Virginia Concrete Conference
Lessons Learned

March 9-10, 2006

Coliseum Central Highway Improvement Project (CCHIP),
Interstate 64 @ Mercury Blvd.

by

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Project Basics

2.5 miles I-64 –
avg 10 lanes wide,

- **26.5 lane miles Mainline**
- **3.8 lane miles Ramps, Loops, Flyovers**
- **4.8 lane miles Mercury and Magruder Blvds.**
- **35.1 total lane miles**

170,000 ADT on I-64

66,000 ADT on Mercury Blvd

I-64 Coliseum Central Challenges

ISSUE

1. Design Flaws

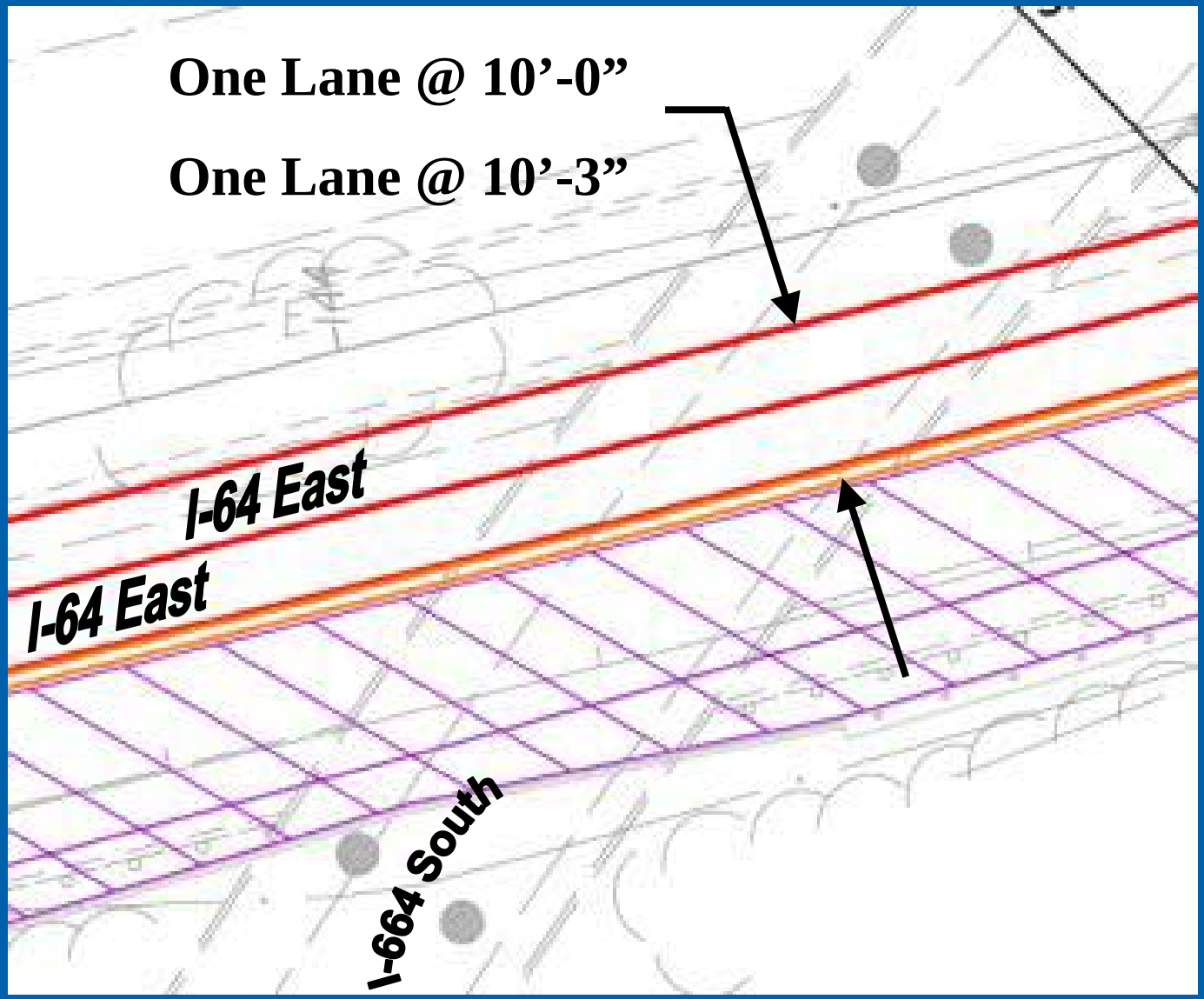
2. Contract Specification Omissions

3. Contractor Means and Method

4. No field decision-making authority for VDOT

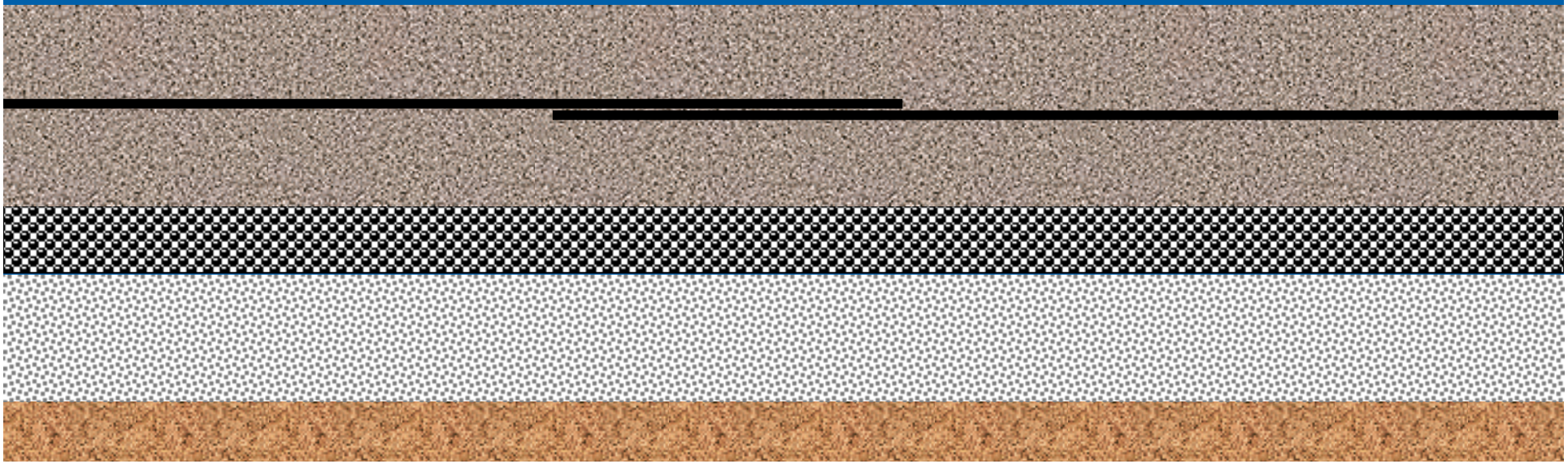
No MOT Issues Yes MOT Issues

Design Change



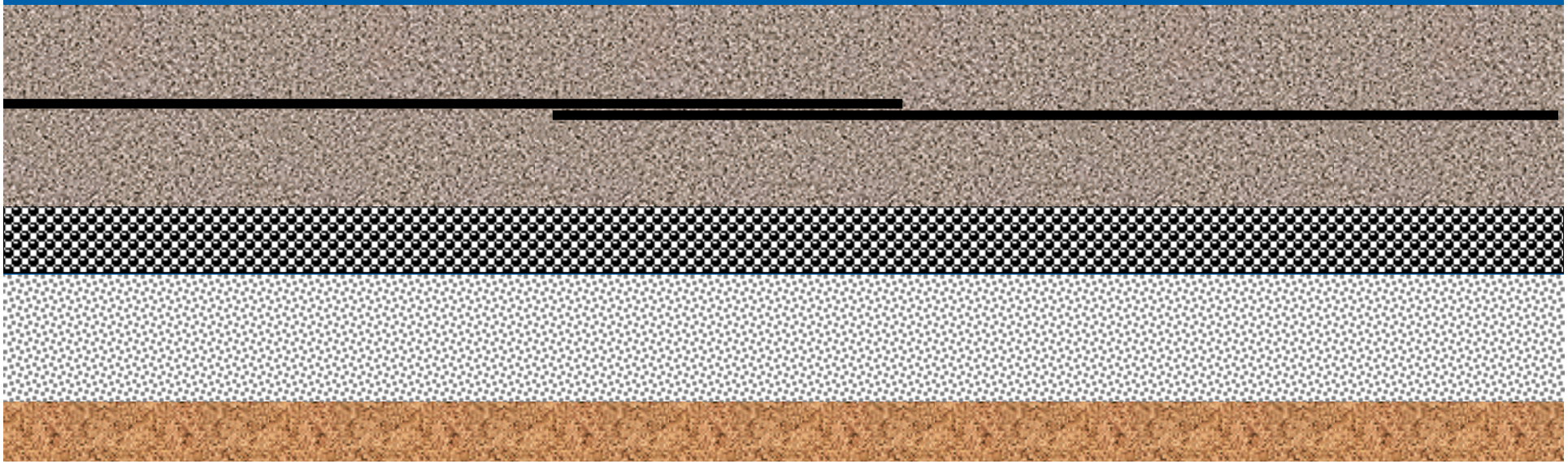
Basic Section for I-64

Concrete	11 inches (275mm)
OGDL	3 inches (75mm)
CTA	6 inches (150 mm)
Subgrade	



Spec Book Tolerances

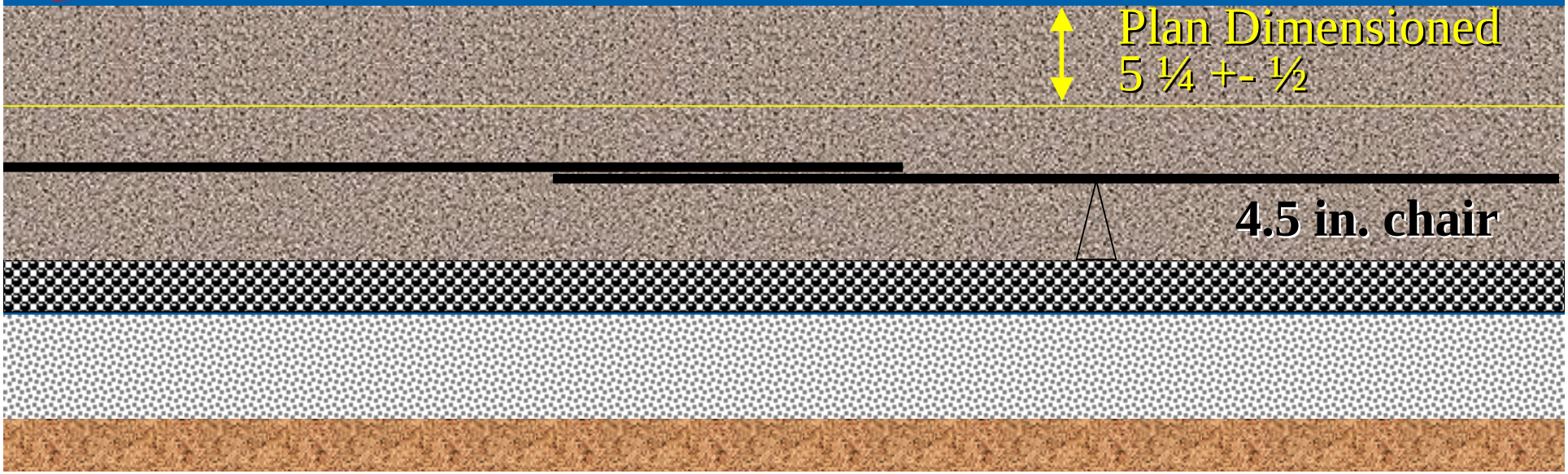
Concrete	Up to 1 inch short = $ penalty
OGDL	-0.6 in. < t filled w/ next layer; no $
CTA	-1 in < t < +1 in
Subgrade	+/- 0.4 inches (10mm)



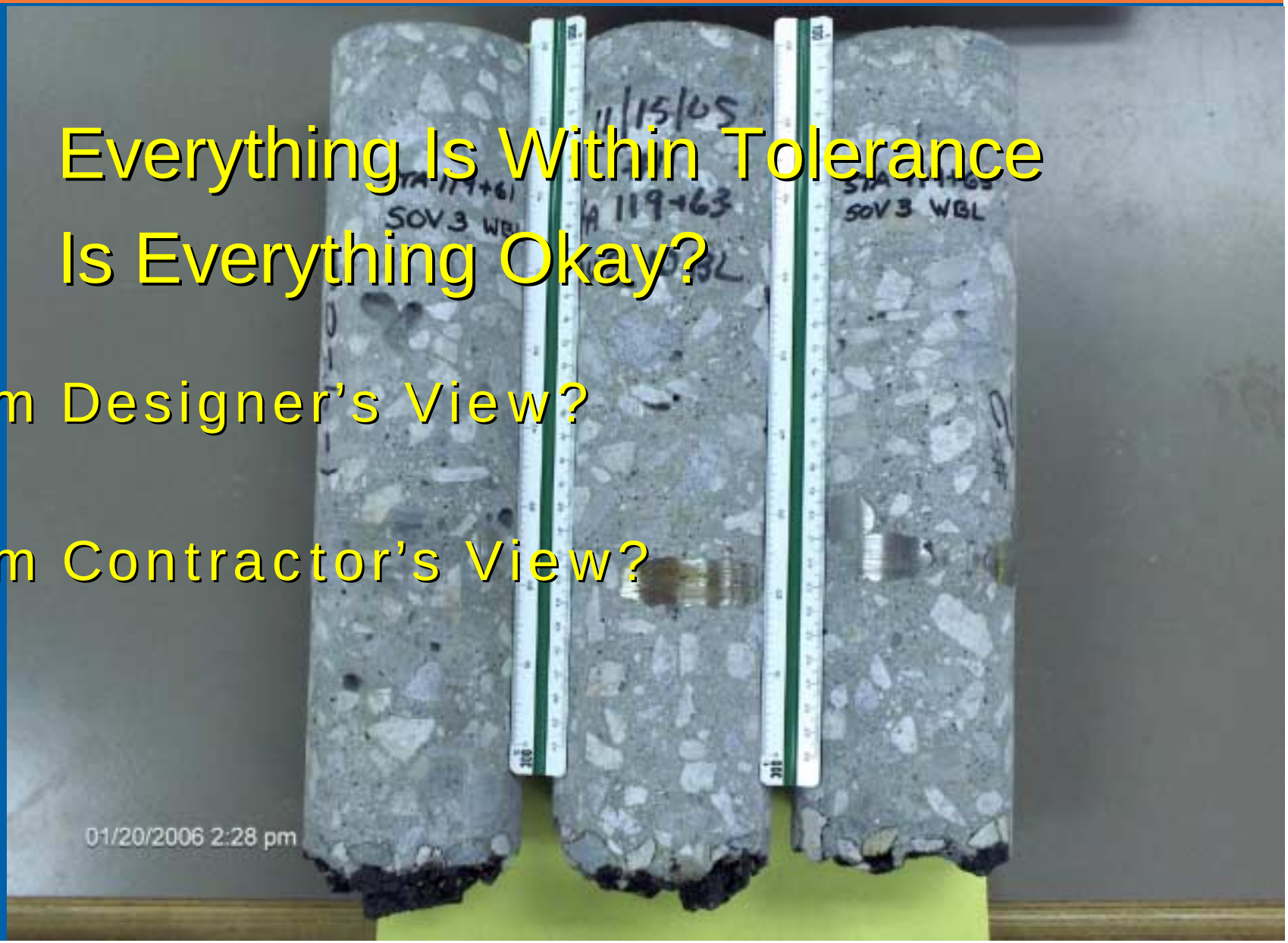
As Constructed

Concrete	Up to 1 inch short = $ penalty
OGDL	-0.6 in. < t filled w/ next; layer no $
CTA	-1 in < t < +1 in
Subgrade	+/- 0.4 inches (10mm)

Finish Grade = ? but elev of rebar = ?



From Inspector's View?



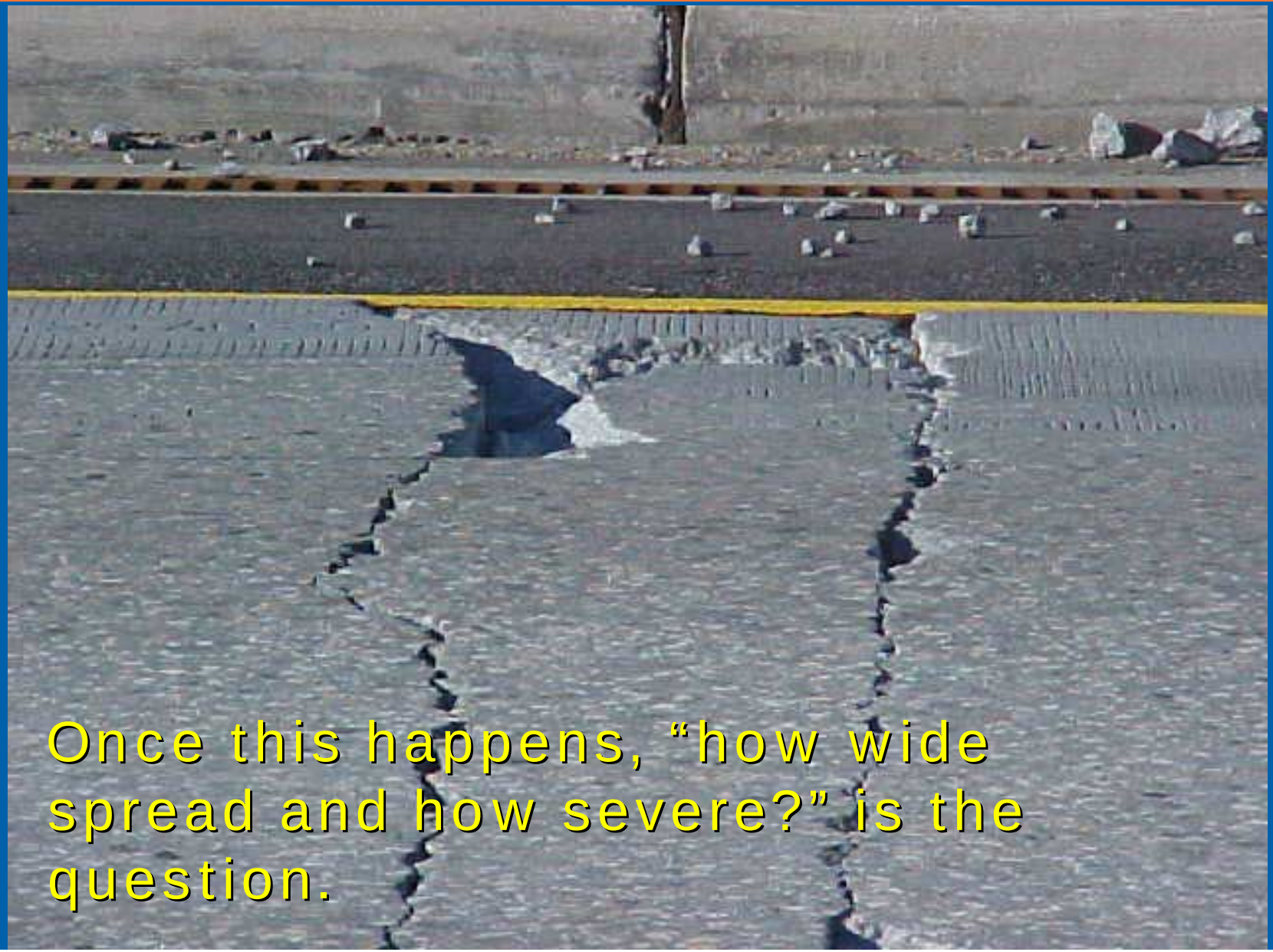
Everything Is Within Tolerance

Is Everything Okay?

From Designer's View?

From Contractor's View?

Undesired Results for Everyone



How do you know before this?

- Cores (initial depth checks)
- Crack Behavior
  - Pre-Traffic
    - Transverse Cracks 3 Feet to 8 Feet Apart
    - Very Tight
  - After Traffic Loading
    - Additional Transverse Cracks
    - Still 3 Feet to 8 Feet Apart
    - Still Very Tight

Utilization of Available Technology

- Immediate Safety Concern
  - Under Traffic
  - Limited View from Two Lanes Away
- VDOT Video Logger
- Technician Review of “footage”
- Quick Review of Pavement w/o Interruption of Traffic

Non Destructive Testing

Falling Weight Deflectometer (FWD)

Non Destructive Testing

Falling Weight Deflectometer

Program of Testing

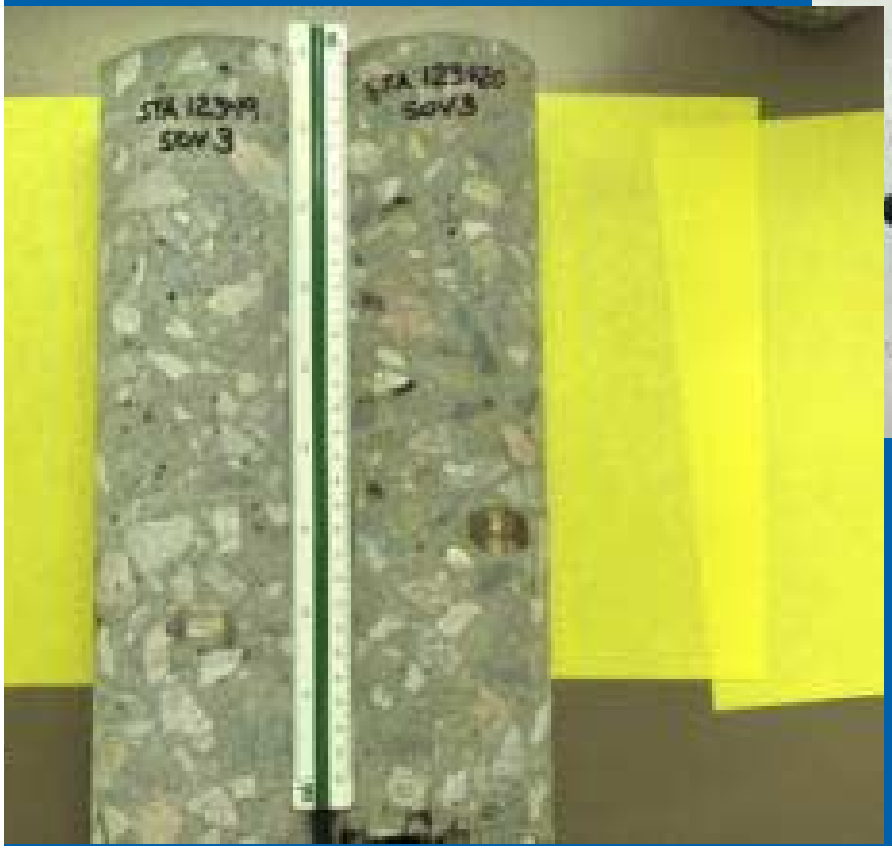
- FWD – Non-destructive Testing
- Testing Spacing Every 50 feet
  - Approximately 2 minutes per location
  - +/- 2 lane miles per night
- Coordinated with Inspector
  - Starting Location to Match a Station
  - Tracking/Mapping of Areas Tested
- FWD – Deflection Bowl Calculations

Analysis of FWD

- Test Results Identify Potential Weaknesses
  - Measures Deflections and Can Calculate Deflections per Layer
  - Results Provide Limited Areas to Review
- Review Crack Pattern and Core

SAMPLE CORES

Some Good



Some Not So Good

Repair Considerations

Designers, Material Engineers

Evaluation

- What Do Adjacent Crack Patterns Tell Us?
- Would The Cure Be Worse?

I-64 PROGRAM

- Walked Approx. 6 lanes 2.5 mi
- FWD tested approx. 25 lane mi
- Identified 150 locations of Interest
- Cored Initial 100% (30 locations)
- Cored Approx. 40% (40+- Locs.)
- Contractor Replacing Approx. 20
  - some areas did not meet spec, but were not replaced because patched section would be weaker

I-64 Coliseum Central Challenges

ISSUE	SOLUTION
1. Design Flaws	1. Hired District Preliminary Engineer for cradle-to-grave engineering; hired a QA/QC group; holding designers accountable
2. Contract Specification Omissions	2. Worked with contractor to define acceptable “industry standard” for concrete tolerance
3. Contractor Means and Method	3. Worked with contractor’s available equipment and construction methods
4. No field decision-making authority for VDOT	4. Returned project management to project level (decentralized from Richmond); designated authority to on-site Professional Engineer

Future Considerations

- **Performance Spec/Long Term Bond**
- **Test Strips (200-400 feet)**
- **Change in Drainage Layer OGDL to BM25 or Other Mat'l**
- **Change in Rebar Chairs**
- **Concrete Mix**
- **Survey Line Required For Drainage Layer**


VDOT