Concrete Patching

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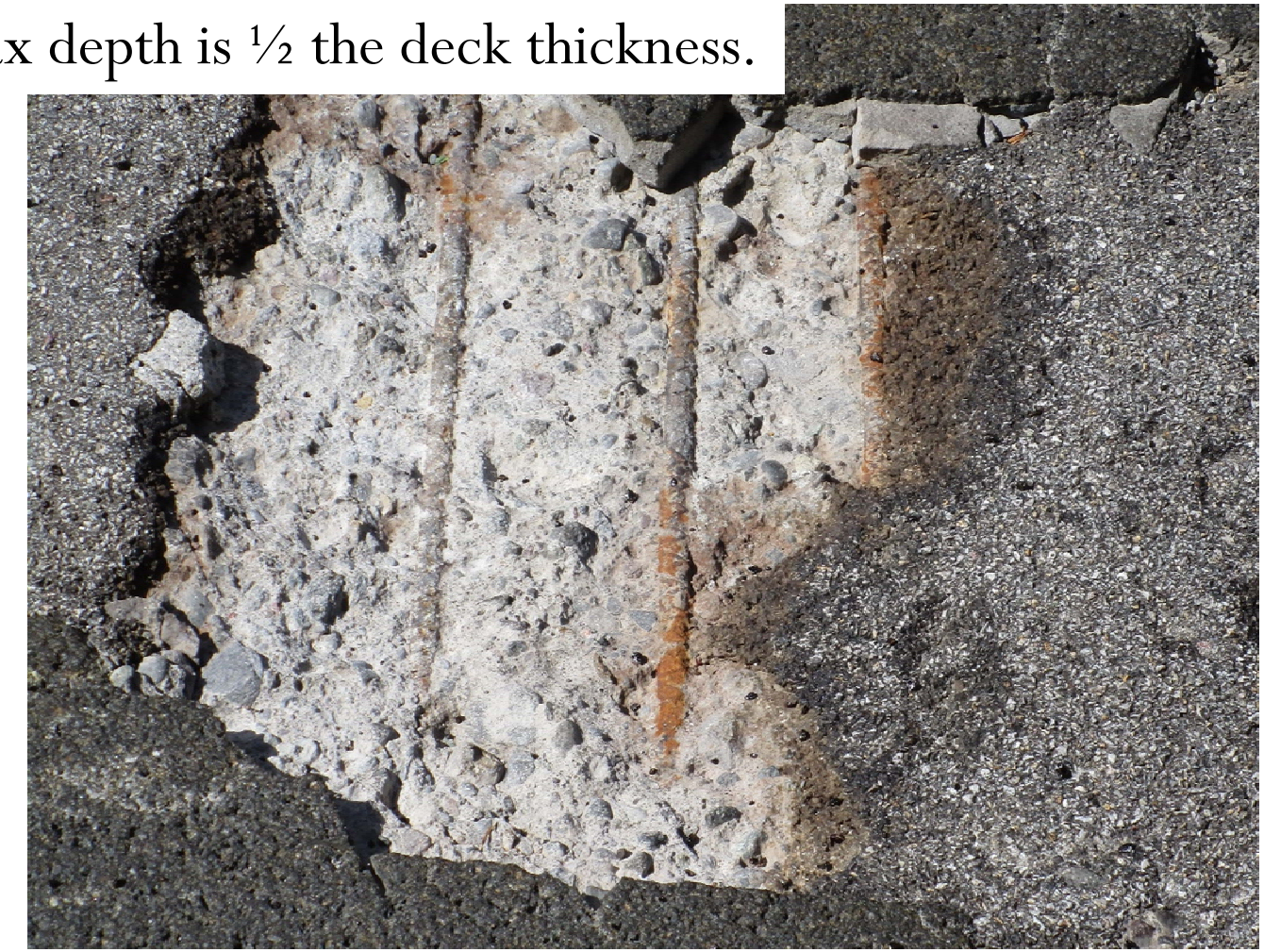
Overview

- Terminology
- Locating Repair Limits
- Selecting a Material
- Patching a Bridge Deck
- Patching Vertical and Overhead Surfaces

Class II Deck Prep

- Max depth is ½ the deck thickness.



Class III Deck Prep

- Full Depth Path

Class I, II, and III Deck Prep

- Class I (Surface Only) – Roughen and clean deck surface only.

Terminology: Spall

Terminology: Map Cracking & Efflo

Terminology: Delam

Selecting a Repair Material

- Literally 100's of products to choose from!

- ODOT Qualified Products List
  - https://www.oregon.gov/ODOT/Construction/Documents/qpl.pdf
  - Currently 41 approved products

- Word of mouth – Network with others to see what works for them.

Selecting a Repair Material

- What's the work window?
- What's the weather?
- What's the size of repair?
- What's being repaired?
- Product cost?

Patching Product Categories

- Cementitious
  - Most Common
  - Lots of admixtures
  - Doesn't require dry concrete
  - Careful with very high early strength. Harder isn't better!
  - Water cure to avoid cracking.

Patching Product Categories

- Polyester Polymer Concrete (PPC)
  - High strengthen but softer than traditional concrete
  - Can return to traffic very quickly.
  - Use caution with deep patches

Patching Product Categories

- Magnesium-Alumino-Liquid-Phosphate Concrete (MALP Concrete)
  - Chemically bonds to adjacent concrete and steel
  - Doesn't require sand blasting
  - Sets in 5-10 minutes

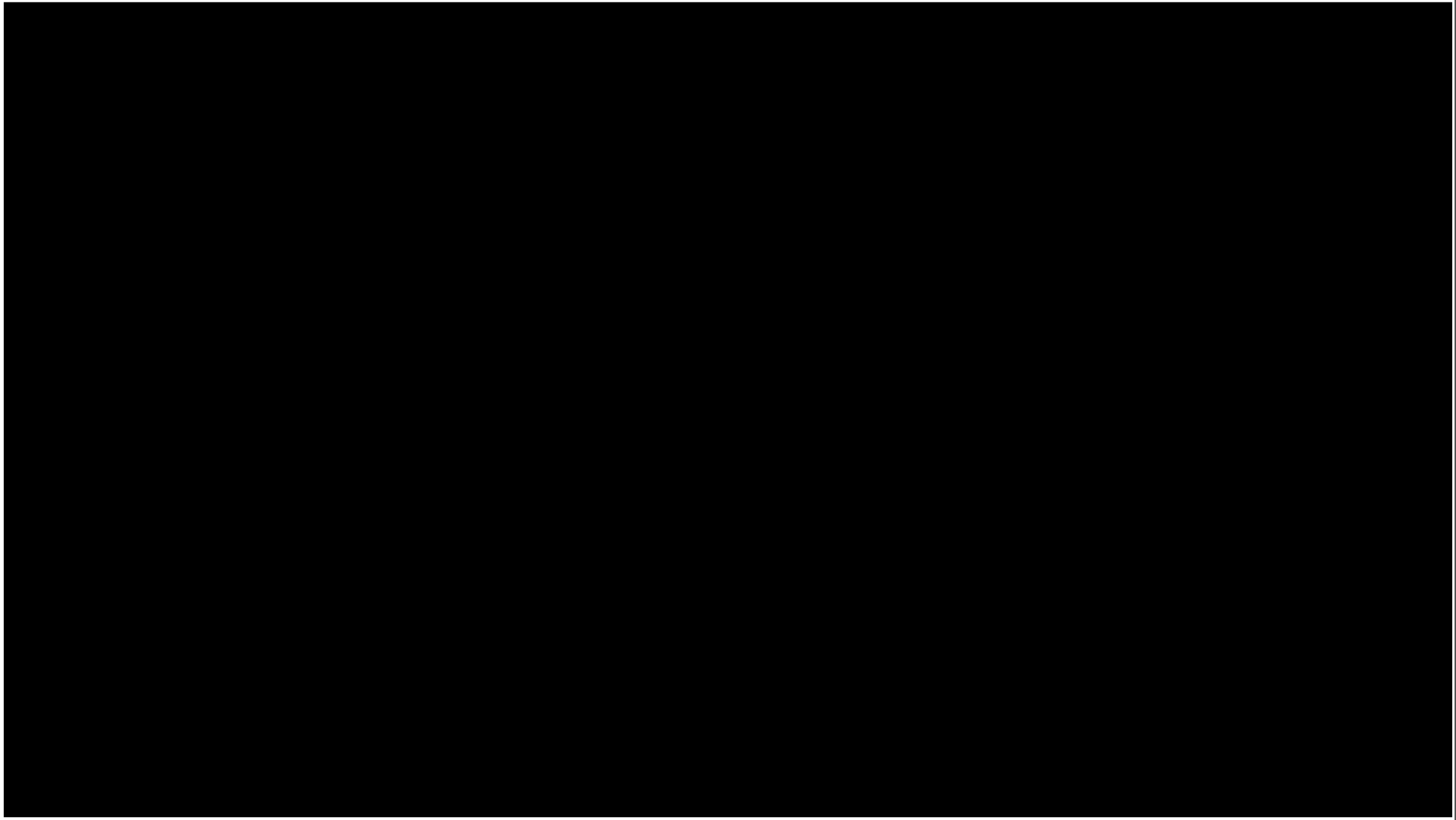
Patching a Bridge Deck

1) Locate Limits of Repair
2) Saw cut the perimeter
3) Chip out poor concrete
4) Clean exposed rebar
5) Apply primer (if required)
6) Mix and place patching material
7) Open to traffic

Mark out the Limits

- Need to sound the concrete to see what is spalled beyond what you can see.
- Try and square off corners.
- Avoid odd shapes with tight corners.
- Need to get edges of patch into sound concrete.

Sounding: Chain Drag Video

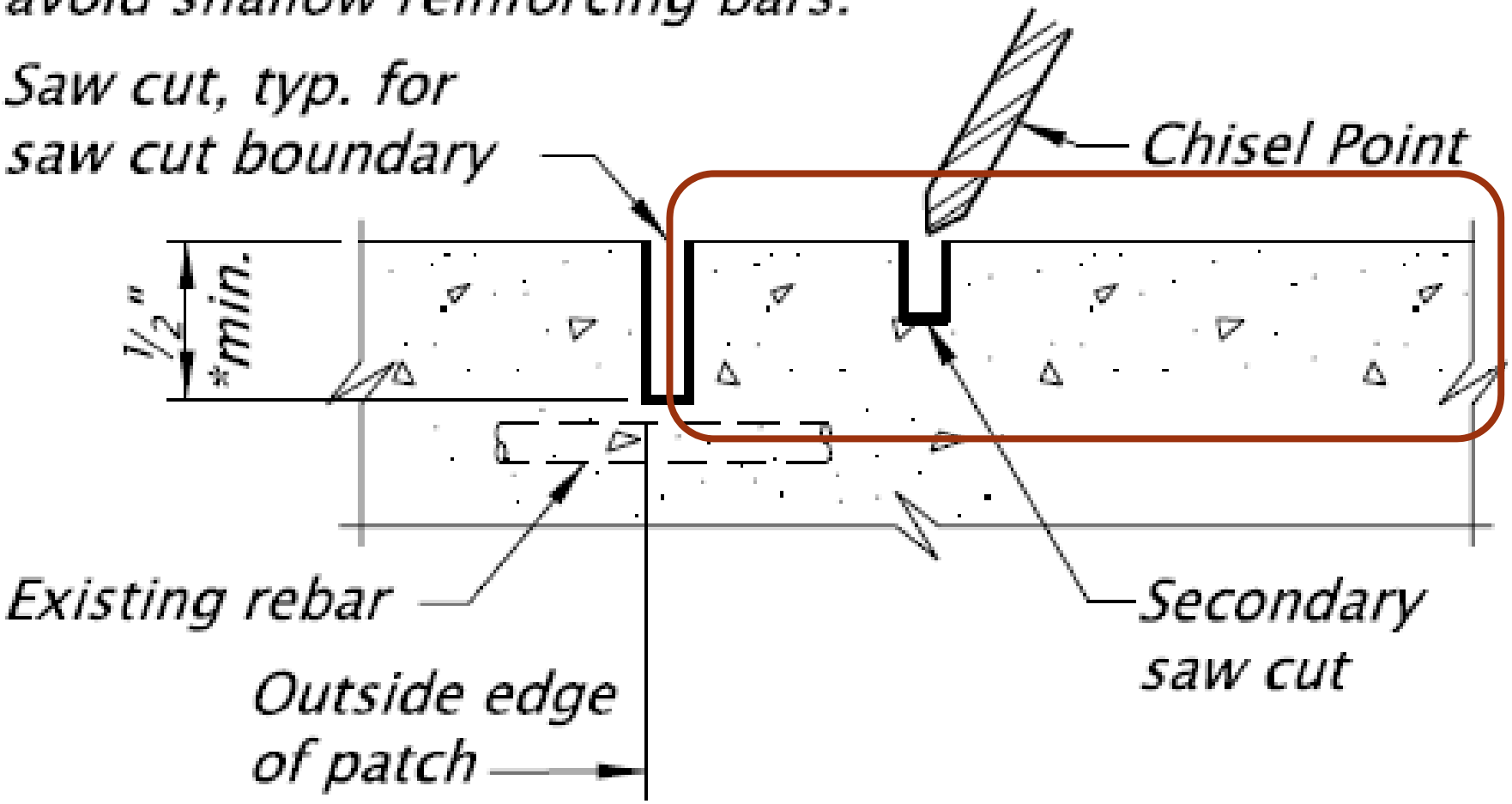


Hammer Sounding of Concrete Superstructure

Saw cut Perimeter

NOTE:

Less than ½" deep saw cut to avoid shallow reinforcing bars.



Chip to Sound Concrete

- Bigger isn't better! Smaller chipping tools take longer but causes less damage to adjacent concrete.
- 15lb max per ODOT Spec

Clean Rebar

- ODOT recommends sand blasting
- Leaving rust behind can cause the patch to fail quickly
- Consult engineer if heavy section loss is discovered

Good Prep Example:

- Full depth edges
- Good square shape
- Concrete removed ¾" min. below exposed rebar.

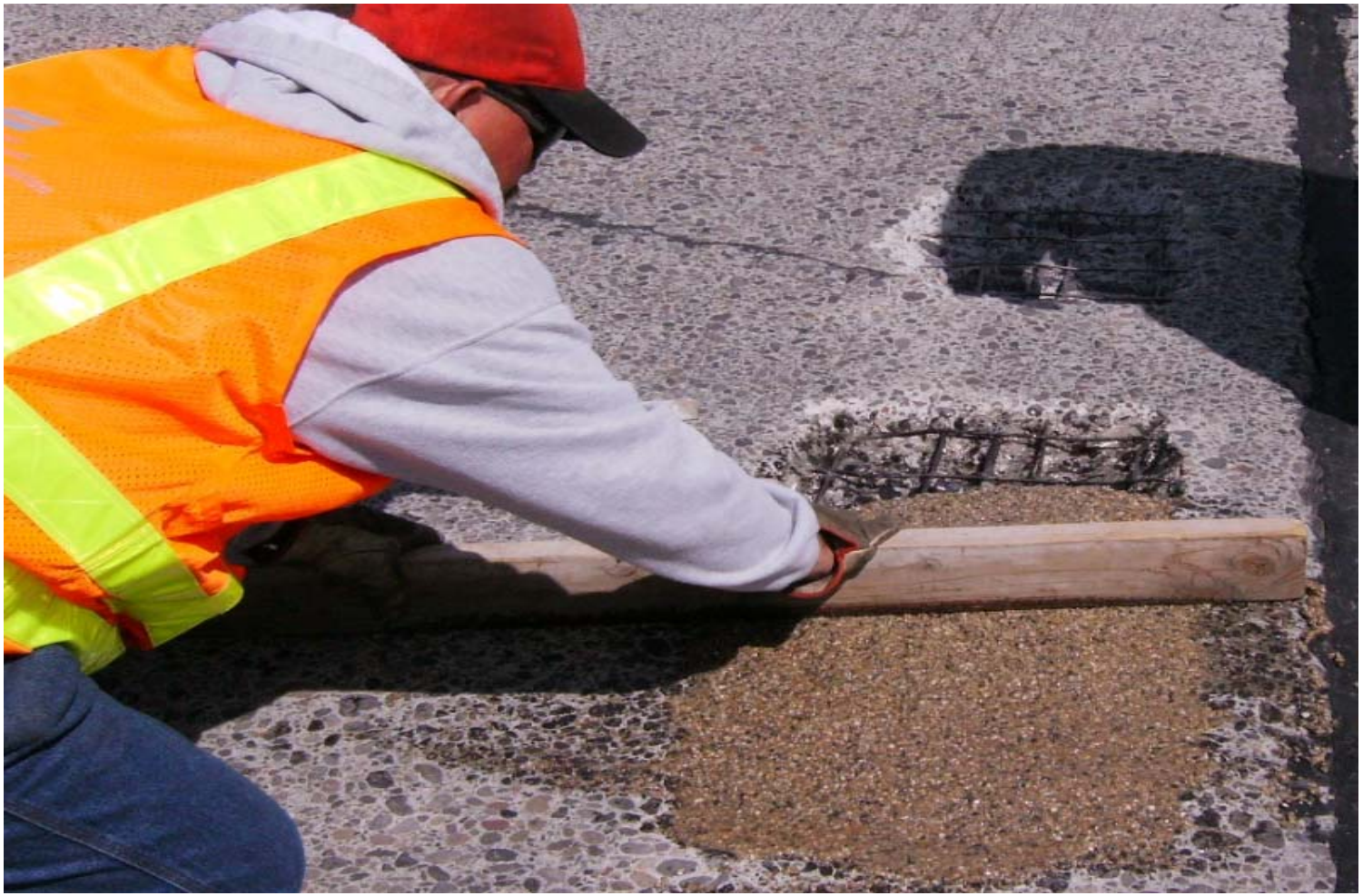
Install Anodes “Hockey Pucks” (Optional)

Follow Manufacturers Mixing and Placing Instructions

- Can feel like a science experiment.
- Errors in measurement can cause early failures.

Trowel Material

Screed to grade



MALP Concrete Placement Video

Overhead and Vertical Repairs:

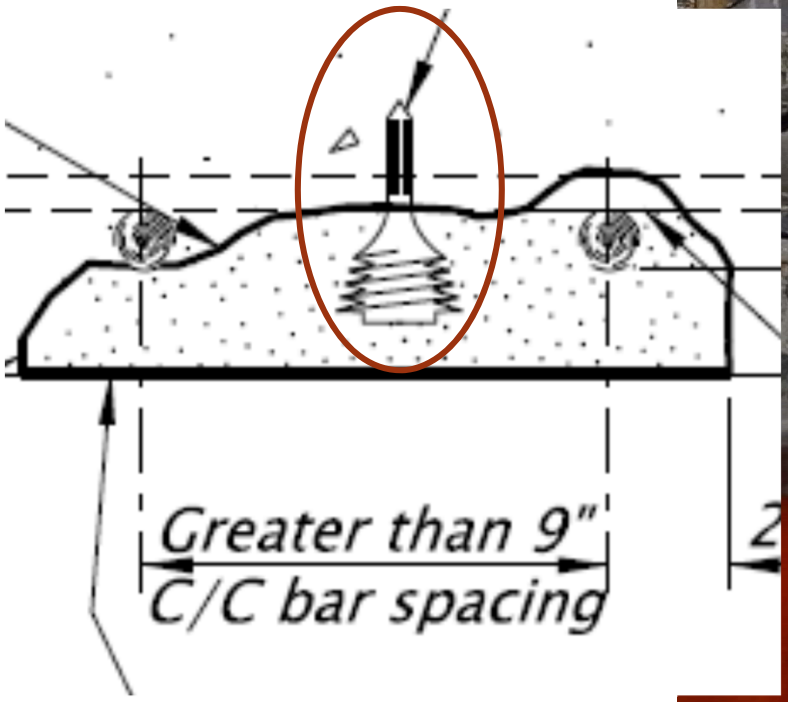
- Requires some special consideration.
- Much harder to get a sound patch.
- Sometimes it's better to not patch

Is Shoring Required?

Limit Removal

Limit Removal

Dry wall Anchors in Concrete?



Trowel Applied

- Trowel Applied when spalls are minor (<2" Deep)

Form and Pour (Large Repairs)

Form and Pump

The No Patch Repair (Epoxy Paint)

- Clean steel and coat with epoxy paint.
- Useful when the rebar has minimal cover.

Epoxy Paint

Temporary Repair: Cold Mix

Questions?