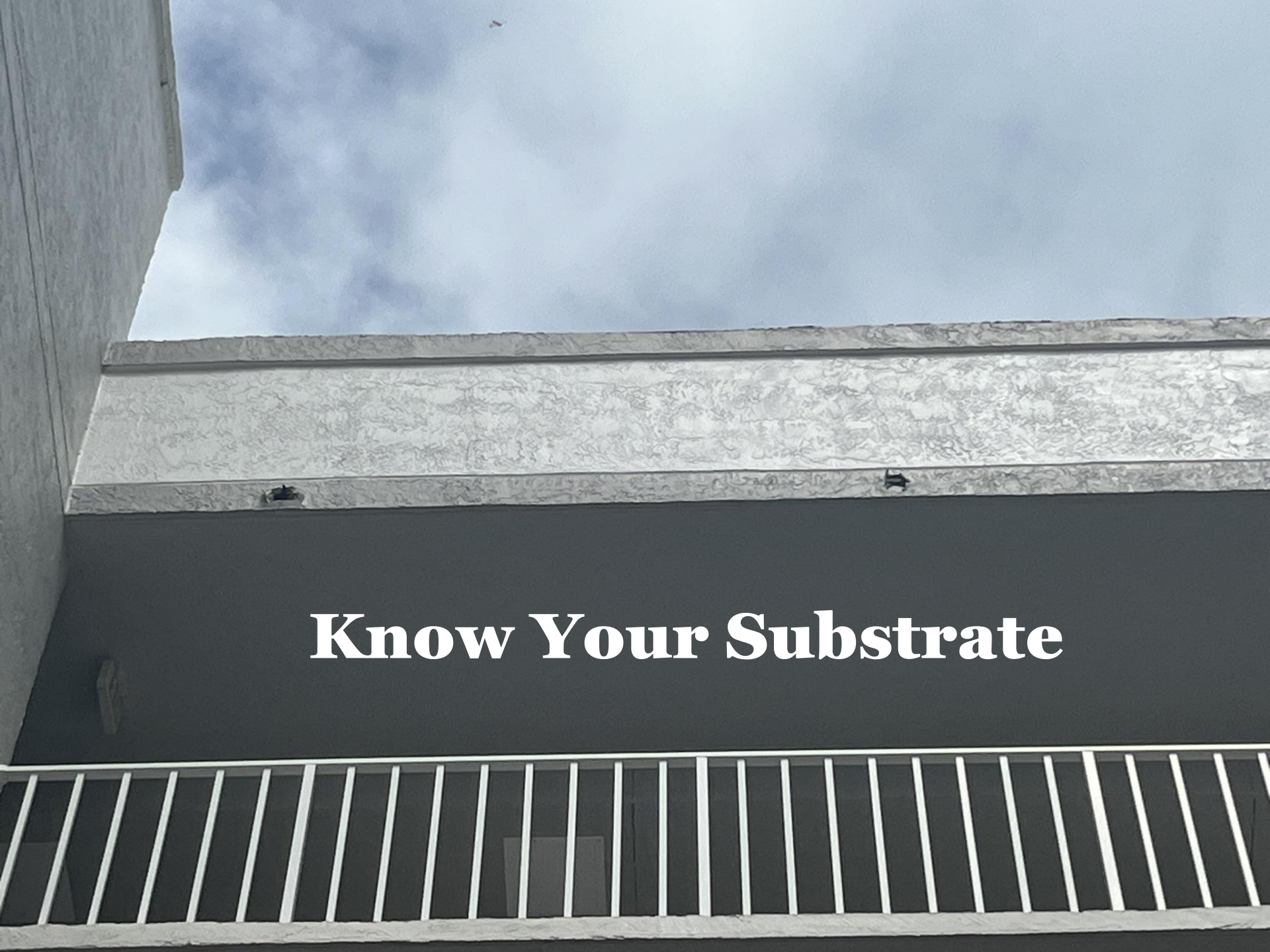
Types of Roofs

■ Low Slope

- Single Ply (TPO, PVC, EPDM...)
- Modified Bitumen
- Polyurethane Foam

■ Steep Slope

- Shingles
- Metal
- Tile
- Contractor Selection

A low-angle photograph of a building facade. The image shows a dark, solid-colored wall section. Above this section is a wide, horizontal band of light-colored, heavily textured concrete or stone. The top of the image shows a cloudy sky. In the foreground, a white metal railing with vertical bars runs across the frame. The text "Know Your Substrate" is overlaid in white, bold, serif font on the dark wall section.

Know Your Substrate







Base Sheet//Vapor Barrier

1 75-44

10/21/202



**New Base Sheet
and Mechanical Stands**

10/15/2025 11:03



Cap Flashing

01/31/2022 14:09

Mechanical Work



11/13/2024 13:46



Slope to Drain

12/09/2021 14:28



Finished Roof Installation

11/13/2024 13:45





Failing New Installation



Poor Coping Desing/Installation









Engineer's Role

- Meet State/Local Requirements for Construction Permits
- Reduce Liability for Board Members and Unit Owners
- Prioritize Project Needs for Safety, Asset Preservation and Aesthetic Considerations
- Ensure Project Funds are Wisely Invested-
Too much work at the end of the money!

Competitive Bidding

- Prepare Standard Bid Documents and Requirements-Sealed Bids!
- Qualified Contractors-New Construction or Restoration
- Quality Assurance
- Payment Terms-Financial Leverage

Types of Contracts

- Lump Sum
- Unit Cost
- Time and Material
- Stipulated Sum
- Attorney Review and AIA Documents

Engineering Process-How to get Started

- Phase I – Condition Survey of Building-Written Report, Findings, Recommendations, Options, Budgets, Life Expectancies
- Phase II – Project Specifications and Bid Documents-Qualified Contractors
- Phase III – Construction Inspections, Project Management, Financial Controls

Phase I – Condition Survey of Building

- Provide Written Report of Findings and Recommendations
- Repair Options and Budgetary Estimates
- Assist Owners in Decision-Making Process
- Educate and Discuss Options and Priorities
- Prioritize Safety, Asset Preservation and Aesthetics

Phase II – Project Specifications and Bid Documents

- Create Standardized Bid Documents-
Compare Apples to Apples
- Proven Methods-Exceed Code
- All Bidders Quote Same Scope of Work
- Qualified Contractors-Experience,
Longevity, Reputation, Financially Sound
- Scheduling of Work
- Contractor Selection can then be Heavily
Weighed by Cost

Phase III – Construction Inspections

- ◆ Designate Areas of Repair
- ◆ Inspect Work to Assure Quality
- ◆ Monitor Work Progress and Schedule
- ◆ Approve Payments/Retainage
- ◆ Create As-Built Repair Docs



Consulting Fees

- Hourly
- Per Site Visit
- Weekly
- Monthly
- Percentage Basis
- Fixed Fee Lump Sum

Building Exterior Functions as a System

- Roofing System
- Exterior Wall Coatings
- Doors and Windows
- Corrosion Protection
- Railings
- Shutters
- Balconies

Building Exterior Functions as a System

- Structural Support
- Protect Contents and Occupants from the Elements
- Wind, Water, Temperature
- Safety, Preserve and Beautify
- Mainain Value

Questions



Scan to get our free
monthly newsletter with
more helpful information

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9-25-2024