All Wrapped Up -
The Protection of Post-Tensioning Tendon Repairs

By:

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Or is it?
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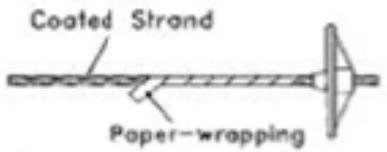
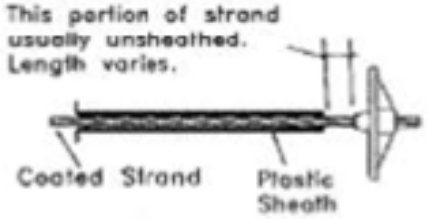
What is sheathing and where did it come from?

- Initially:
  - Intended to allow the unbonded tendon to move inside the concrete
  - Greased and helically wrapped with paper
  - ACI 318-63: “Unbonded steel shall be permanently protected from corrosion” but no guidance given regarding sheathing material
  - Provision could be interpreted that concrete cover provides protection

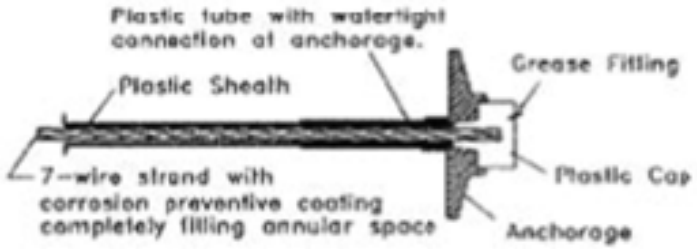
Paper-wrapped
1955-1975+



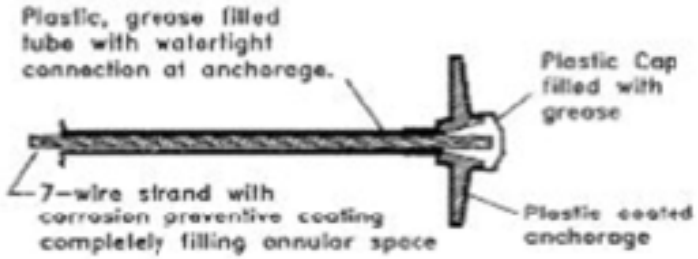
Plastic Sheath
1960-Present



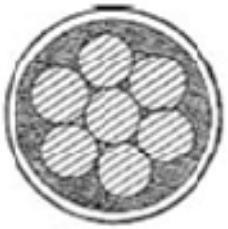
1985 PTI
Recommended
System



Electrically
Isolated Tendon

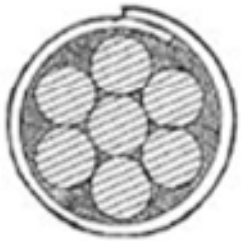


Entire Tendon Assembly covered with
electrically isolating material.



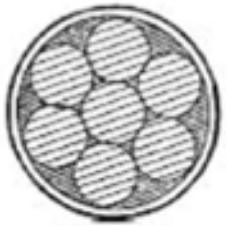
PUSH-THROUGH PREFORMED TUBE

STRAND PUSHED THROUGH AS GREASE IS APPLIED.



HEAT-SEALED

FORMED FROM FLAT STRIP AS GREASE IS APPLIED.



EXTRUDED

FORMED BY EXTRUDING OVER STRAND AS GREASE IS APPLIED.

Specification for Repairs?

- No current specifications for PT repairs
- PT repair specification under development by PTI DC-80
- PTI Field Procedures Manual – Repair of sheathing damaged in new construction

Current Sheathing Requirements

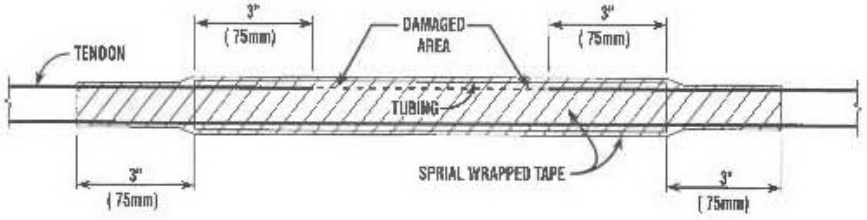
- Per ACI 423.7 and PTI M10.2 (New Construction)
- Sheathing:
  - Extruded high density polyethylene or polypropylene covering
  - Watertight, impermeable, stable
  - 0.050 in. thick
  - Encases tendon, prevents bond to surrounding concrete, provides corrosion protection, and contains PT coating

RECOMMENDATIONS

1. Restore tendon P-T coating in damaged area if required.

2. a. Place split tubing over damaged area and extend 3 inches (75mm) past each side. (If split tubing is not available, tendon sheathing can be used if two pieces are overlapped).

b. Spirally wrap the entire length of the repair area with tape and extend past tubing by 3 inches (75mm).



Note: *Material used shall be of suitable quality to allow for seal of tubing method above to be watertight.*

3. Taping can be used in place of the above method if the tape material used can ensure a watertight tendon and no significant portion of the original extruded sheathing is missing. (Practical judgement should be applied to the term "significant"). Testing has demonstrated the successful repair of a ¼ in. x 2 in. (6mm x 50mm) slot. Spirally wrap a minimum of 2 layers of repair tape extending a minimum of 3 in. (75mm) past the damaged areas in both directions.

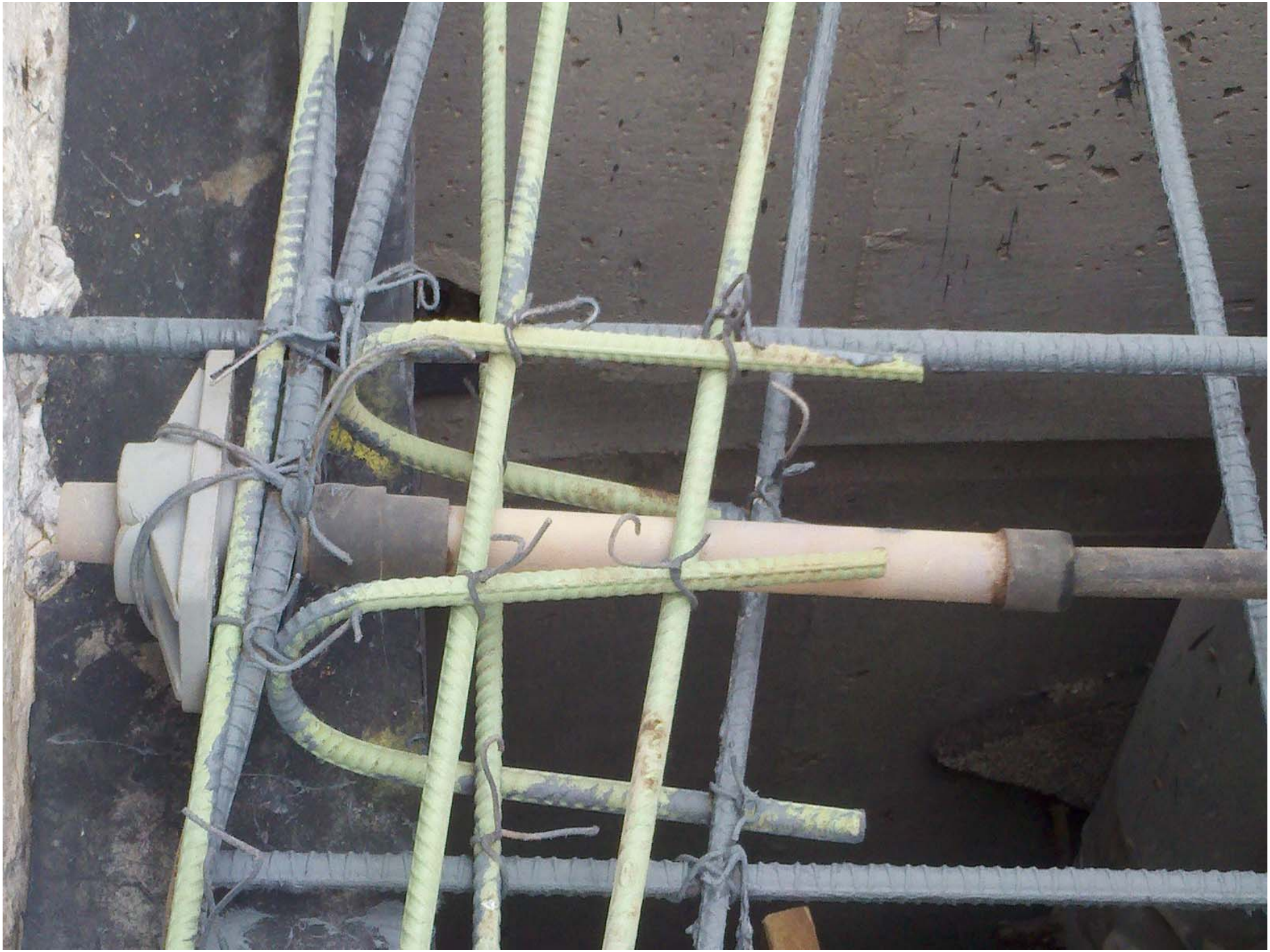
Issues with Sheathing in Repairs

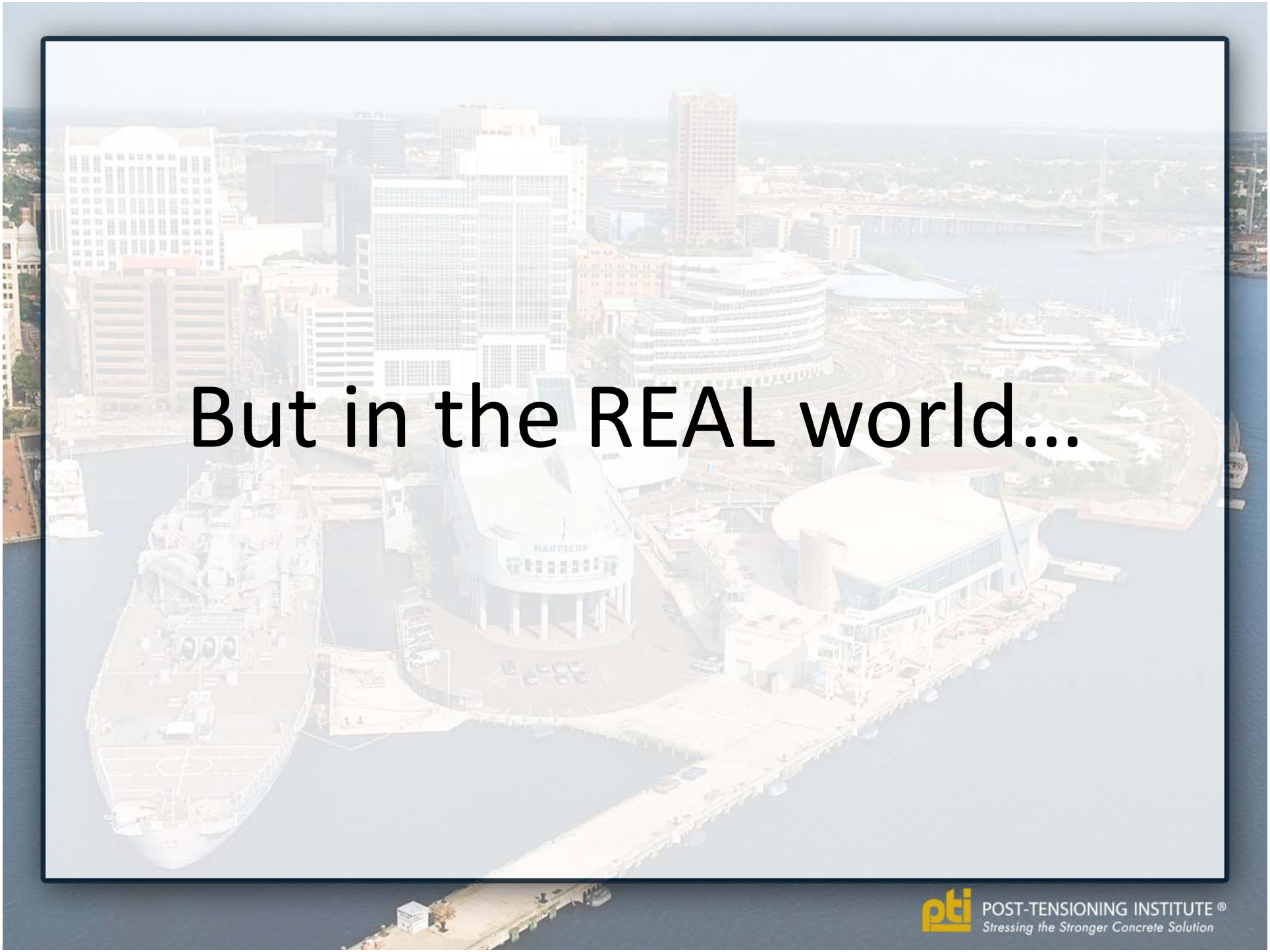
- No standard - Repair to match existing?
- Repair to meet specification for new?
- At minimum, need to repair to protect tendon exposed at repair

Goal of Sheathing Repairs:

Keep Water Out!


DENVER




But in the REAL world…
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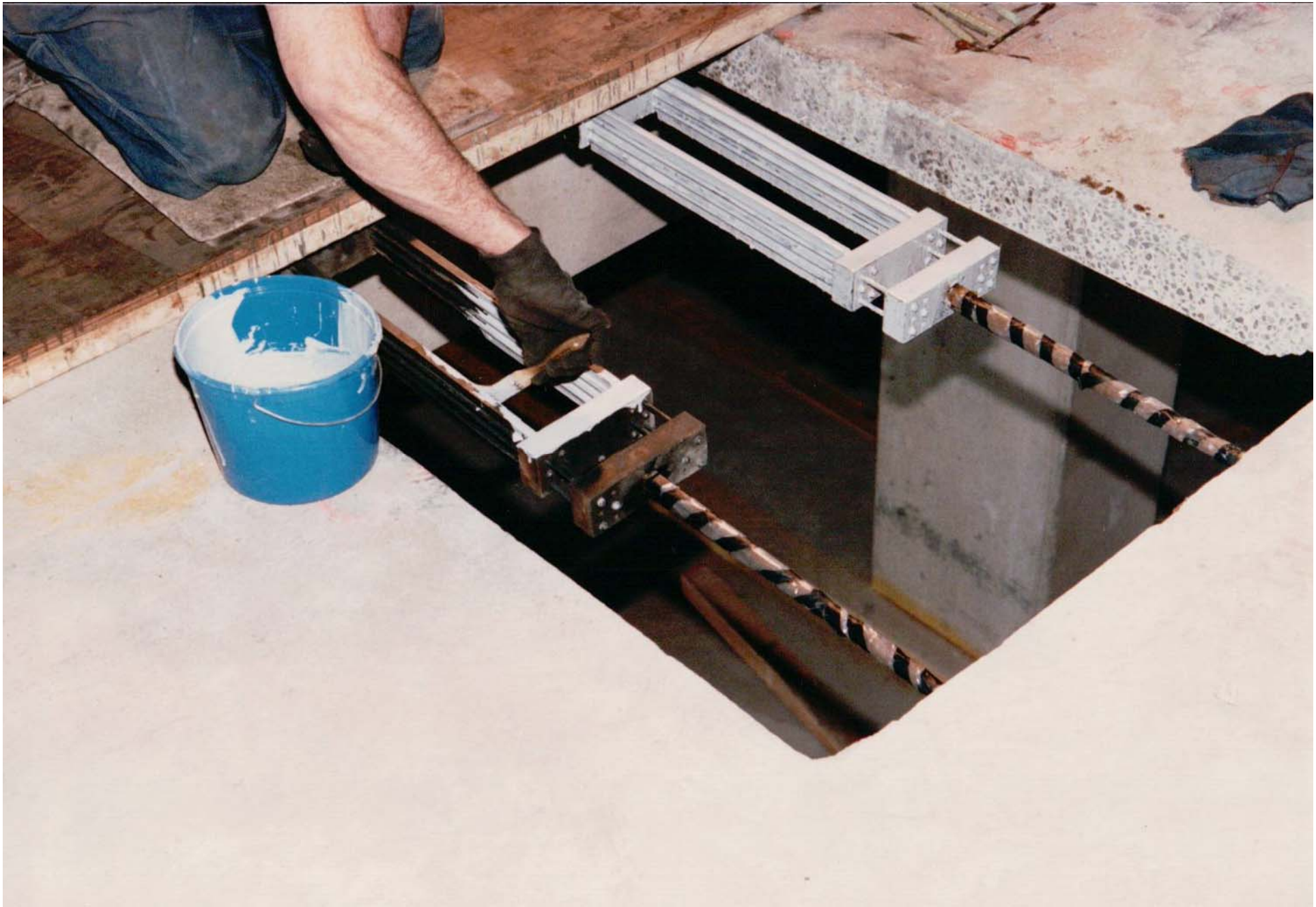

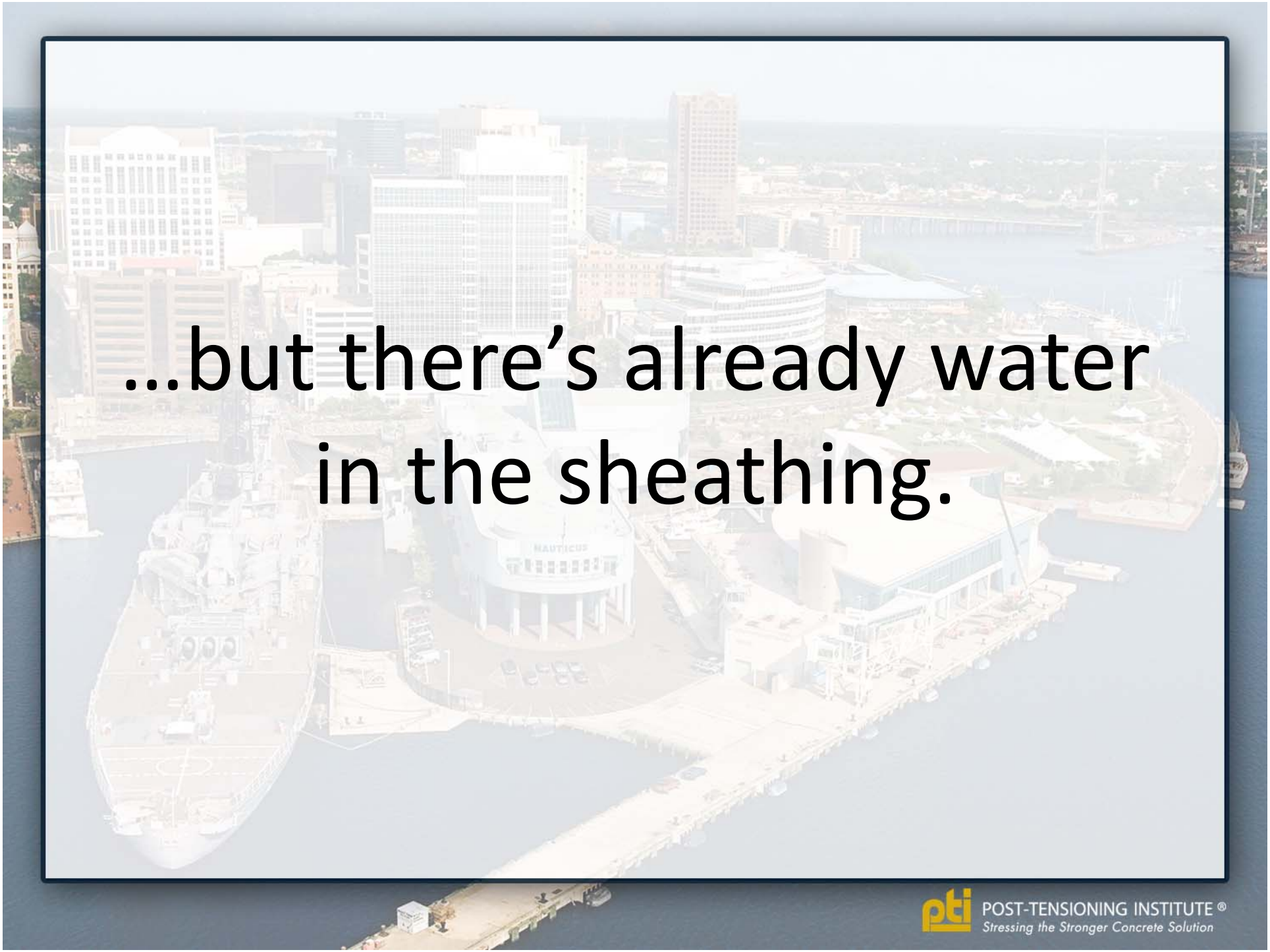
…but there’s already water
in the sheathing.
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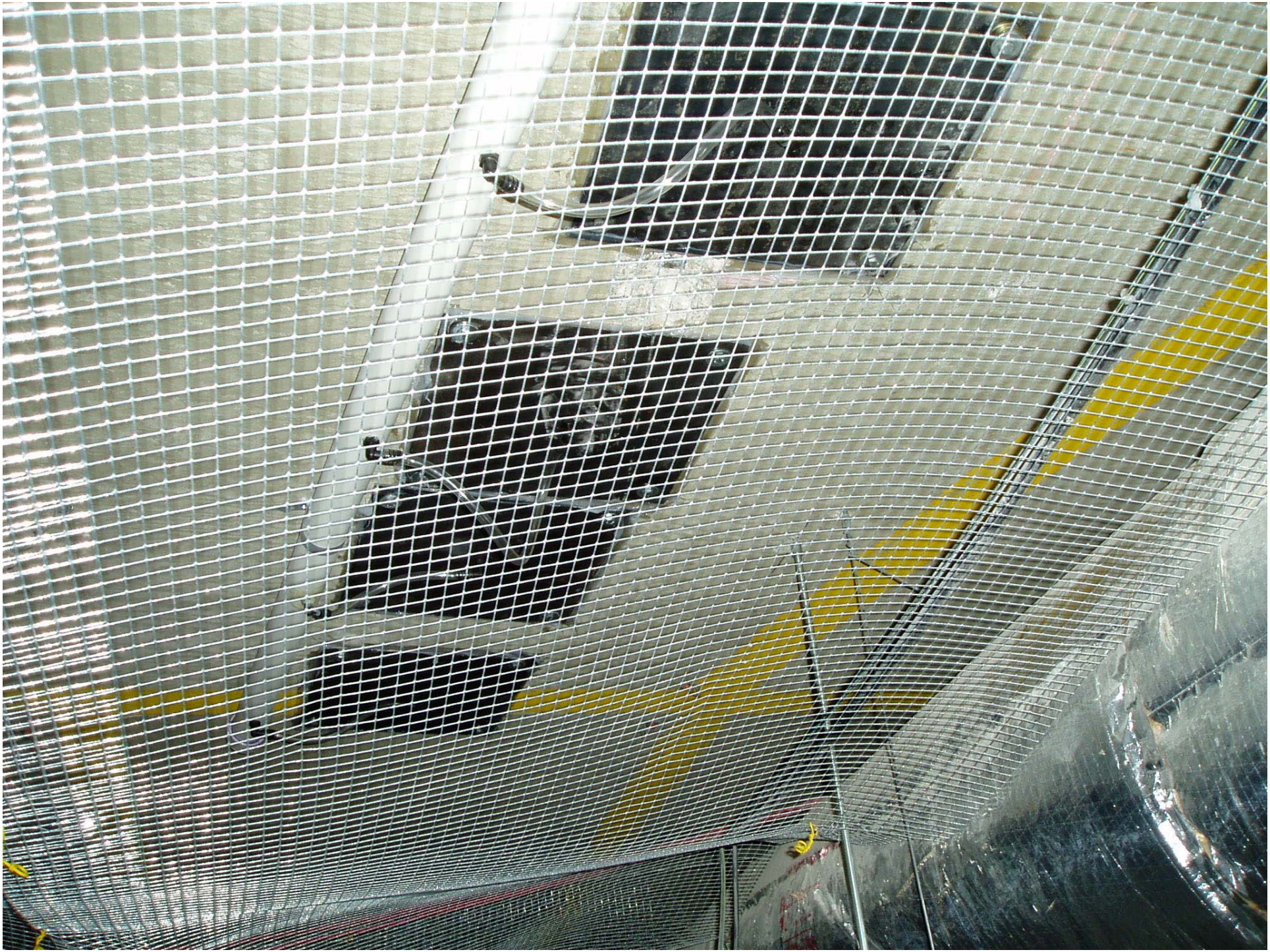


Last step:
Stop the water.
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Additional Work Required:

- Testing of newer waterproof tapes
- Possible other protection methods
- PTI standard for sheathing repair?

Questions?

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