Cass County History w/ Stabilization and Recycle

- 25 year regional wet cycle
- In the last 7 years completed over 80 lane miles of Cement Stabilized Subgrade with no issues
- In the last 10 years we’ve focused on adding RAP into our HBP and completed the first Warm Mix RAP project in North Dakota
- We were looking for better ways to reconstruct our roads.
Cass County Hwy 9 Test Sections

Test Section information can be found at: https://www.casscountynd.gov
Test Section 14

- 4" OVERLAY IN 1993
- REFLECTIVE CRACKING
- NO FINE AGGERGATE LOSS
Test Sections 1 & 13

- REFLECTIVE CRACKING
- NO CHIP LOSS

- REFLECTIVE CRACKING
- NO AGGREGATE LOSS

In-Place Recycling & Reclaiming Seminar  |  Dickinson, ND  |  June 27-28, 2017
Test Sections 1 & 13
Test Sections 2 & 12

- THERMO CRACKING
- BETWEEN WHEEL TRACKS ROUGHER PAVMENT – PLOW MARKS
Test Sections 2 & 12
Test Section 2 & 12

- ROOUGHER SECTION BETWEEN WHEEL TRACKS
  - PLOW MARKS
Test Sections 3 & 10

- MAT LOOKS GOOD – NO FINES LOSS
- TRANSVERSE & LONGITUDINAL CRACKING

12" FDR W/ 4% CEMENT
PROFILED, PRIMED & 3/4" S-MIX W/ FIBERS

12" SOIL STABILIZATION W/ 6% CEMENT
5" OF SALVAGED ASPHALT & AGG. BASE
5" W/ 3% EMULSIFIED AGG,
PROFILED, PRIMED & CAPE SEAL
Test Sections 3 & 10

- ROLLER PAD MARKS AFTER MILLING
Test Sections 3 & 10

- LONGITUDINAL CRACK POSSIBLY FROM MILLING
Test Sections 3 & 11

- MAT LOOKS GOOD – NO FINES LOSS
- TRANSVERSE & LONGITUDINAL CRACKING

12’ (SITE 3)

30’ GRADED ROADBED

12” FDR W/ 4% CEMENT

PROFILED, PRIMED &
3/4" S-MIX W/ FIBERS

12’ (SITE 11)

12” FDR W/ 4% CEMENT

PROFILED, PRIMED & CAPE SEAL

- MAT LOOKS GOOD – NO FINES LOSS
- TRANSVERSE & LONGITUDINAL CRACKING
Test Sections 4 & 10

- MAT LOOKS GOOD
- THERMO CRACKING
- COUNTY FORCES SCRATCHED SURFACE WITH CARBIDE POINTS

- MAT LOOKS GOOD
- THERMO CRACKING
- MINIMAL AGGERGATE LOSS
Test Section 4 & 10

- COUNTY FORCES SCRATCHED SURFACE WITH CARBIDE POINTS
Test Section 4 & 9

- MAT LOOKS GOOD
- THERMO CRACKING
- COUNTY FORCES SCRATCHED SURFACE WITH CARBIDE POINTS

- LOOSING CHIPS
- MILLED SURFACE ROUGHER
Test Sections 4 & 9

- LOOSING CHIPS
- MILLED SURFACE ROUGHER
Test Sections 5 & 8

- MAT LOOKS GOOD
- THERMO CRACKING
- COUNTY FORCES SCRATCHED SURFACE WITH CARBIDE POINTS
- RAVELING BETWEEN WHEEL TRACKS
- COUNTY FORCES SCRATCHED SURFACE WITH CARBIDE POINTS
Test Section 5 & 8

• RAVELING BETWEEN WHEEL TRACKS
• COUNTY FORCES SCRATCHED SURFACE WITH CARBIDE POINTS
Test Sections 6 & 7

- SUBGRADE SHOWING NO SOFT SPOTS
In-Place Recycling & Reclaiming Seminar | Dickinson, ND | June 27-28, 2017
• Consulted with other agencies that have done similar sections.

• With a limited budget on a large project we had to design the new roadway for under 1 million a mile.

• By integrating the material already on the project we found that we could save large amounts of money by doing this type of section without giving up the strength.

• 9 Mile Regrade Project (ultimate build of 17 miles with north 8 miles in 2018)
  • 9-12” of existing asphalt – All to be milled off
  • Road being widened from 24’ top to 36’ top
  • Cutting down Road 1’-3’ through hill sections
  • 36’ X 12” wide cement treated subgrade
  • Bring back 6” of millings
  • Haul in 2” of Gravel
  • Blend top 7” of material with Engineered Emulsion
  • Top blended material with 5” of Asphalt Pavement
Cass County Hwy 38 Regrade Project

- **Old Design:**
  - 12” of aggregate and 7” of HBP
  - Gravel Structural # per inch = 0.1, total 1.2
  - HBP Structural # per inch = 0.4, total 2.8
  - Total Structural # = 4.0

- **New Design:**
  - Cement Treated Subgrade Structural # per inch = 0.14, total 1.68
  - Blended Base Structural # per inch = 0.25, total 1.75
  - HBP Structural # per inch = 0.4, total 0.8
  - Total Structural # = 4.23, with additional 3” HBP will be 5.43
Strength and Cost

- Increases Strength by 35%: 5.43 vs 4.0
- Reduces Cost by 30%: $970k vs $1.4 million
• Engineer’s Estimate: $9.1 million

• Low Bid: $7.0 million

• Cost per Mile: $777,000/mile

• With 3” Overlay in 2019, total cost: $981,000/mile
Cass County Hwy 38 Regrade Project
Cass County Hwy 38
Regrade Project
Cass County Hwy 38 Regrade Project

- Nuclear Gage Density Testing of the Subgrade
- DCP Testing of the Subgrade & Bituminous Blended Treated Base – 7 Day
Cass County Hwy 38 Regrade Project
Gravel Stabilization & Cement Treated Base

- 2" CLASS 13 MODIFIED
- 2" ASPHALT MILLINGS
- TEAM BASE ONE
- CALCIUM CHLORIDE
- APPROXIMATELY 40 MILES OF GRAVEL ROADS WITH CEMENT
Future Testing and Data

- We will be conducting FWD testing this summer on our test road and will continue to do annual testing for the next 5 years.

- More information can on the Test Sections can be found at: https://www.casscountynd.gov