

**Repair of Concrete Session in Memory
of Tony Murray**

**Post Tensioning Repairs and
Modifications**

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Conditions that Lead to Damage or Deterioration

- Not Encapsulated/Protected
- Improper Handling During Placement
- Improper Grouting
- Exposure to High Concentrations of Chemicals/Chlorides
- Post Stressing Errors
 - Core Drillers/Saw Cutters
 - Post Installed Anchors



Conditions that Can Lead to PT Deterioration

Chloride Accelerators in Grout



Missing Grease Caps



Poorly Protected or Unprotected Anchors

Grease Only—No Grease Cap



Severe Corrosion of Wedges and Anchor



Failed Post Tensioning Due to Anchorage Corrosion



External Post Tensioning



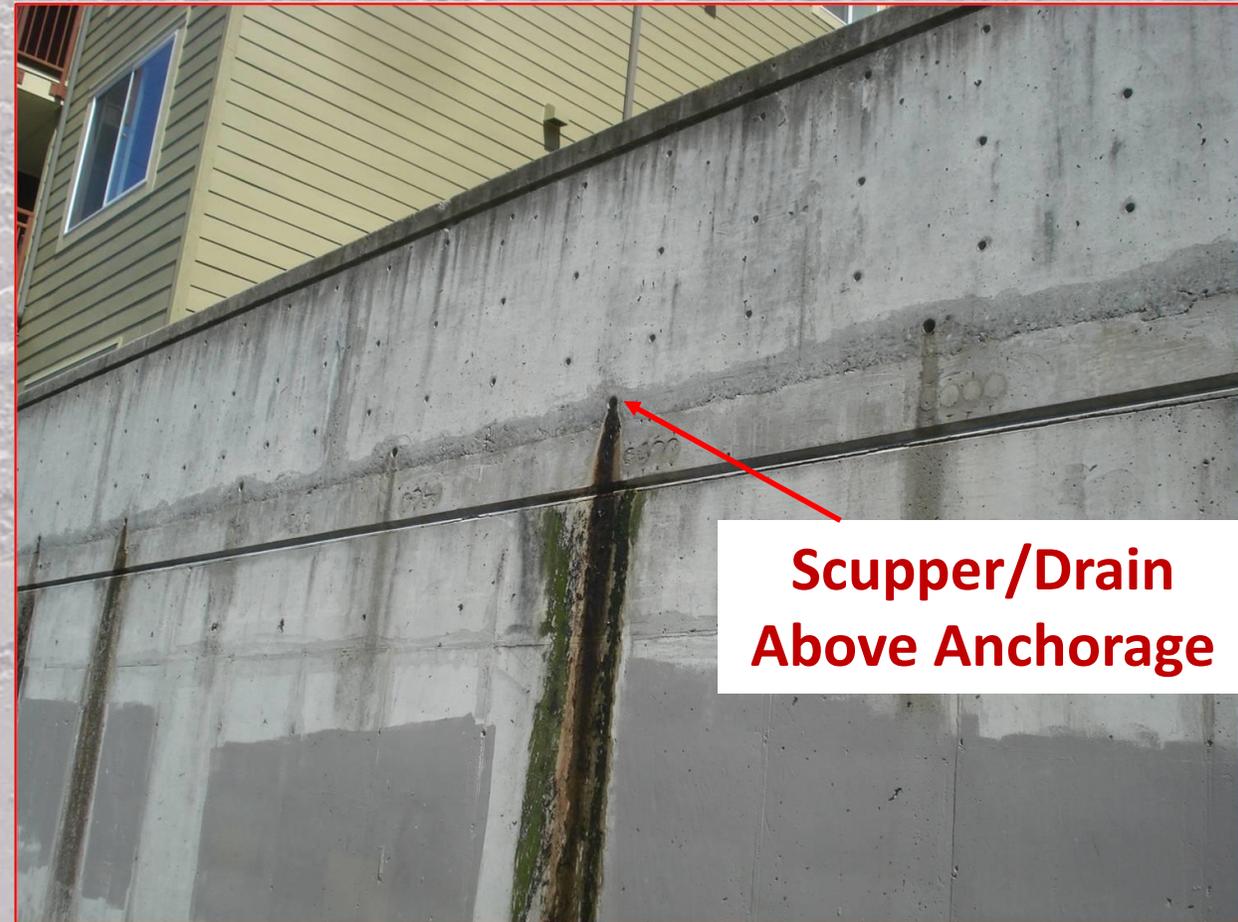
**Laying on the Parking Garage Slab
Monday Morning**

Design and Environmental Concerns

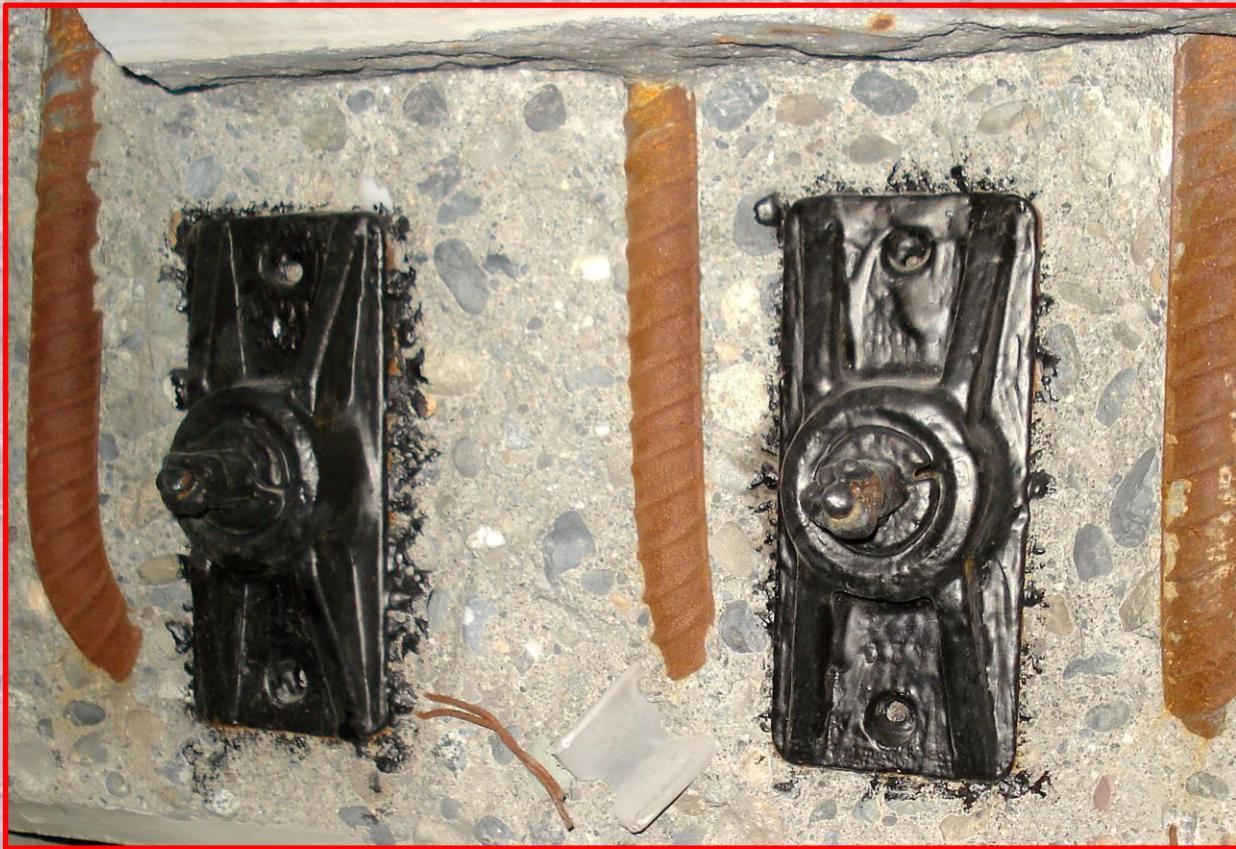
Swimming Pool Leaking
Chlorinated Water



Scupper/Drain
Above Anchorage

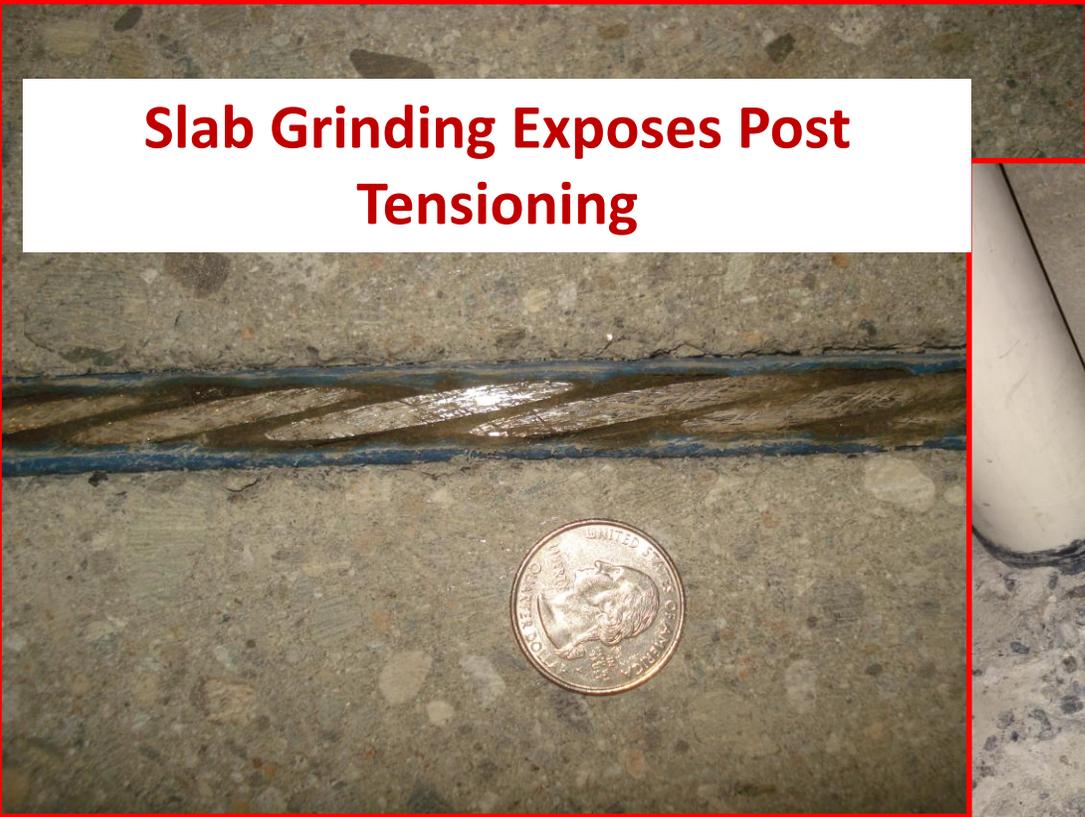


Previously Unprotected Anchors

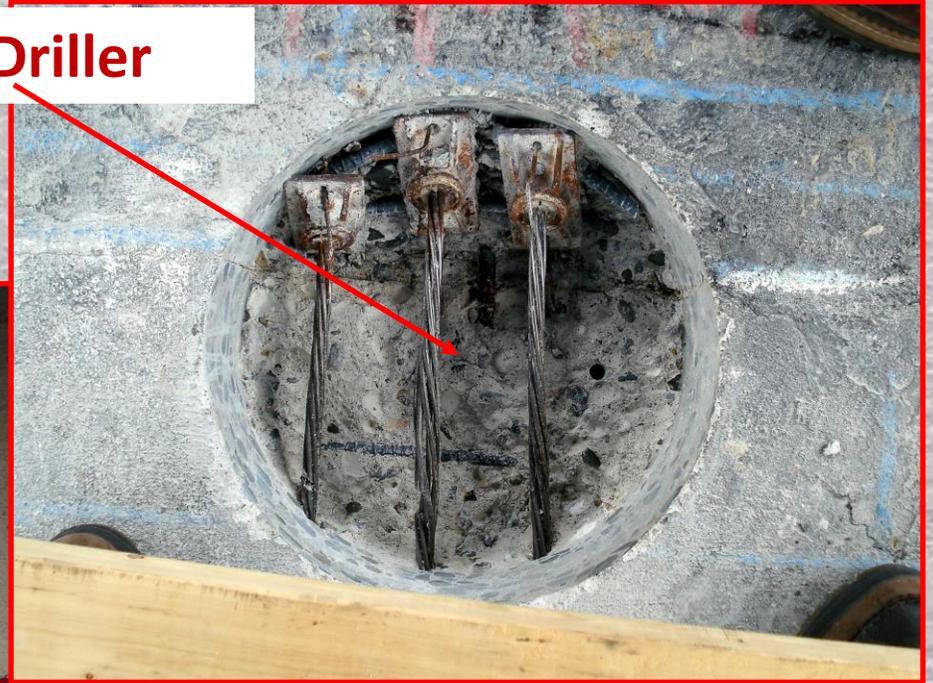


Post Stressing Errors

Slab Grinding Exposes Post Tensioning



Errant Core Driller



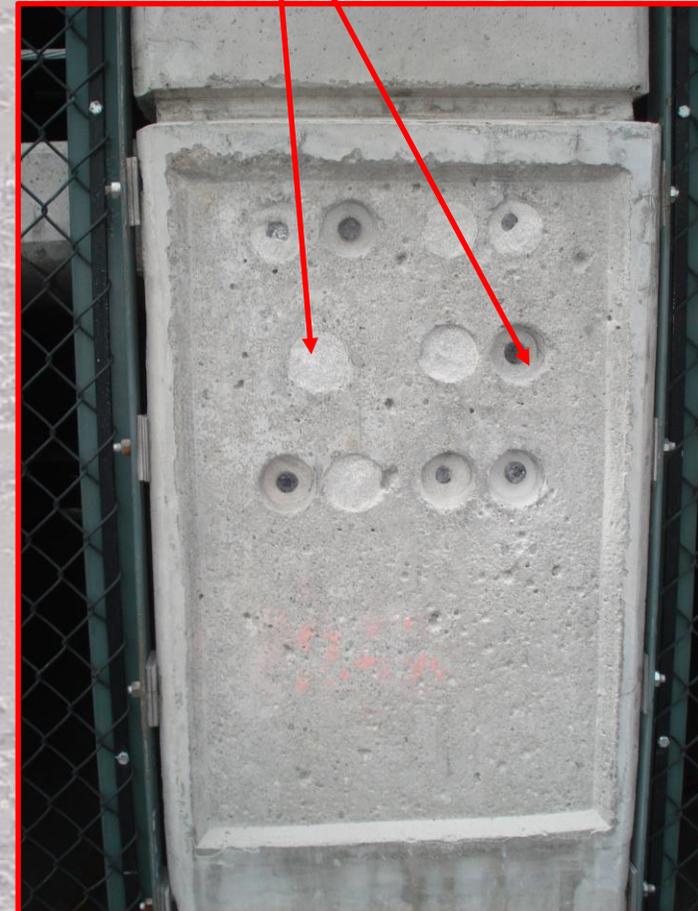
Direct Hit Post Installed
Fence Anchor

Grout Issues

- Shrinkage
- Tempering
- Poor Consolidation
- Addition of Chlorides



Varying Qualities of Grout



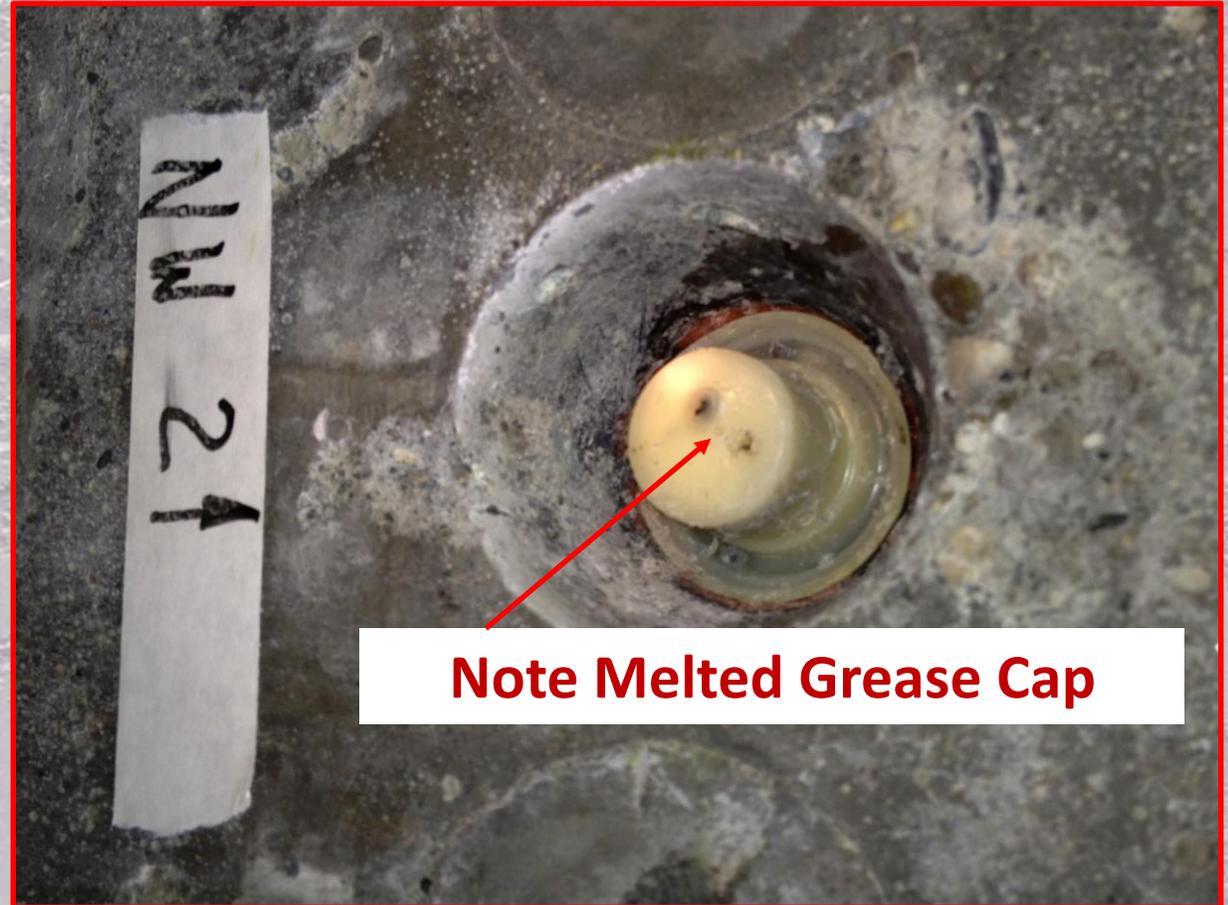
Stressing Pocket Grouting

**Cut Tendon Ends and Properly Clean
Grout Pockets**



**Properly Mixed and Placed Non
Shrink Grout**

Grease Caps



Note Melted Grease Cap

Grease Cap Placement

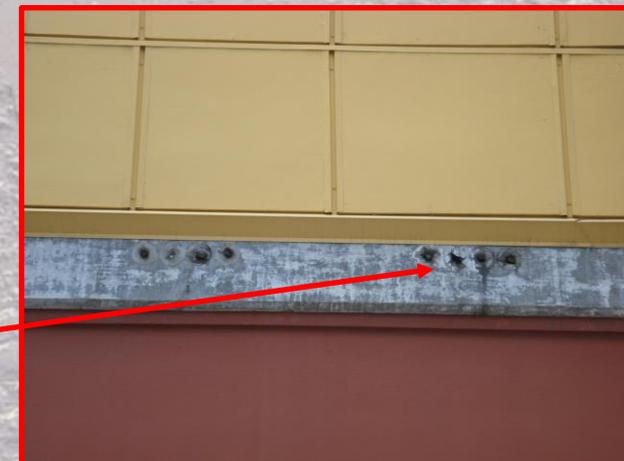


Design Consideration/Conditions Initiating Repairs

- **No Tendon Repair is Needed:**
 - No Significant Deterioration
 - No Loss of Pre-Stressing
- **Selective Abandonment:**
 - Sufficient Reserve Capacity
- **Repair:**
 - Severely Deteriorated/Damaged
 - Lost or Failed Pre-Stressing
- **Tendon Supplement/Replacement:**
 - Insufficient Capacity
 - Unrepairable
- **Selective or Full Structure Replacement**
 - Insufficient Capacity
 - Significant Deterioration
- **Stabilizing/Strengthening**
 - Restoration
 - Improvement

REF--PTI DC80.3-12

No Repair Necessary—
Tendons Never Stressed

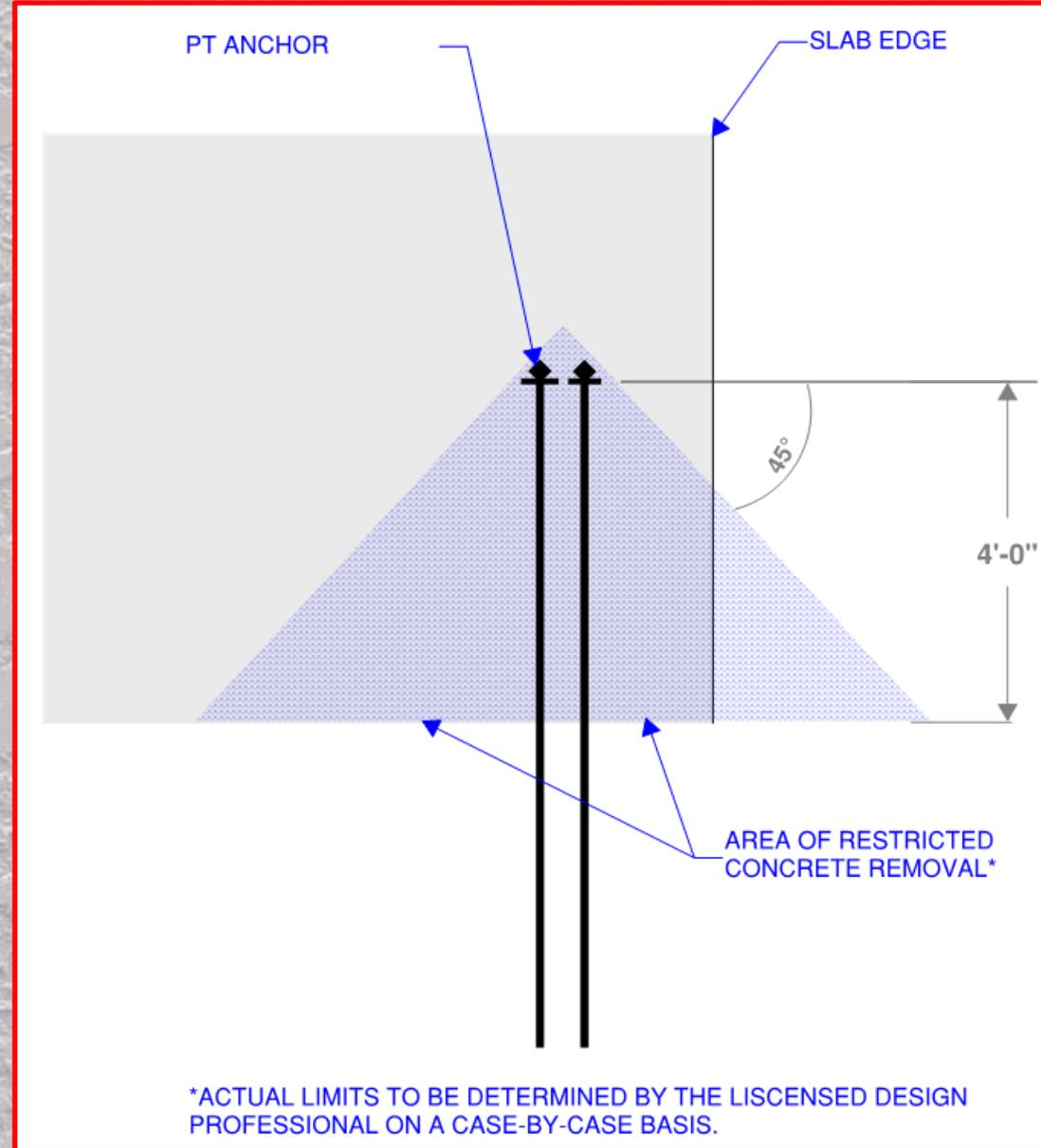


Know What You Are Getting Into



- Review PT Shop Drawings
- Locate Tendons
- Locate Anchors
- #of Tendons/Group
- Location in Slab

Concrete Removal—Cautiously



Repair of Unintentionally Cut Tendons

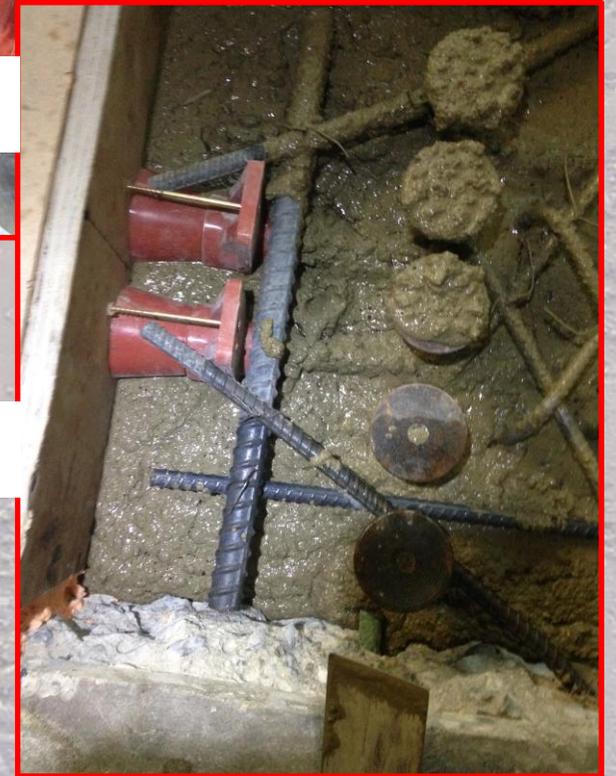


Installing New Anchors

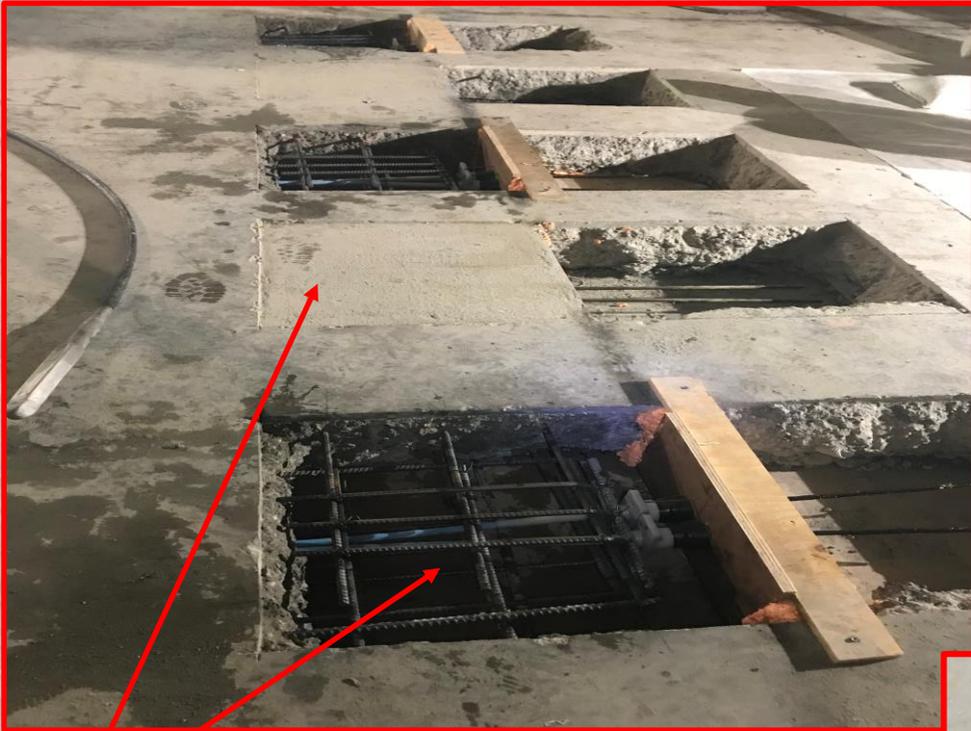


Severed Anchors by Core Drilling

Casting New Anchors



Destressing & Restressing



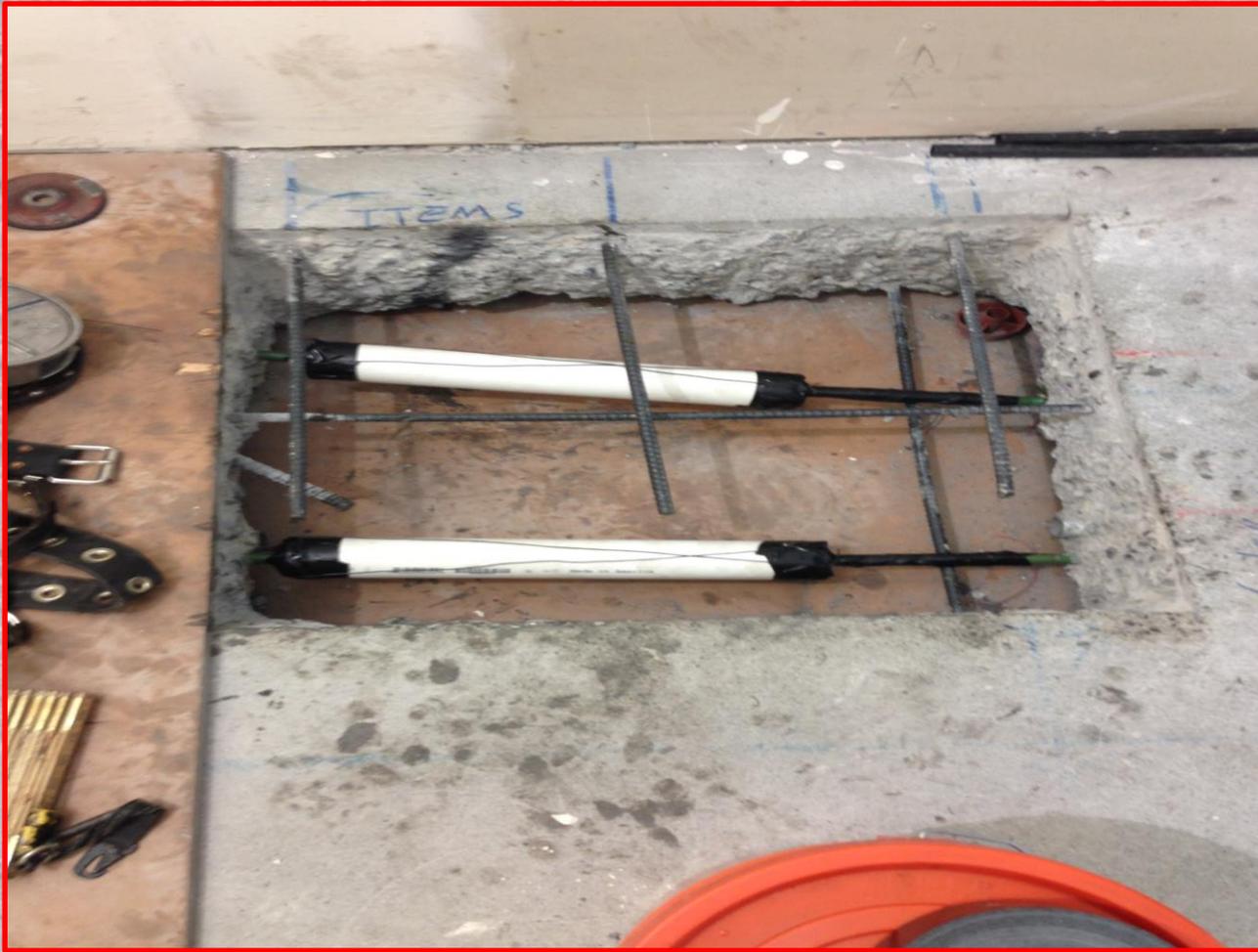
Staggered Destressing & Restressing



Destressing & Restressing in Both Directions



Examples of Tendon Couplers



Temporary Anchors/Trouble Shooting Anchors



Tendon Extraction

Extraction Frame



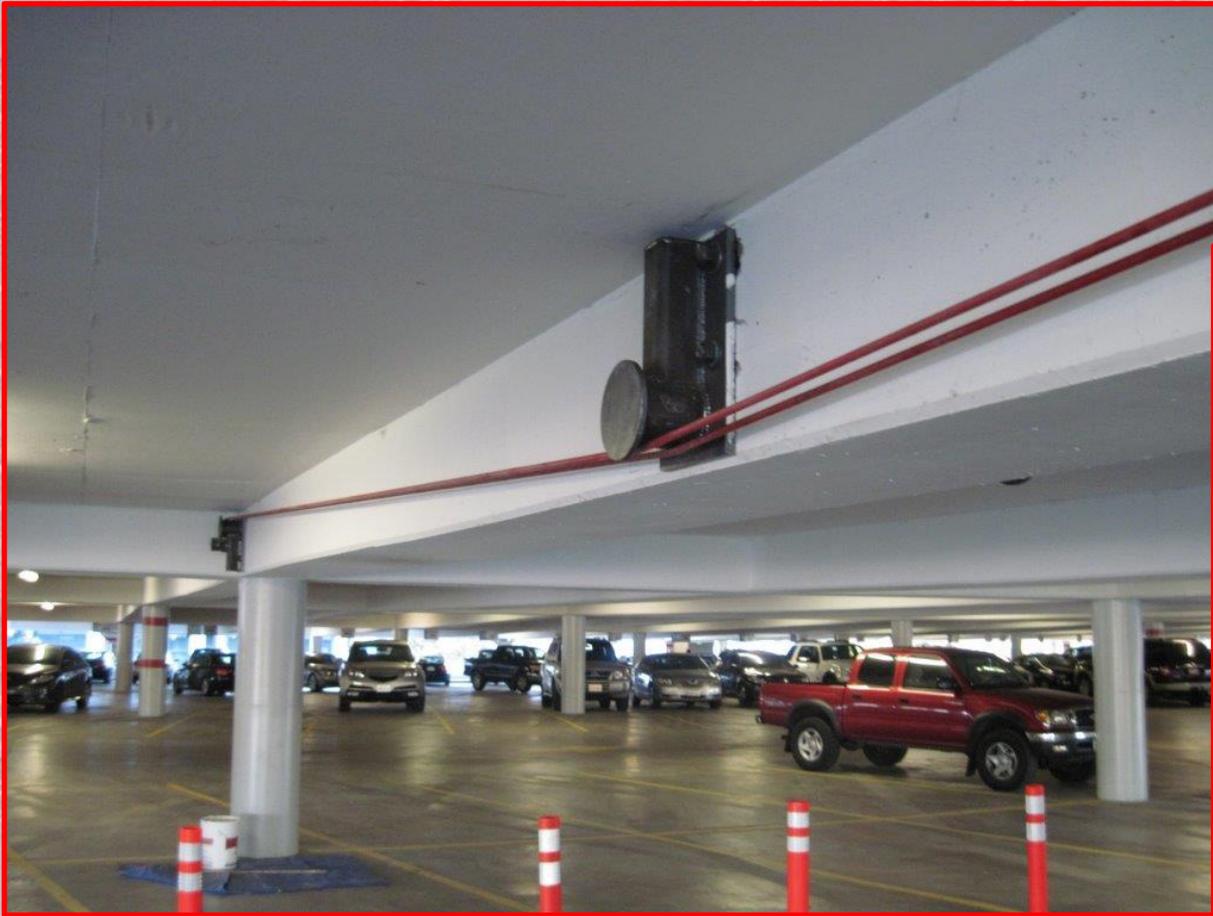
Pulling Tendon



Breaking Loose Anchorage



Externally Installed Post Tensioning



Thank You--Questions

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