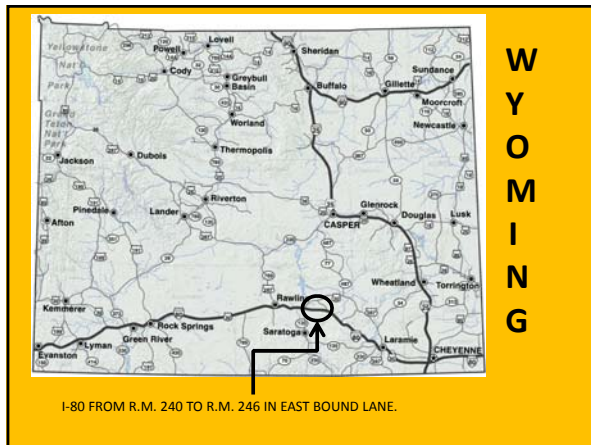


REHABILITATION OF EXISTING
CONCRETE PAVEMENT WITH
HOT PLANT MIX ON I-80



PROJECT PARAMETERS:

- DANA RIDGE, PROJECT # 0804236, WALCOTT JCT. - LARAMIE
- LOCATED ON INTERSTATE 80 FROM R.M. 240 TO R.M. 246 IN EAST BOUND LANE IN WYOMING.
- EASTBOUND DIRECTION CONSISTING OF 3 CLIMBING LANES OF CONCRETE.
- 11 INCHES CONCRETE PAVEMENT (DOWELED) OVER 10 INCHES OF CRUSHED BASE.



PROJECT CONCERNS:

- EXISTING CONCRETE PAVEMENT WAS SUFFERING FROM DAMAGE CAUSED BY ACR
- JOINTS WERE DAMAGED AND EACH YEAR SITUATION DRAMATICALLY WORSENERD.

PROJECT CONCERNS:

- HIGH LEVELS OF HEAVY TRUCK TRAFFIC; 3500 TRUCKS PER DAY IN ONE DIRECTION.
- INCREASINGLY HARD AND UNSAFE FOR MAINTENANCE CREWS TO WORK ON ROAD.

HIGH LEVELS OF TRUCK TRAFFIC



WHAT WENT WRONG:

ACR: ALKALI CARBONATE REACTION
(NOT TO BE CONFUSED WITH ASR)

- THE HYDROXIDE IONS FROM THE CEMENT PASTE ATTACK THE DOLOMITE CRYSTALS IN THE REACTIVE ROCK AND PRODUCE AN AGGREGATE EXPANSION THAT CRACKS THE CONCRETE.

WHAT WENT WRONG:

ACR: ALKALI CARBONATE REACTION
(NOT TO BE CONFUSED WITH ASR)

- PROCESS IS CONTINUOUS AS LONG AS CONCRETE IS EXPOSED TO MOISTURE.

WHAT WENT WRONG:

- ONLY PLACE WEST OF THE MISSISSIPPI RIVER THAT ACR HAS BEEN FOUND
- THE AGGREGATE EXPANDS AS MUCH AS 14%
- IT IS NOT MITIGATABLE DURING CONCRETE MIX DESIGN PROCESS (UNLIKE ASR CAN BE WITH FLYASH)

BASICALLY:



ACR CAUSED THE CONCRETE JOINTS TO EXPLODE!

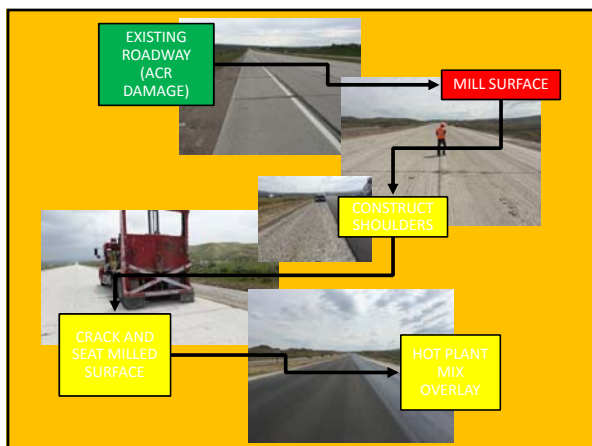
ACR DAMAGED JOINTS





REHABILITATION STRATEGY

1. MILL EXISTING SURFACE TO REMOVE A DETERIORATED CONCRETE.
2. PLACE MILL TAILINGS ON SHOULDERS FOR TAPER SUPPORT
3. **CRACK AND SEAT THE MILLED SURFACE OF THE CONCRETE TO LIMIT REFELCTIVE CRACKING**
4. PLACE HOT PLANT MIX ON CRACK AND SEATED CONCRETE



MILLING



3" MILLING CONCRETE PAVEMENT

MILLING

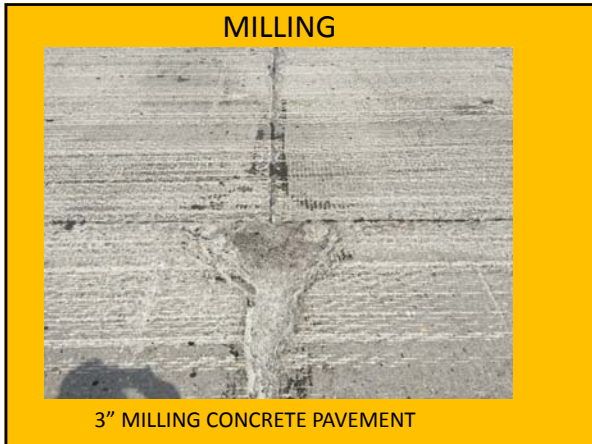


3" MILLING CONCRETE PAVEMENT: DID NOT REMOVE ALL DETERIORATION AFTER MILLING.

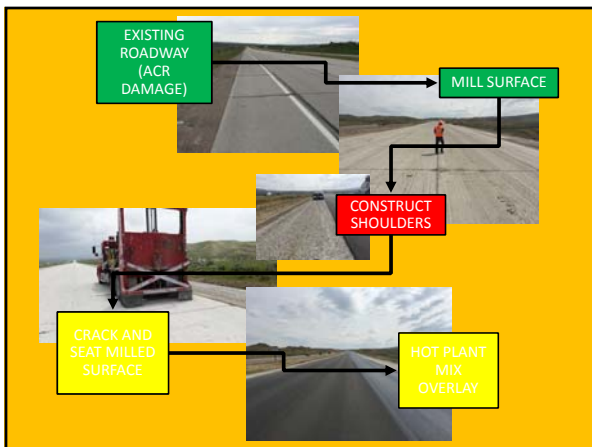
MILLING



3" MILLING CONCRETE PAVEMENT



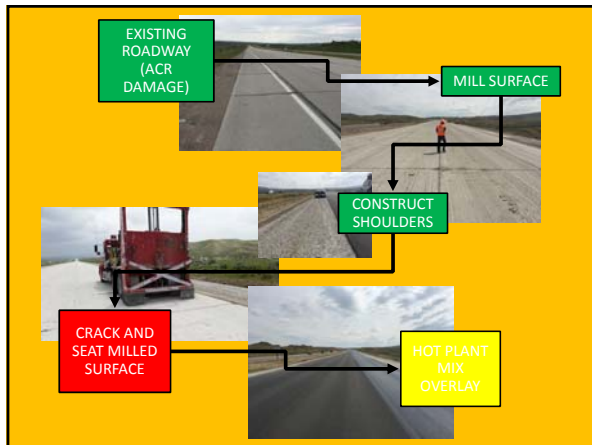




CONSTRUCT SHOULDERS



COMPACTED CONCRETE MILL TAILINGS




CRACK AND SEAT



•CRACK AND SEAT THE MILLED SURFACE OF THE CONCRETE TO LIMIT REFLECTIVE CRACKING

CRACK AND SEAT



•CRACK AND SEAT THE MILLED SURFACE OF THE CONCRETE TO LIMIT REFLECTIVE CRACKING

CRACK AND SEAT

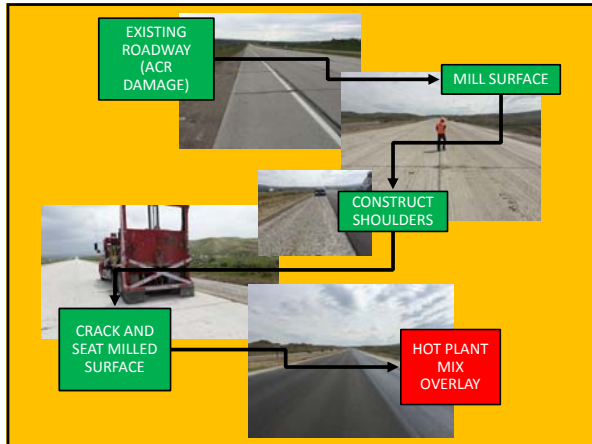


•HARD TO SEE CRACKS UNDER NORMAL CRACK AND SEAT CONDITIONS, EVEN HARDER UNDER MILLED SURFACE.

CRACK AND SEAT



MAY NEED TO APPLY WATER TO SEE IF PROPER CRACKING ATTAINED.



HOT PLANT MIX

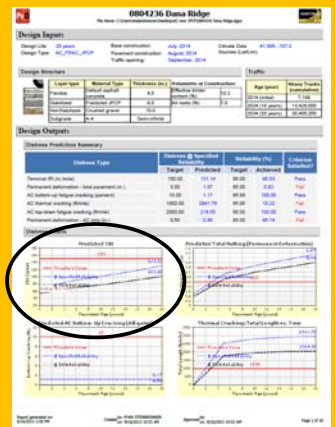
1. APPLIED AN INITIAL LIFT OF 1" OF LEVELING
2. APPLIED A 4" LIFT OF HOT PLANT MIX
3. COMPLETED WITH A WEARING COURSE (OPEN GRADED FRICTION COURSE)

HOT PLANT MIX DESIGN PARAMETERS

- HOT PLANT MIX (CHANGED TO WARM MIX DURING PRODUCTION – FOAMING TECHNOLOGY)
- 75 GYRATIONS (SUPERPAVE MIX)
- PG 76-28 USED AT 4.7% BINDER CONTENT
- 1% HYDRATED LIME ADDED

PAVEMENT DESIGN:

- UTILIZED AASHTOWARE ME TO DETERMINE PAVEMENT DESIGN
- USED IRI AS GOVERNING CRITERIA FOR DESIGN



HOT PLANT MIX

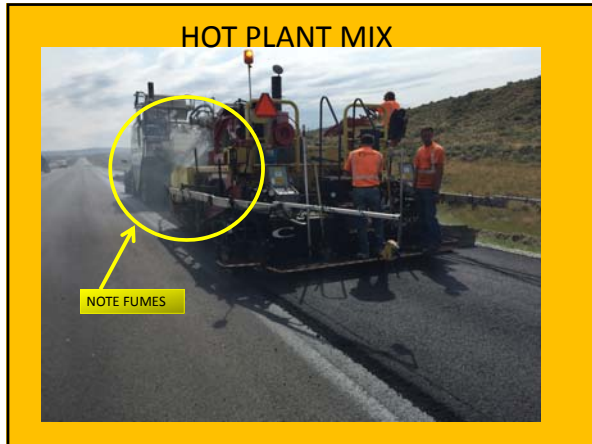


1. APPLIED AN INITIAL LIFT OF 1" OF LEVELING HPM

HOT PLANT MIX



2. APPLIED A 4" LIFT OF HOT PLANT MIX

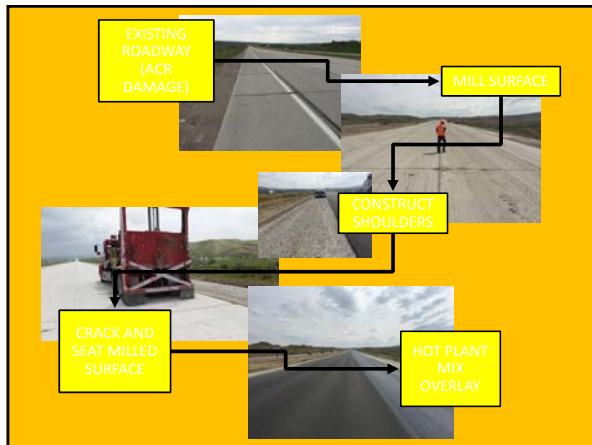






HOT PLANT MIX

- INITIAL AVERAGE IRI WAS 125
- AVERAGE IRI WAS 34 UPON COMPLETION
- CONTRACTOR RECEIVED A \$26,600 BONUS



QUESTIONS?

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