

Joint Deterioration

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The problem?

- Some joints are deteriorating faster than we would like
- We are not sure why



What can be causing it?

- Chemical
- Mechanical
- Frost



Chemical?

- ASR
- Sulfate
- Doubt it



Mechanical

- Narrow
- Shallow
- Crescents



Mechanical

- Early age



Mechanical

- Pretty stable



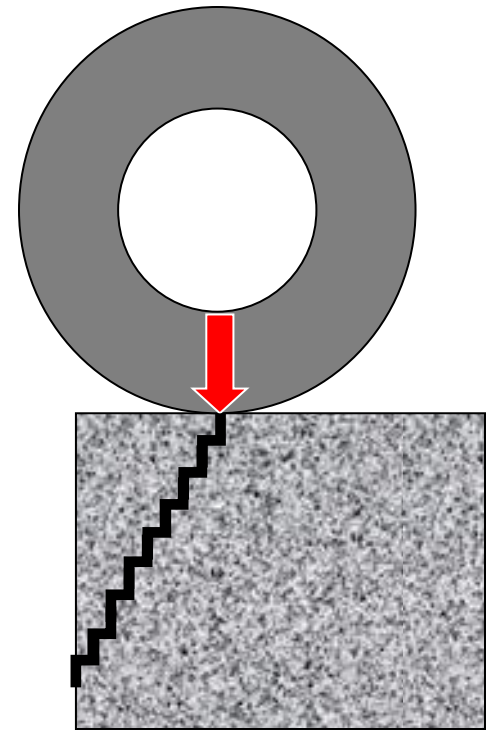
September,
2009



September,
2010

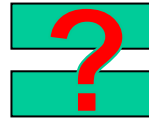
Mechanical?

- Traffic
 - Unlikely – stress is $\sim 50\text{psi}$



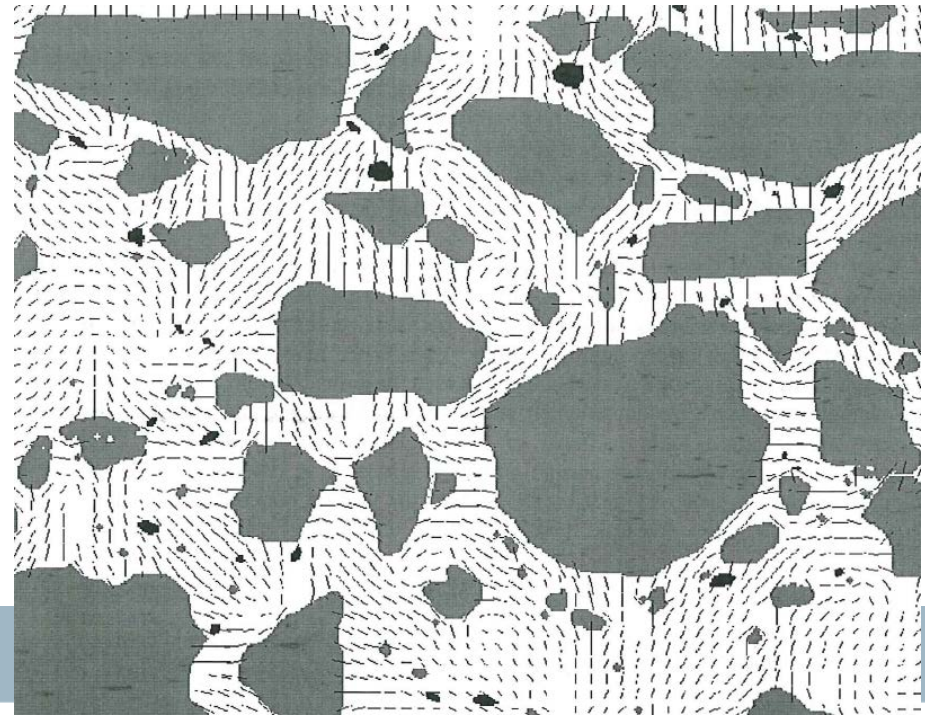
Mechanical?

- Sawing
 - Maybe



Mechanical

- How do we investigate?
 - Saw up a slab and re-create it
 - Model stresses in paste



Frost

- Common features
 - Marginal air
 - Abundant water
 - Deposits in air voids





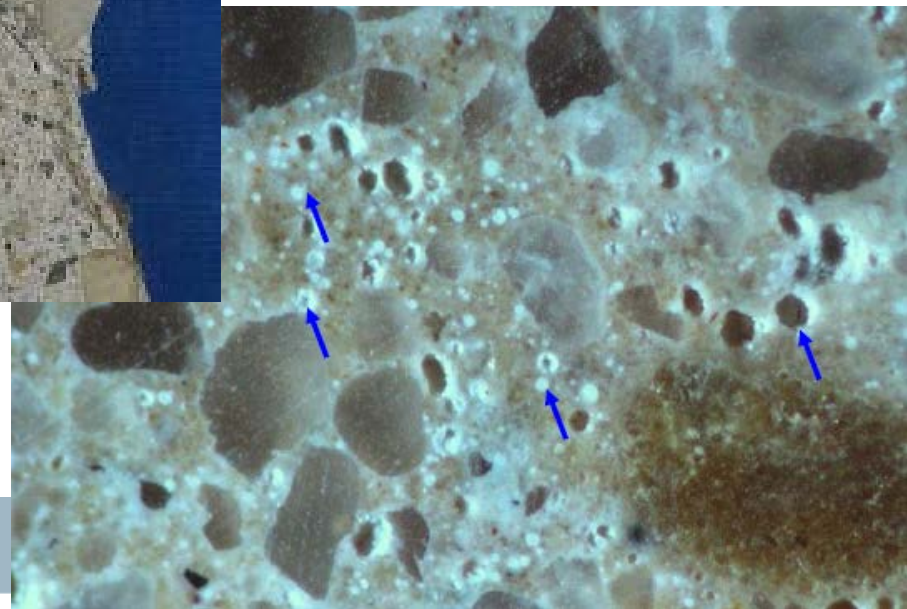
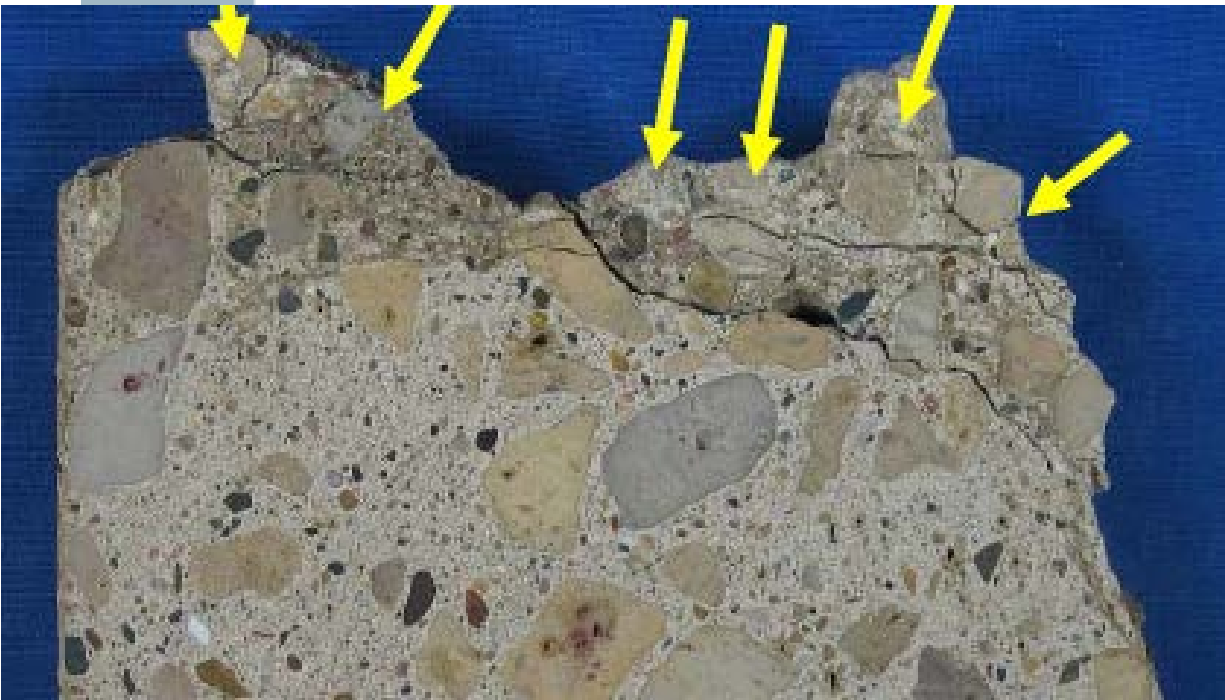
Frost

- Trapped water

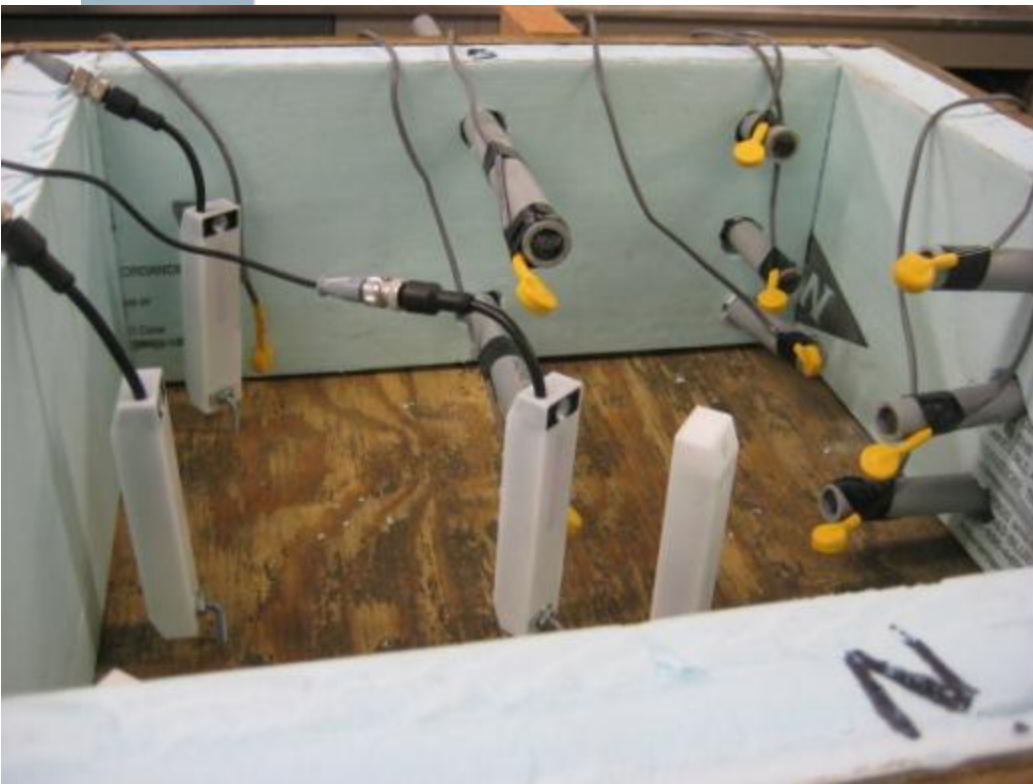


Frost

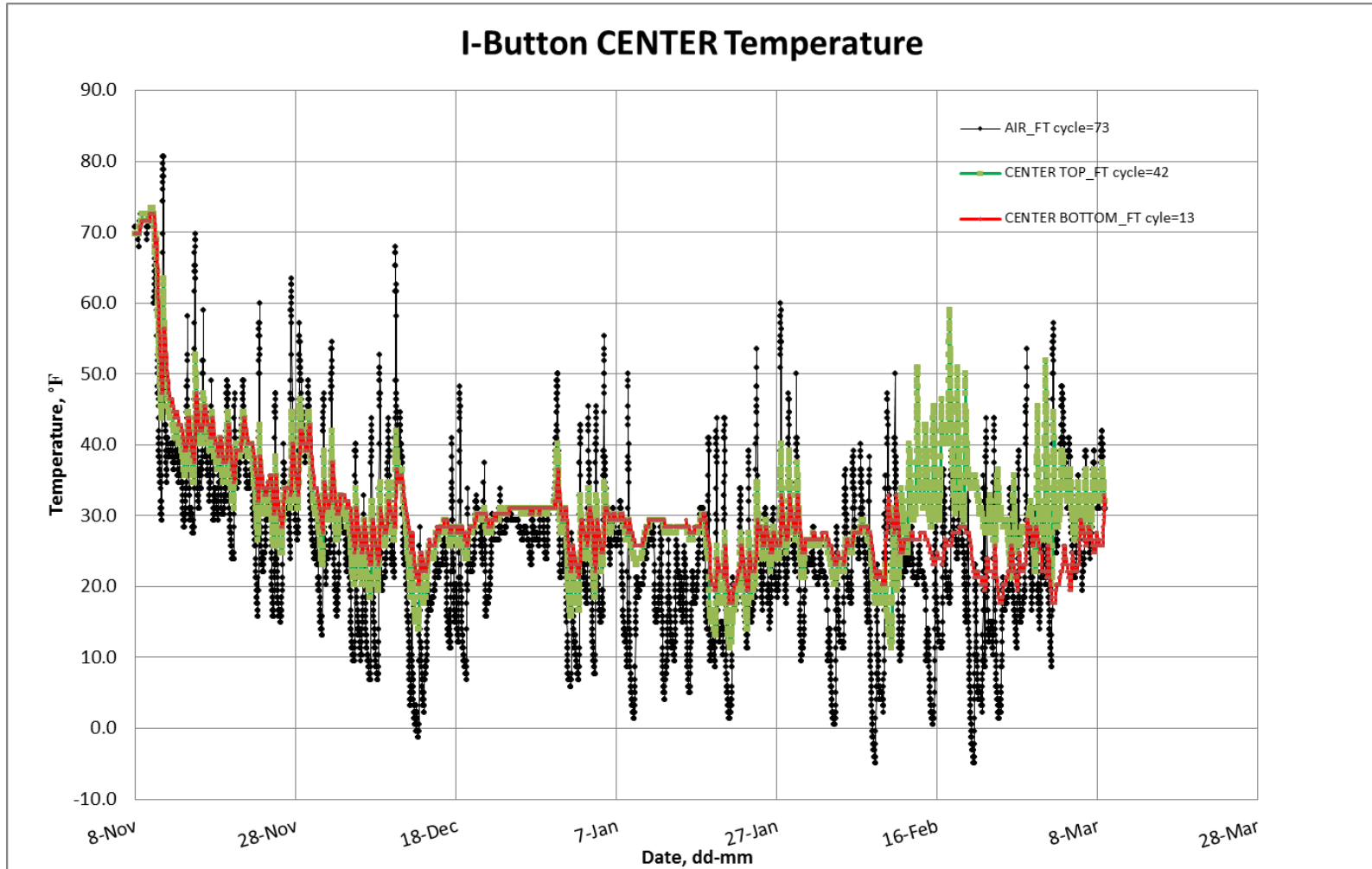
- Trapped water



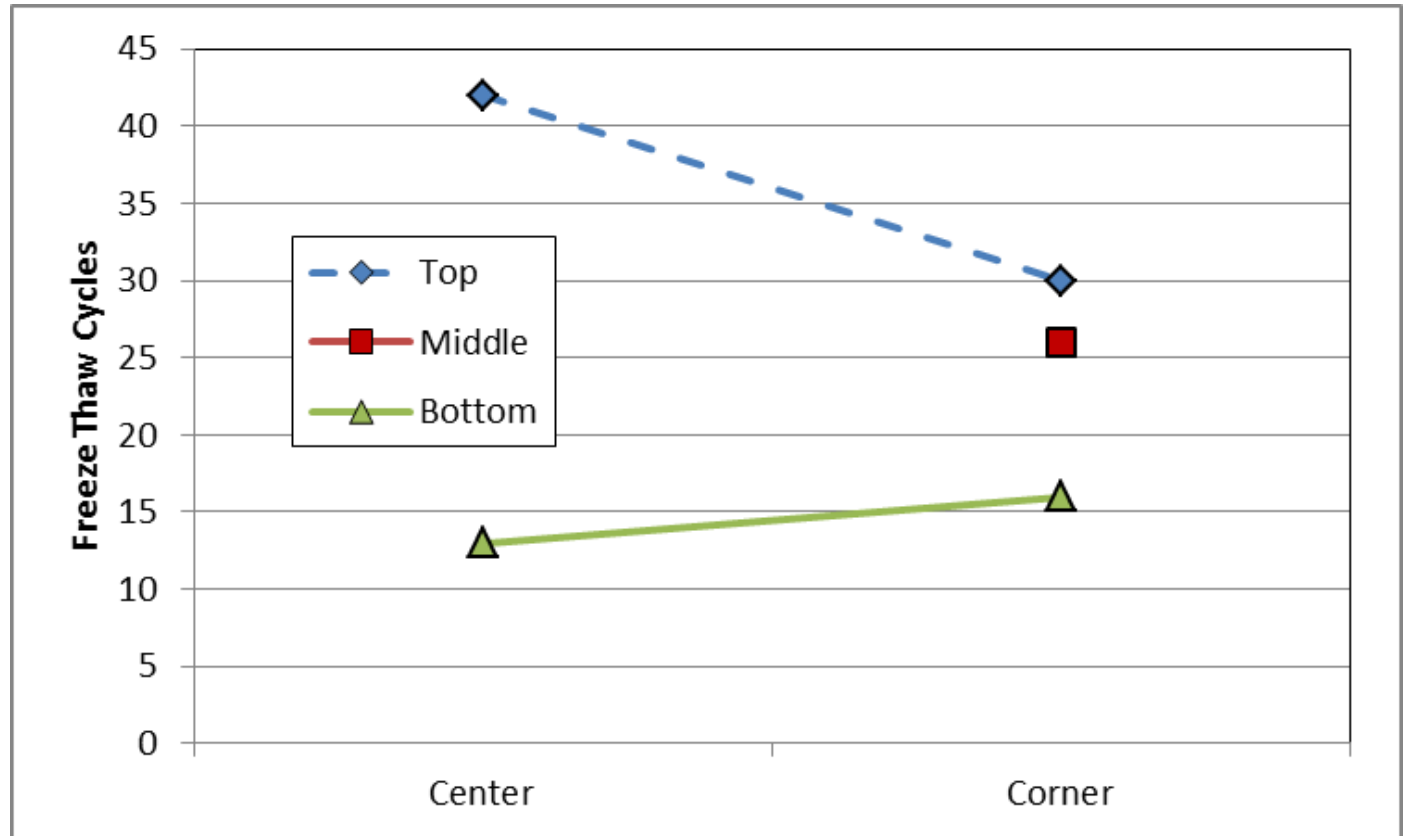
Test Slab



Test Slab



Test Slab



What advice can we give now?

- Allow water to leave
- Pay attention to air void system & w/c
- Sawing workmanship
- Seal existing?



Future Tasks

Work in collaboration with Purdue and Michigan Tech

- Questionnaire
- Sampling and testing from field
- In-situ sub-base permeability
- Tests on Sealants
- Look at influence of sawing
- Effect of gradation on stress at corner



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