

# LATEX MODIFIED CONCRETE



**MoDOT SPEC. SECTION 505.20**

A nighttime photograph of a construction site. The scene is illuminated by bright work lights, creating a high-contrast environment. In the foreground, a large, flat concrete surface is visible, possibly a bridge deck or a large slab. In the background, there is a complex structure of scaffolding and rebar, with several workers in high-visibility vests and hard hats standing on it. The overall atmosphere is industrial and busy.

WHY???

## LATEX MODIFIED CONCRETE

**This work shall consist of constructing a Latex Modified Concrete overlay for the purpose of protecting the underlying structural concrete from the deterioration caused by absorption of vehicular chemicals, deicing salts and water.**

Typically, Latex is placed at night due to Environmental Factors.



# Latex Modified Concrete is NOT B-1/2 or PCCP!

Latex  
Very Delicate  
Timing too Late will Pull Agg.  
Forms a Film on the Surface  
Minimal Finishing Work (2)  
2 Day Wet Cure

B-1/2 & PCCP  
Firm Throughout  
Timing too Early will Pull Agg.  
Hardens Evenly  
A lot of Finish Work (4)  
7 Day Wet Cure



# Latex Storage



**505.20.2.3** Latex admixture shall be kept in a suitable enclosure that will protect the admixture from freezing and from exposure to temperatures in excess of 85 F. Drums of latex admixture to be stored at the work site in direct sunlight shall be completely covered with a suitable insulating blanket material to maintain an enclosed temperature below 85 F.

# Concrete Mixture

**GOAL**

Air content is effectively entrapped air.



Property	Requirement
Air Content, percent	0 to 6.5
Slump, inches	9 maximum
Percent Fine Aggregate as percent of Total Aggregate by Absolute Volume	50 to 55
Cement Content, lbs./cubic yard min.	658
Latex Emulsion Admixture, gallons/cubic yard. min.	24.5
Net Water/Cement Ratio, <b>max.</b> lbs. <sup>a</sup> water/lbs. cement	0.40 DEPENDS ON AGG. MOISTURE

# MATERIALS & MOISTURE

Keep stock piles separated to avoid contamination.

Maintain moisture of the aggregates during dry and wet weather.

Do not let aggregate dry out due to the sun.

Moisture of aggregate directly relates to how much mix water is added.

Dry aggregate will quickly absorb all mix water that is added to the concrete.

If aggregate is too wet, if no mix water is added, the mix can still be too wet for placement.

These points will relate to the overall product & smoothness.





# SURFACE PREPARATION

**Goal:**  
**Remove Paste and**  
**Open the Surface,**  
**should be able to see**  
**Sand & Aggregates.**

**505.20.6.2** On both old and new decks, within 24 hours prior to placing latex modified concrete, the entire surface shall be thoroughly cleaned by sandblasting followed by an air blast.

**Power wash the deck as well.**



# Hydro Water Blast



This is an option instead of sand blasting.

With this process, on hardened concrete, the edges will still need to be addressed since the machine cannot get all the way to the edges. Also address vertical edges.

On green concrete, a High Pressure Washer may be used on the edges to remove the paste after initial curing.



**If approved**, a retarder may be used to help in removing the past if it does not counteract latex.





## **DRY RUN**

**Use a board that is the minimum thickness of your overlay and attach it to a roller on the Bidwell.**

**Might have to balance too thin vs. too thick. ( $\approx 1.25''$ - $3''$ )**

**Aggregate size is related to the allowable thickness.**





**505.20.8.1 Prior to placement of latex modified concrete, the cleaned surface shall be thoroughly wetted for a minimum of three hours, then covered with polyethylene sheeting until time of concrete placement. The surface shall be damp at the time the overlay is placed.**



# PLACEMENT

Tests:  
Evaporation Rate  
Air  
Slump (after 5min)

**Download and check with an Evaporation Rate Meter /App. before you start pouring.  
FHWA recommends no more than 0.15lb/ft<sup>2</sup>/hr  
Monitor the rate throughout the pour.**

<https://www.fhwa.dot.gov/construction/reviews/revlmc3.pdf>



# Volumetric Concrete Truck



**505.20.5.1** The concrete shall be volumetrically mixed at the bridge site by a continuous mixer.



# Telebelt Concrete Placer



A Telebelt will help speed up the pour when greater than 30' wide.

# Protect Clean Surface



**505.10.8.8** The wheels of rubber wheeled vehicles or transport containers for the concrete shall not be permitted to contact any portion of the existing concrete surface prior to placement of the concrete.



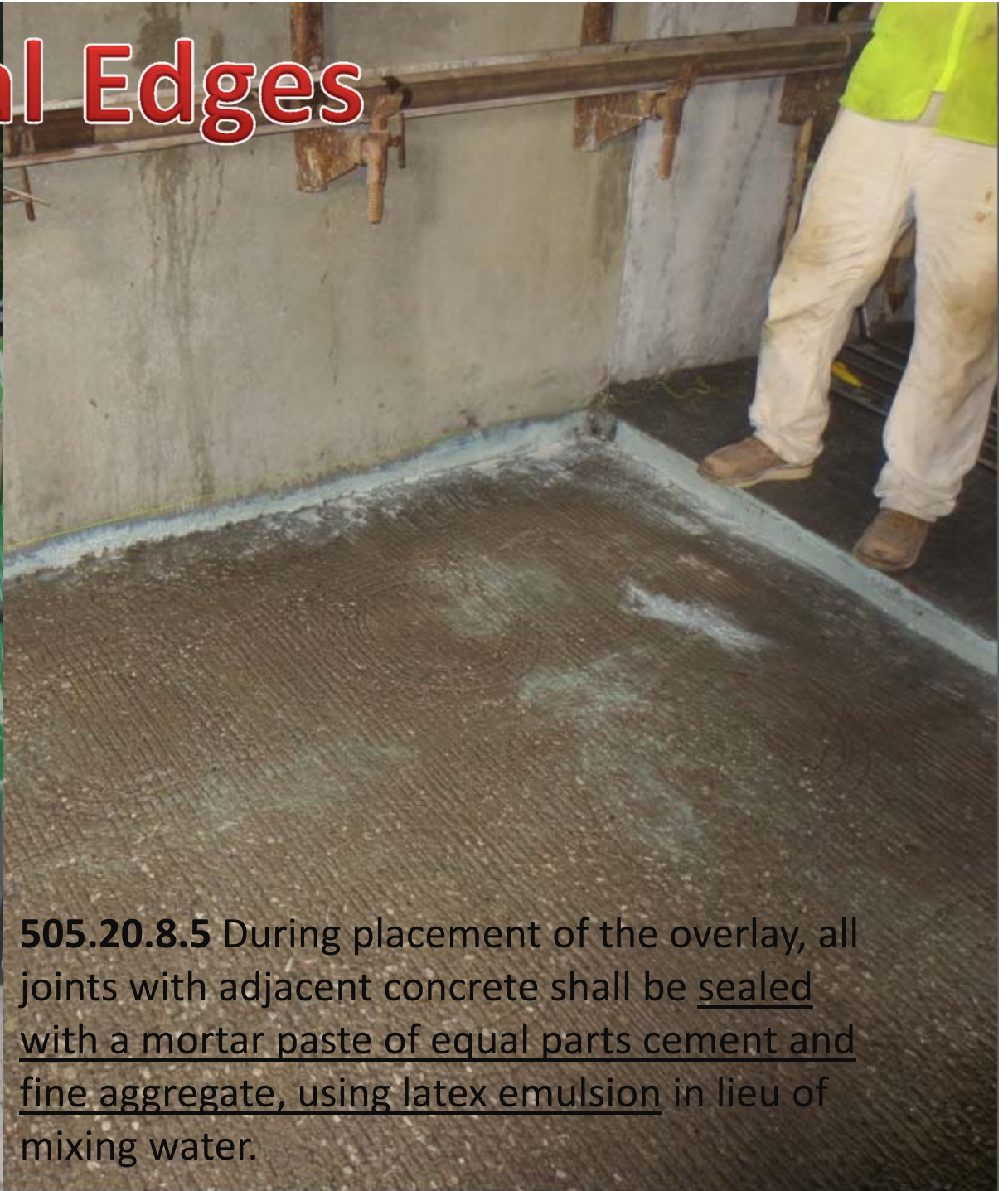
**505.20.8.1** No free water or puddles of standing water shall exist at the time of placement.



The use of a vacuum and leaf blower will help to remove any excess water that may be present at time of placement.



# Seal Vertical Edges



**505.20.8.5** During placement of the overlay, all joints with adjacent concrete shall be sealed with a mortar paste of equal parts cement and fine aggregate, using latex emulsion in lieu of mixing water.



# Placing Full Width



No lateral joints

Allows for a higher production rate

Requires more manpower & machinery

Burlap should be long enough to go full width.



# Longitudinal Joints



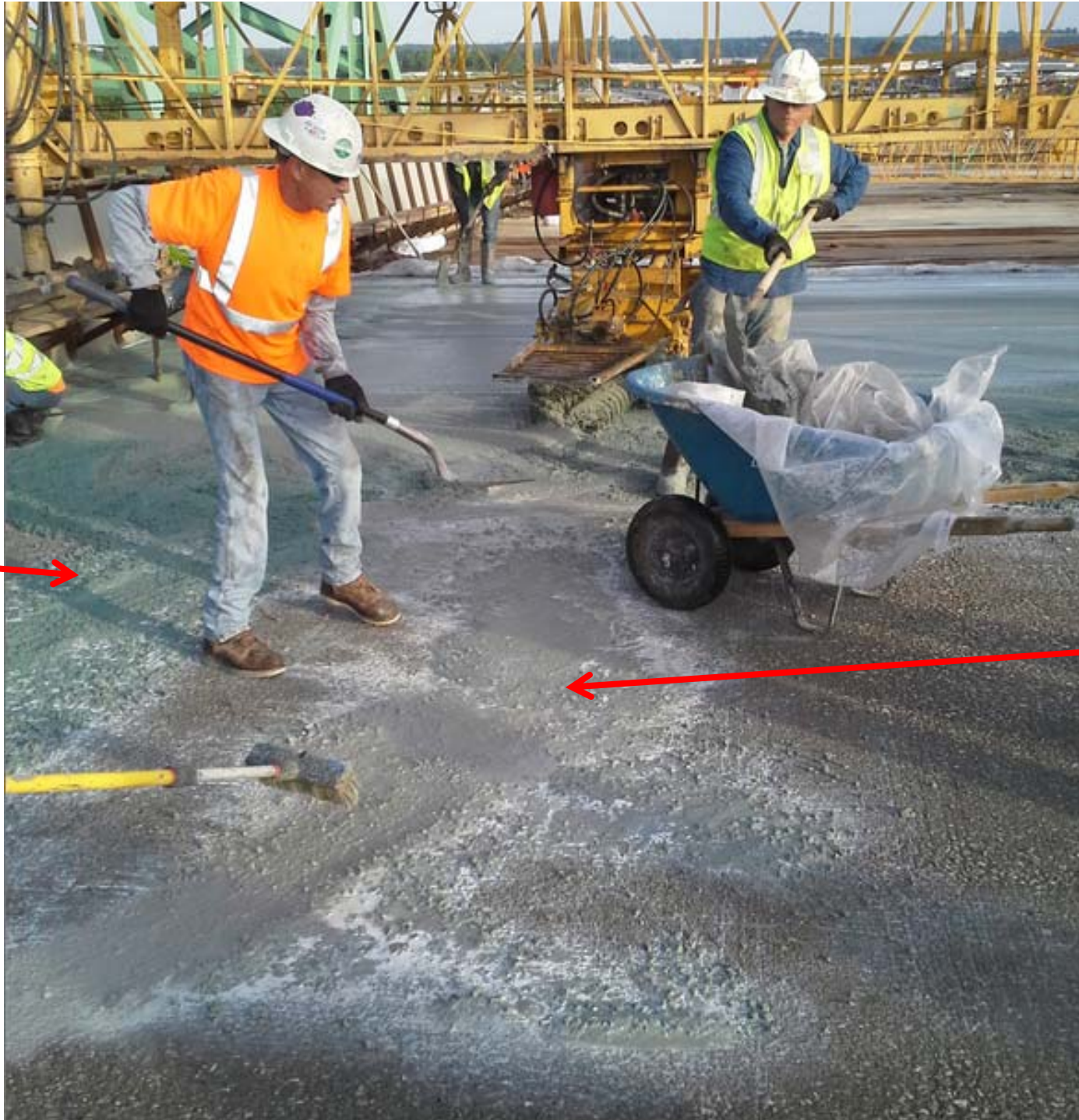
**505.10.8.1** A lateral support for the concrete such as 2 x 4-inch lumber attached to the deck will be required at least 6 inches beyond the line where the saw cut for the longitudinal joint is to be made.

Place joints on lane lines.

5" of plastic overlay will help with removing the extra 6".

6" Removed





**BLUISH  
GREEN**

Mix  
Contains  
Latex

**GRAY**

Mix  
Does  
NOT  
Contain  
Latex

**Remove**



# Inconsistent Mix (Dry to Wet Up-Hill Pours)

Wet mixes will try to flow down hill causing a rolling effect.  
(Pink Indicates Failed Straight Edge)

## Prevention Ideas

- Set Rail Brackets on 24" Centers Instead of 30".
- Try Pouring Down Hill.
- Slow Down the Bidwell.
- Advance Bidwell 6".



# FINISHING

## ONLY Bidwell & Tining

Additional finishing will lead to  
faster drying,  
leading to cracks.  
Minimize hand work!

505.20.5.2 The concrete discharged from the mixer shall be uniform in composition and consistency. Final finishing shall be completed before the formation of a plastic surface film.



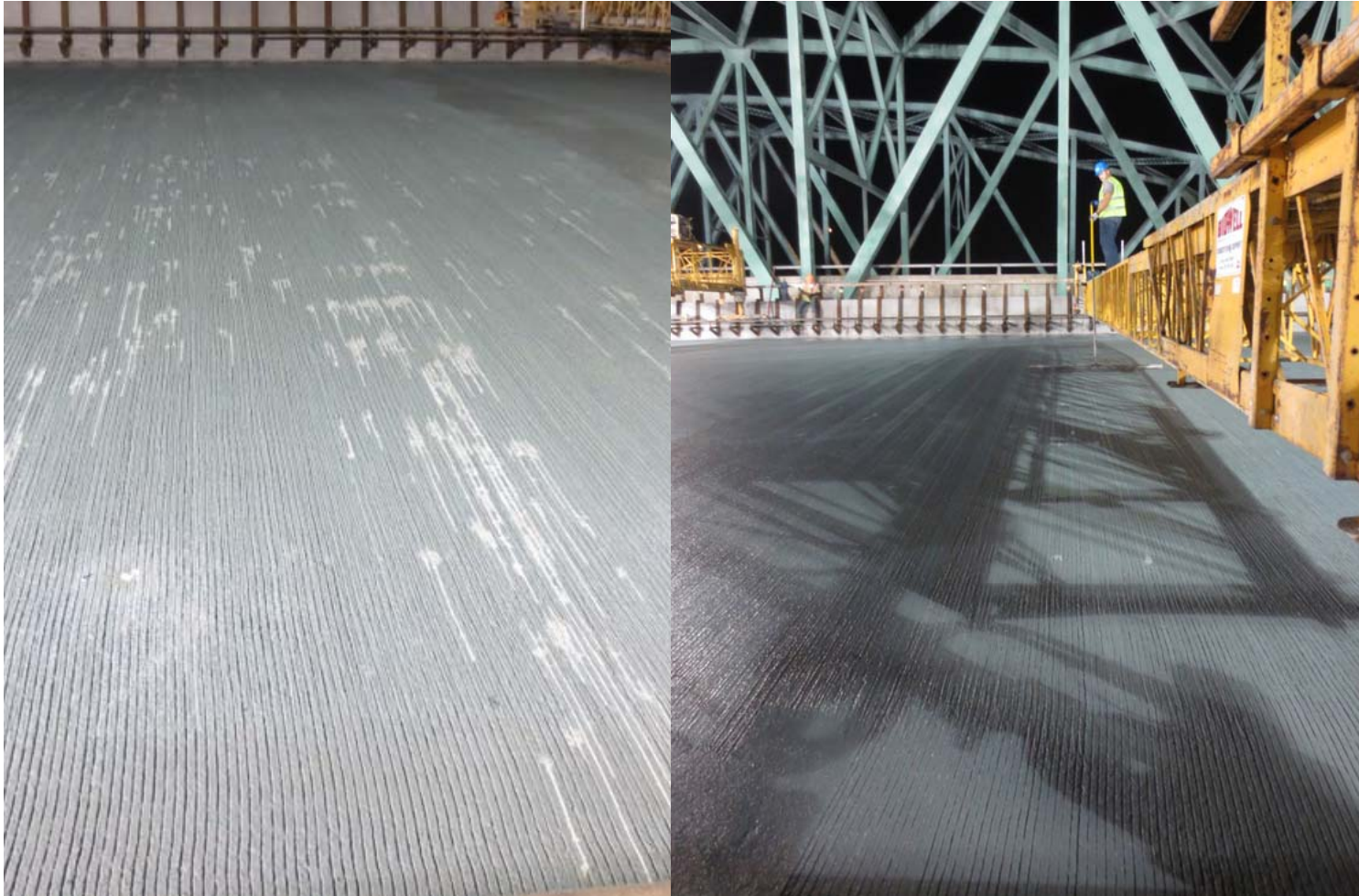


# Bidwell

- Vibrating Rollers or Pans
- Float Pan
- Float Pan
- Burlap Drag



# Texturing



**505.20.8.3** Texturing shall occur immediately after finishing and before the plastic film forms on the surface. Texturing shall be performed in a manner to prevent pulling the concrete away from an existing vertical face. Care shall be taken not to texture too deep and not to tear the surface.



# WET CURE 48Hrs.

**505.20.8.6** The wet cure shall be applied promptly after the concrete has been placed on the deck without deforming the finished surface.

Once the Burlap is covering the mix and it has had some time to harden, come back and place low pressure soaker hoses and plastic over the mix to help maintain the wet cure.



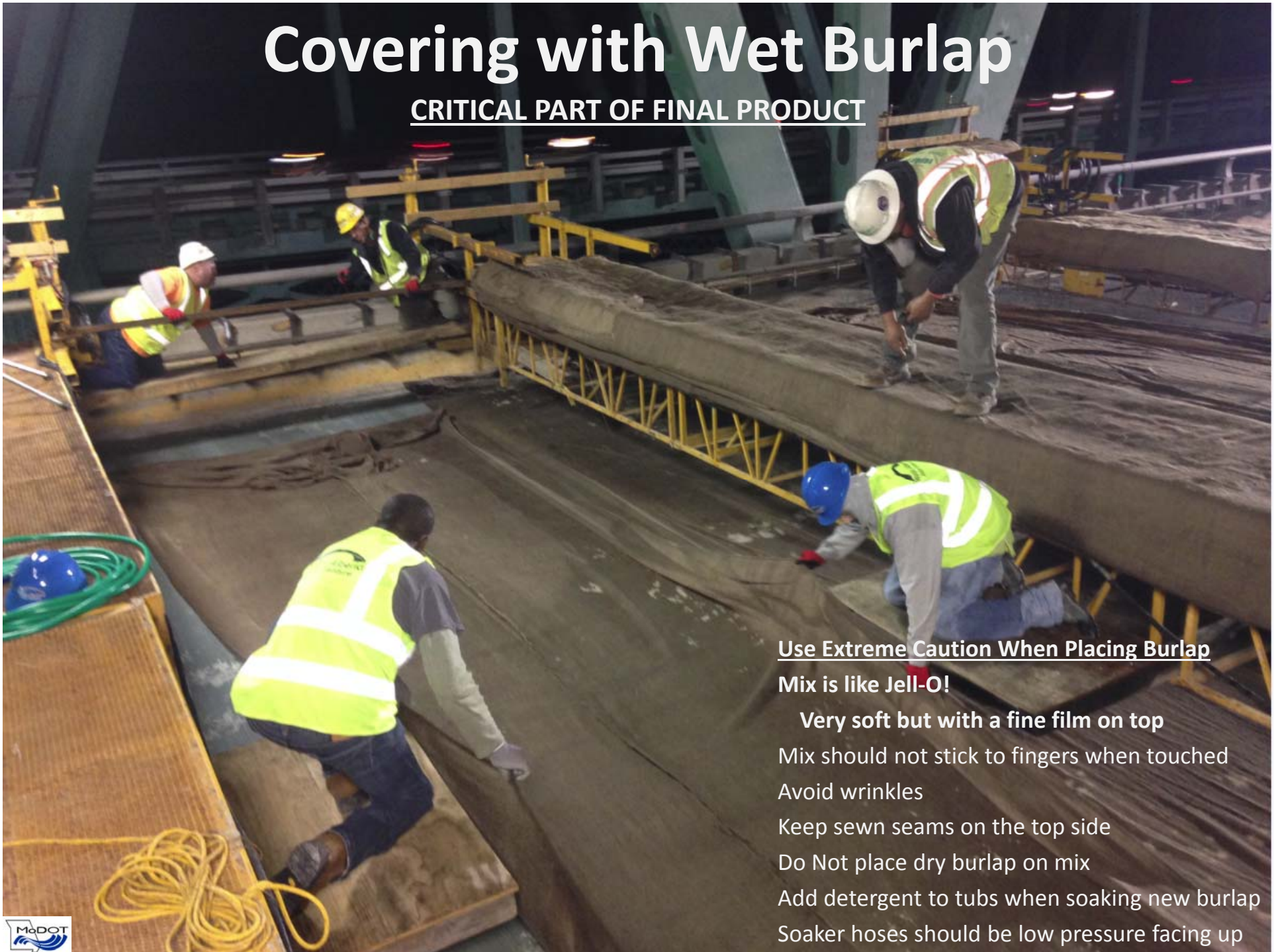
Water pressure will go through burlap and damage the surface.





# Covering with Wet Burlap

CRITICAL PART OF FINAL PRODUCT



Use Extreme Caution When Placing Burlap

Mix is like Jell-O!

Very soft but with a fine film on top

Mix should not stick to fingers when touched

Avoid wrinkles

Keep sewn seams on the top side

Do Not place dry burlap on mix

Add detergent to tubs when soaking new burlap

Soaker hoses should be low pressure facing up



# Placing Wet Burlap too Late



**REMOVED  
&  
REPLACED**

Wind and sun are detrimental to the surface. They will speed up the formation of the film which will lead to cracking faster.



Some Fine Cracks may be Filled with MMA.



**REMOVED  
&  
REPLACED**



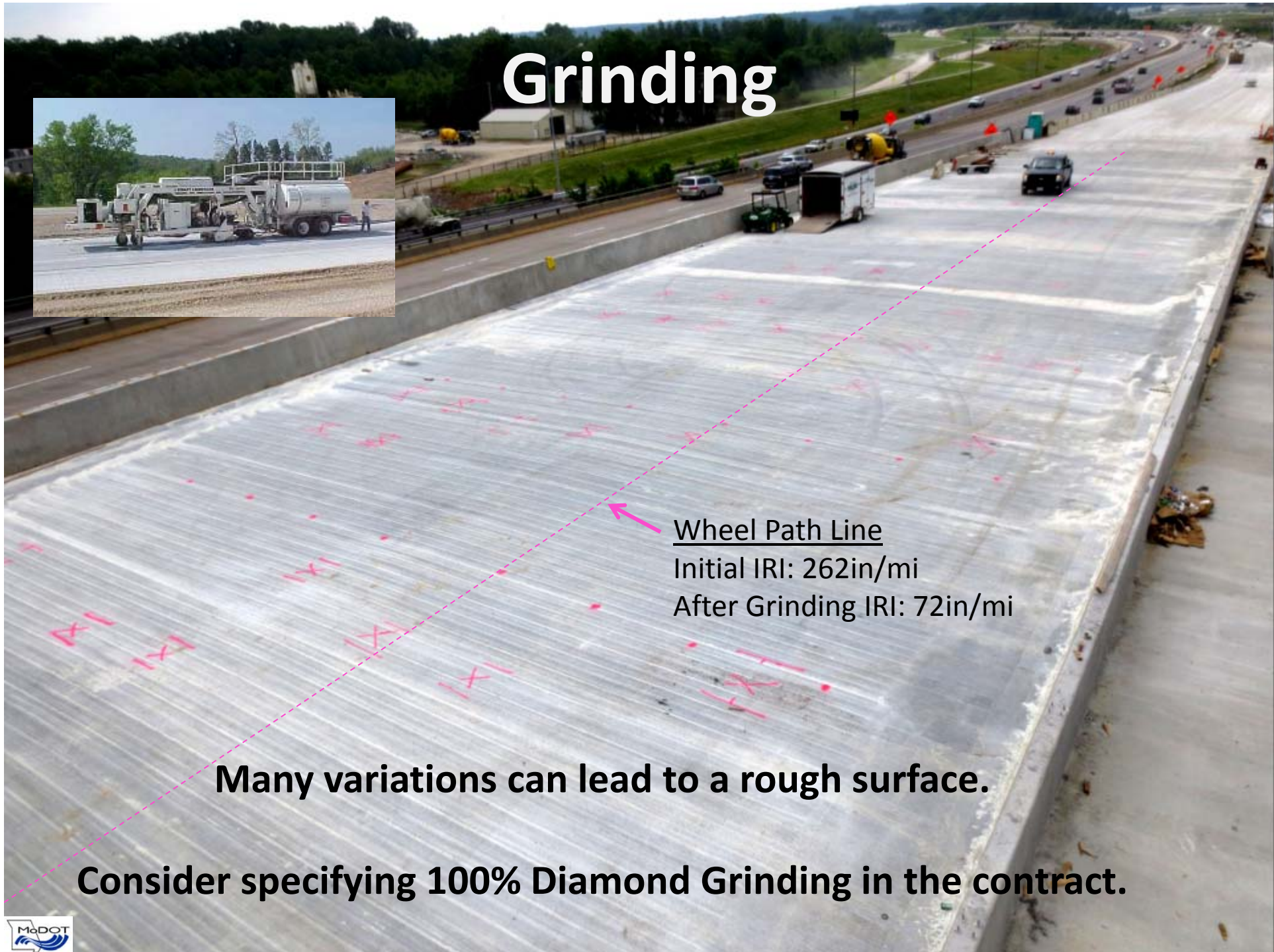
# Placing Burlap too Early



Some marring may occur on the edges. Take Extreme Caution when placing burlap. Try to fold the burlap on the edges instead of leaving it piled up. Marring of the surface can lead to failure of the straight edge test.



# Grinding



Wheel Path Line  
Initial IRI: 262in/mi  
After Grinding IRI: 72in/mi

**Many variations can lead to a rough surface.**

**Consider specifying 100% Diamond Grinding in the contract.**



# SOUNDING

**505.20.8.8** After placement and cure of the latex modified concrete, the finished deck will be tested to detect unbonded areas.





# LATEX MODIFIED CONCRETE

## Points to Remember

- Sandblast Deck & Clean**
- Wet Deck and Cover with Plastic**
- Maintain a Consistent Mix**
- Seal Vertical Edges with Slurry**
- Placement-Bidwell-Tining-Cure**
- Do not Float After Bidwell**
- Tine Before Film Forms**
- Allow Film to Form Before Covering**
- Wind and Sun Are Not Good for Latex**
- Make Burlap look Nice When Placing**
- Cutback 6" on Longitudinal Joints**

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