

Lightweight Concrete Delamination: Causes, Identification, Repairs, and Solutions

ACI Session: Honoring Bruce Suprenant

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What Makes a Suprenant??



What Makes a Suprenant??






Magnum Ph.D.

What Makes a Suprenant??





You need to have more tolerance for these situations

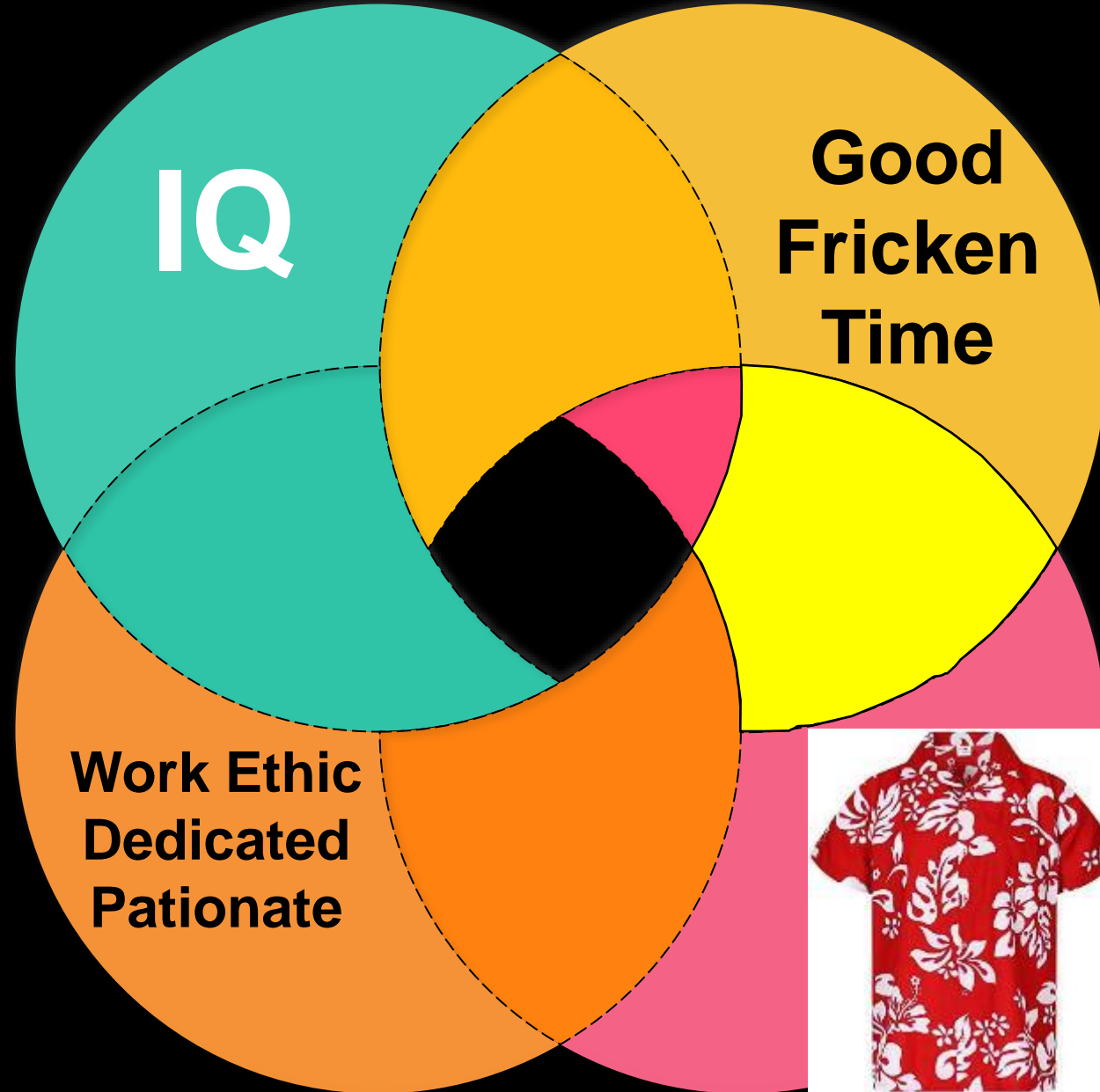


Genius

What Makes a Suprenant??



What Makes a Suprenant??





What Makes a Suprenant??





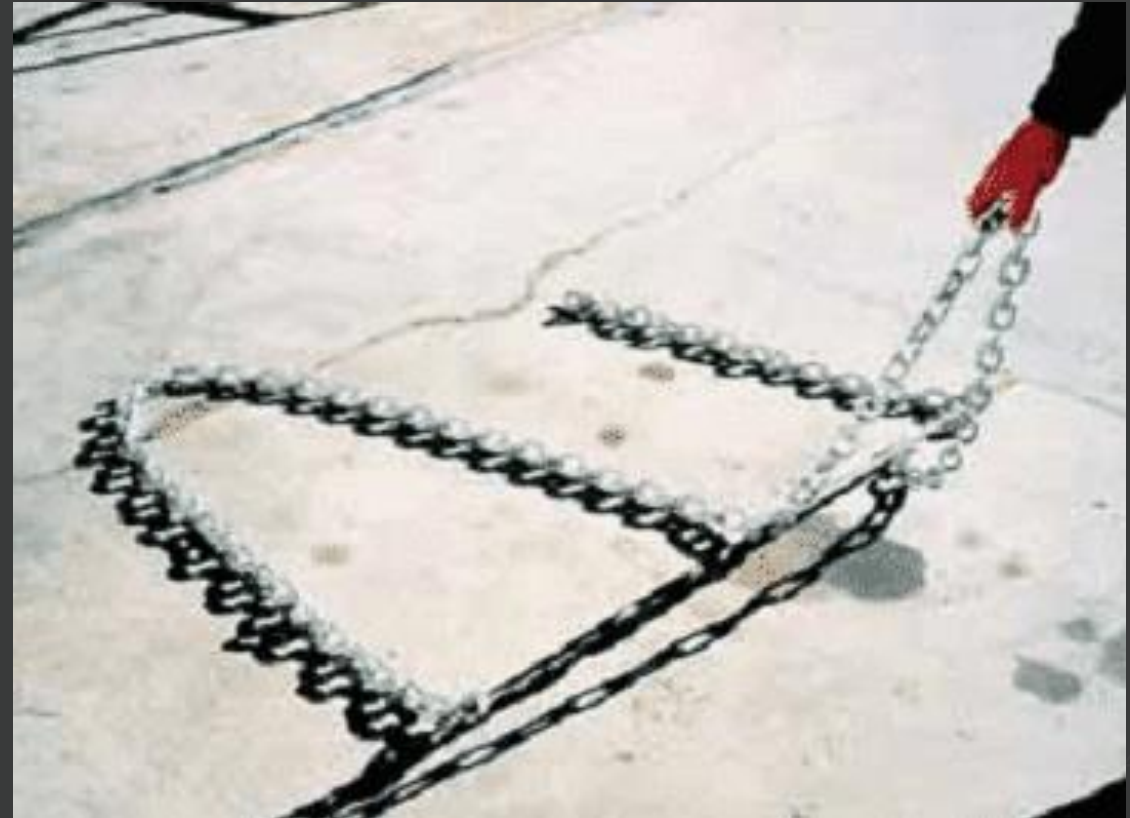


Source?

- Usually due to:
 - Trapped bleed water
 - Finishing air entrained concrete

Identification – Chain Drag Analysis

- ASTM D4580 – Standard Practice for Measuring Delaminations in Concrete Bridge Decks
- Procedure B – Chain Drag



Identification – Chain Drag Analysis



Core To Investigate The Source of Delamination





CM 1 2 3 4 5 6 7 8
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INCH 1 2 3

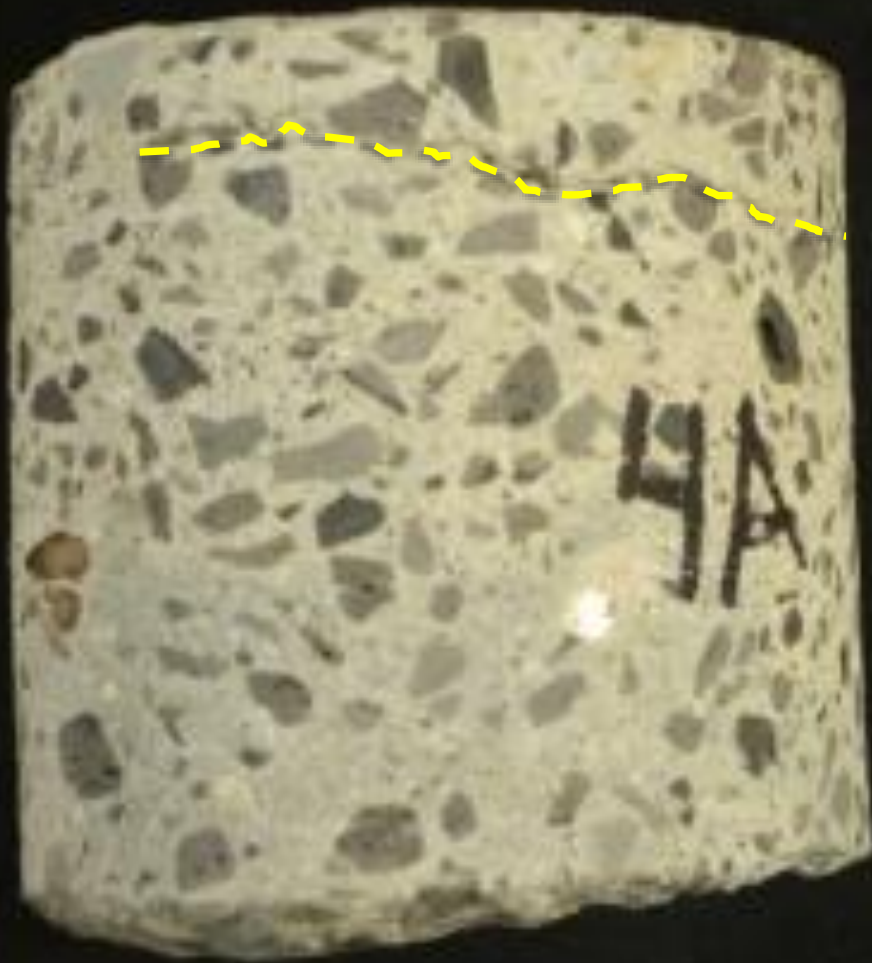


Normal Weight Concrete Delamination

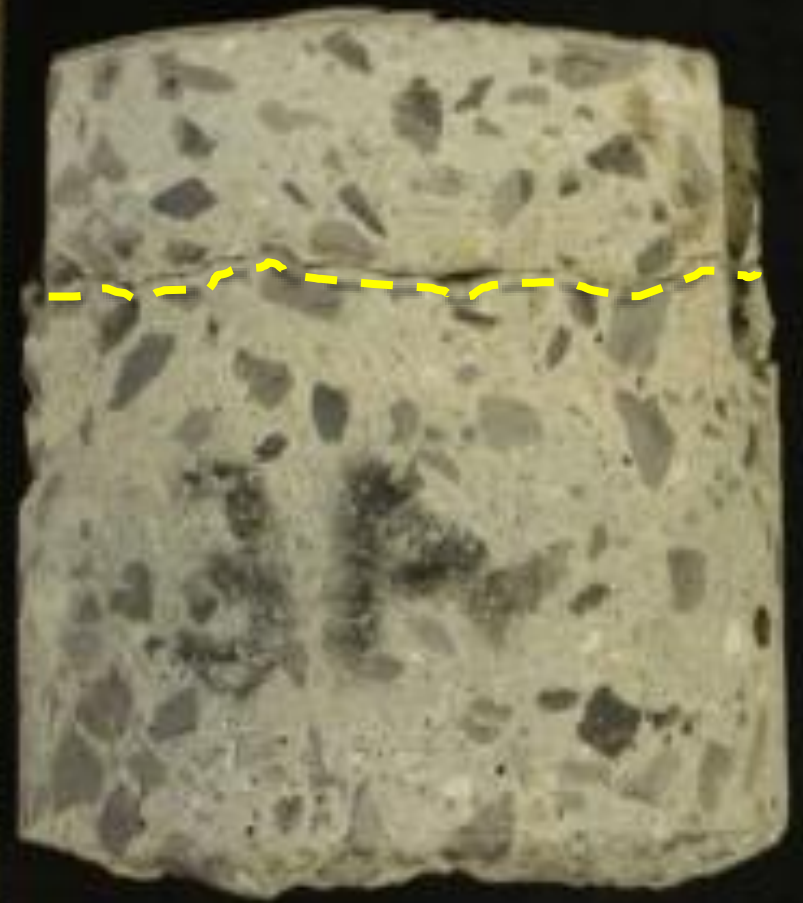


Lightweight Concrete Delamination

Profile of Core



Profile of Core



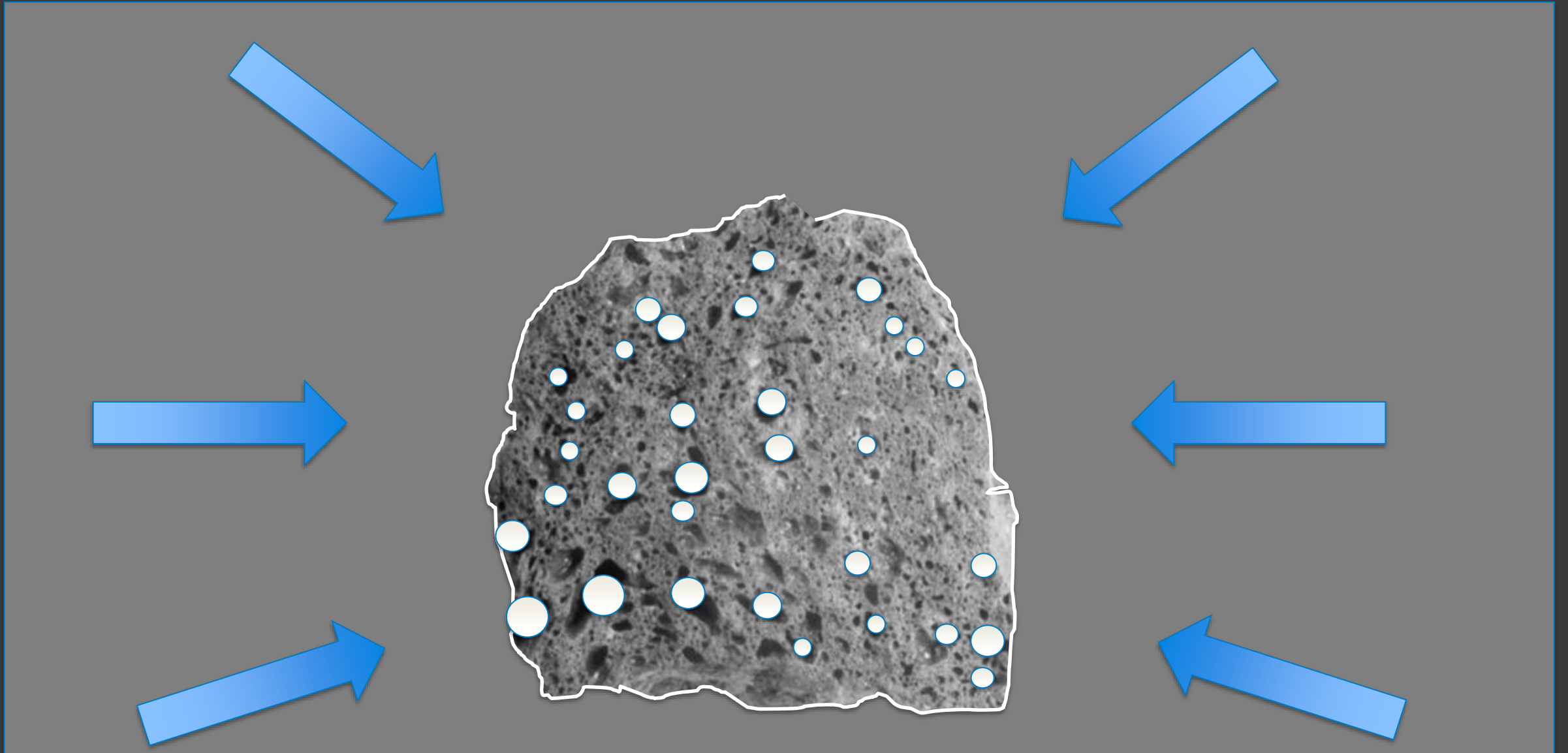


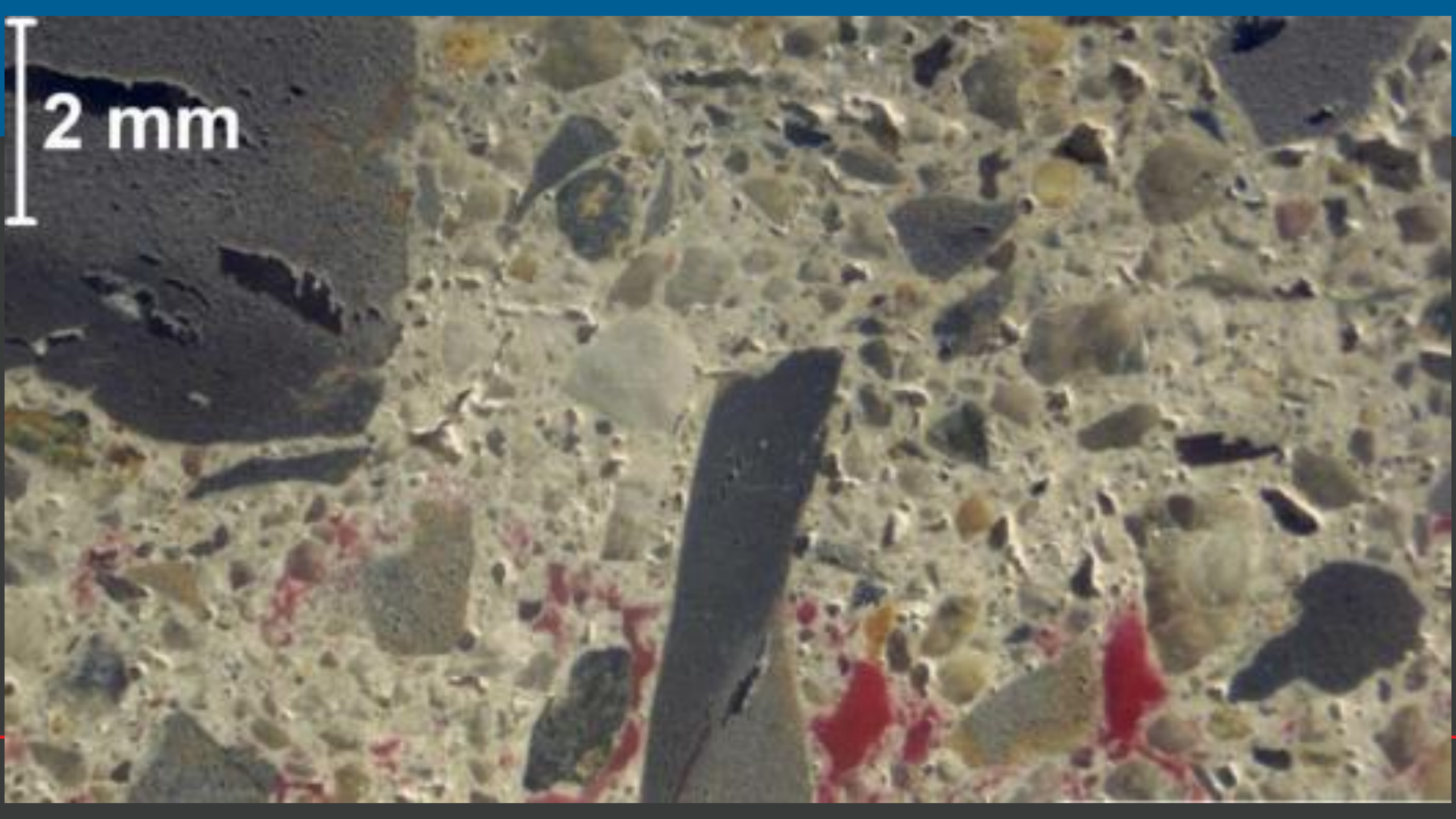




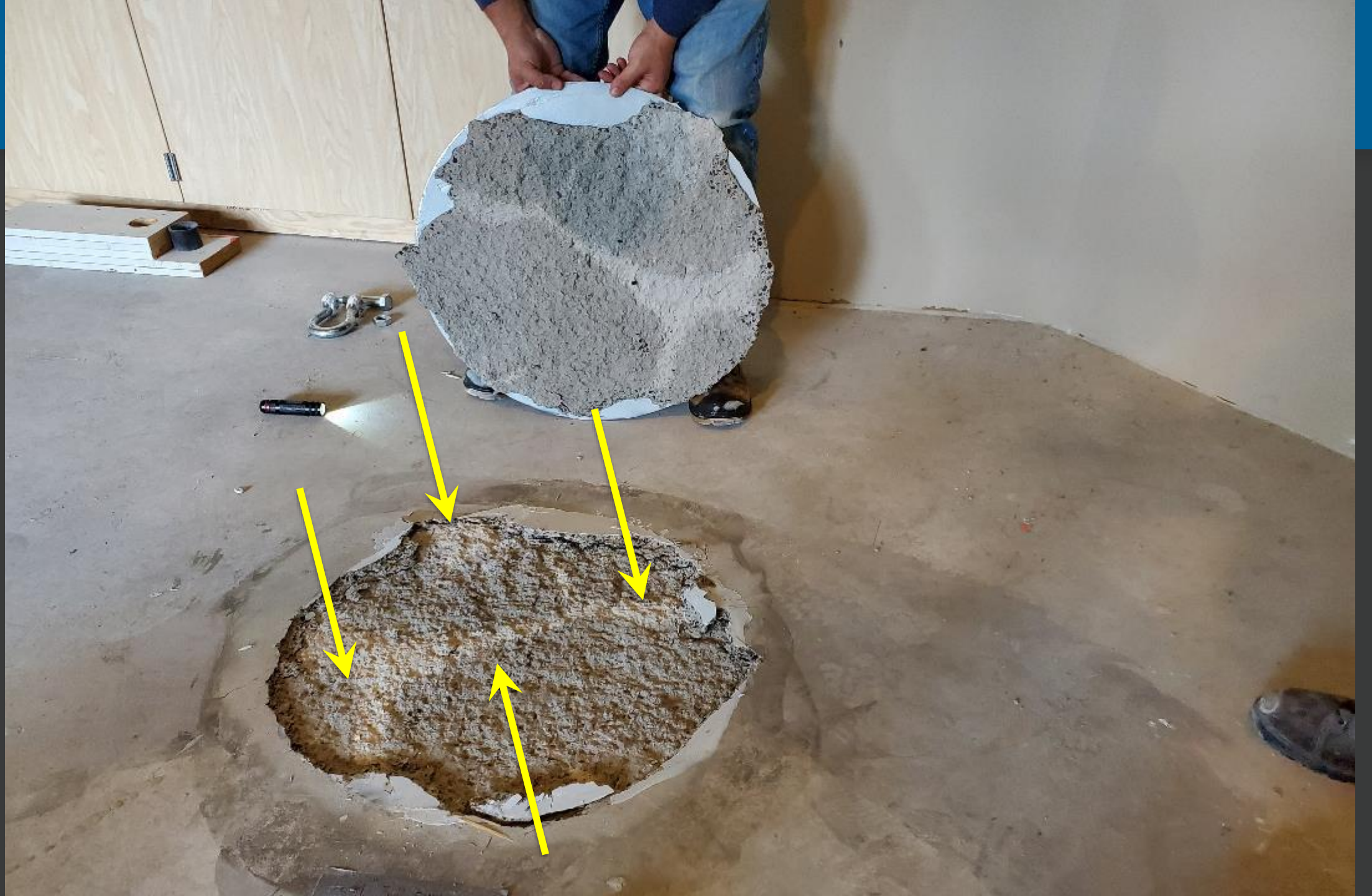


Undersaturated Aggregate – Adds Entrapped Air





2 mm





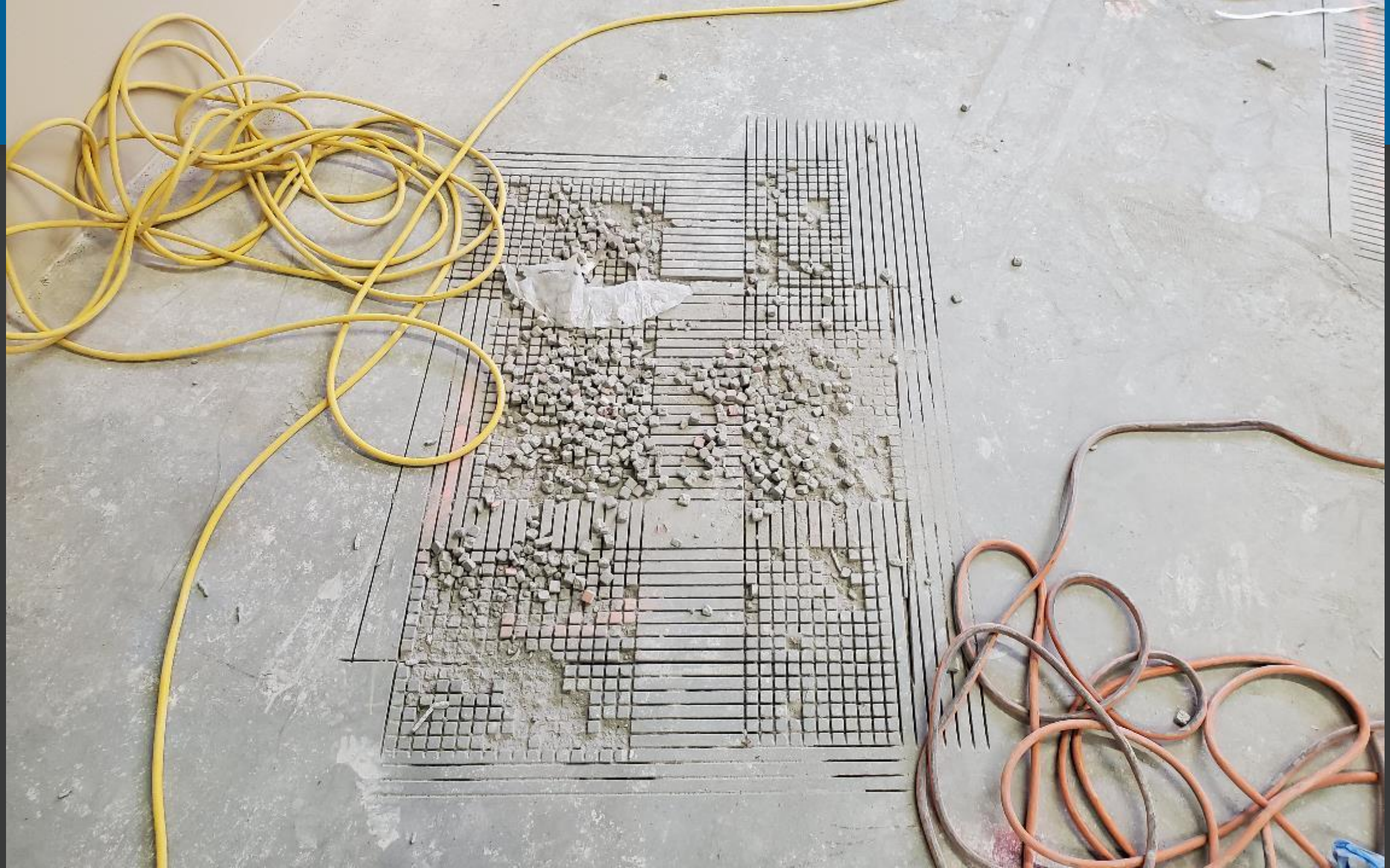




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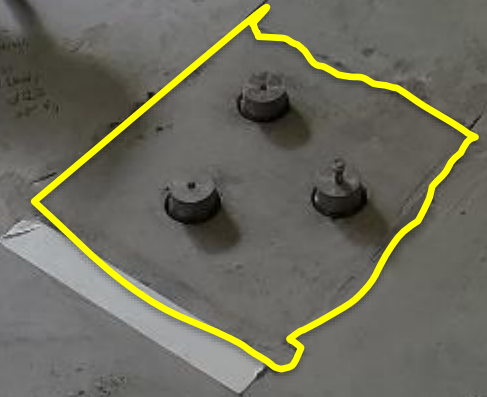
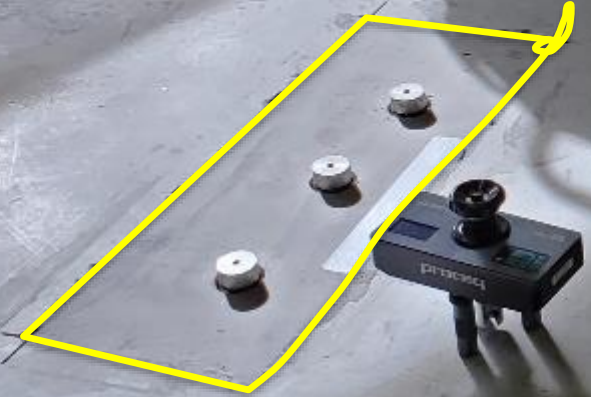
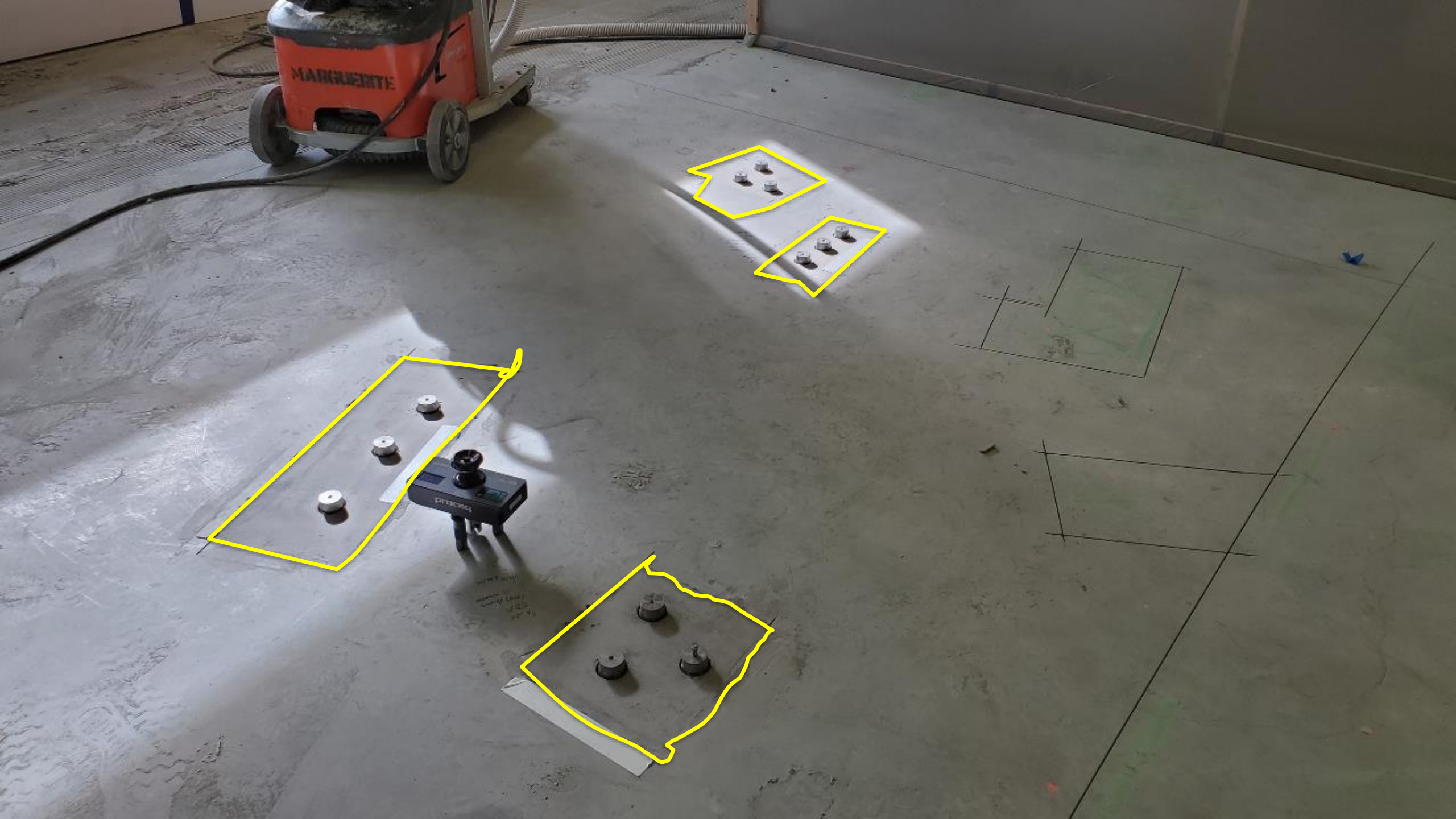


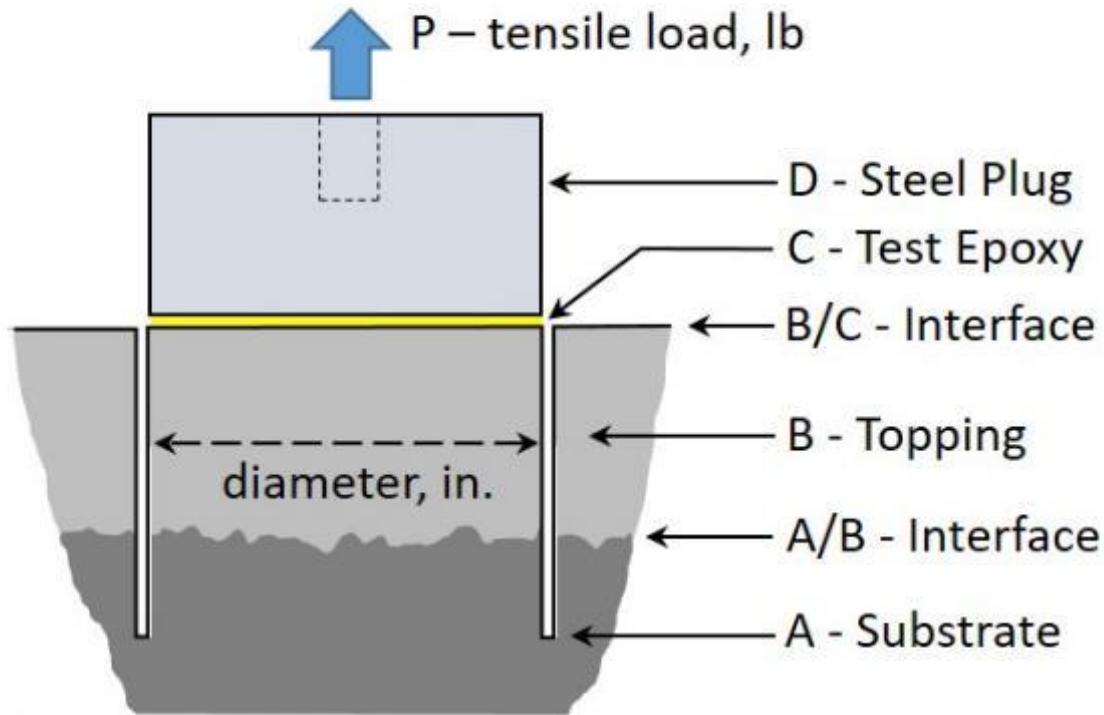








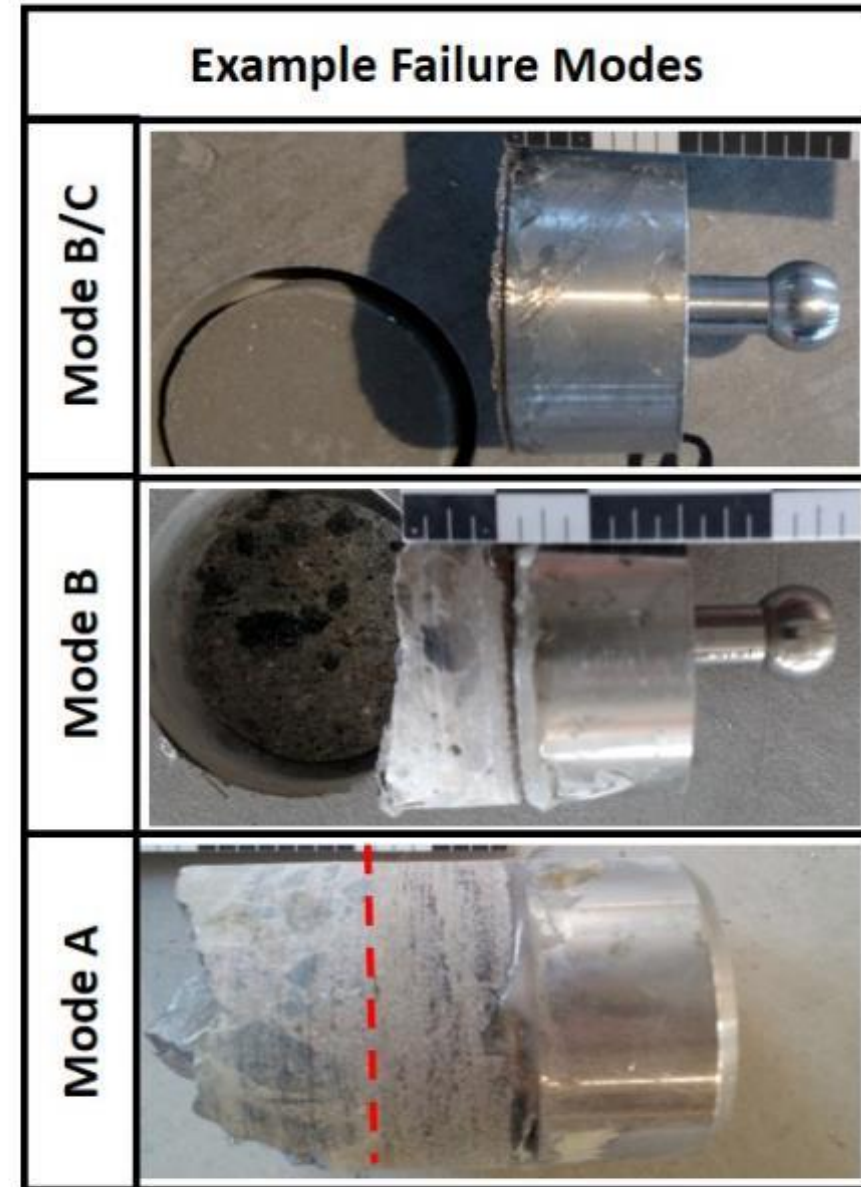




- A – Cohesive failure in the concrete substrate
- A/B – Adhesive failure between the substrate and topping
- B – Cohesive failure within the topping
- B/C – Adhesive failure between the topping and test epoxy
- C – Cohesive failure within the test epoxy
- C/D – Adhesive failure between the test epoxy and steel plug

Note:

In some instances, a failure will occur in more than one of the planes described above. In such an instance, each failure plane is noted and the percent of surface covered by each failure mode is estimated and reported.



Additio



QUESTIONS??