

CAPRI

BMD Field Validation Project



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BMD FIELD VALIDATION PROJECT

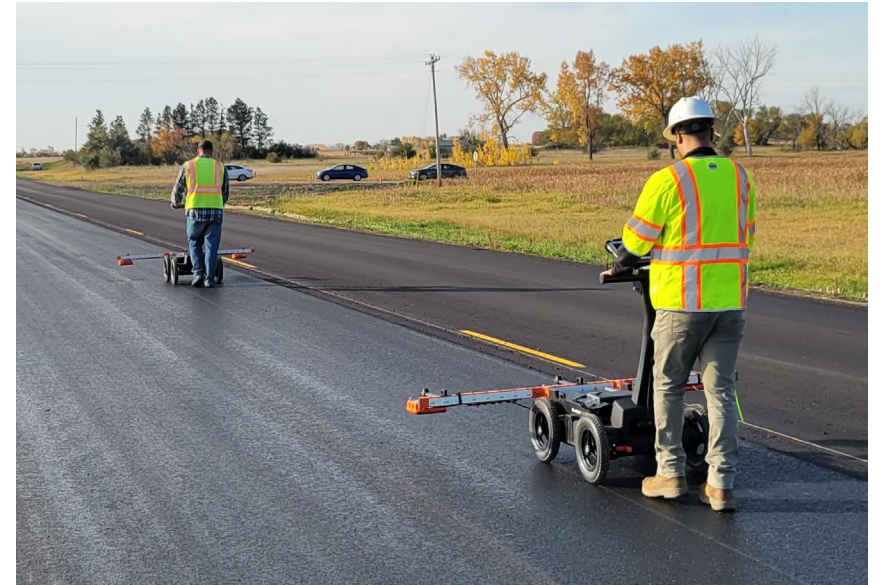
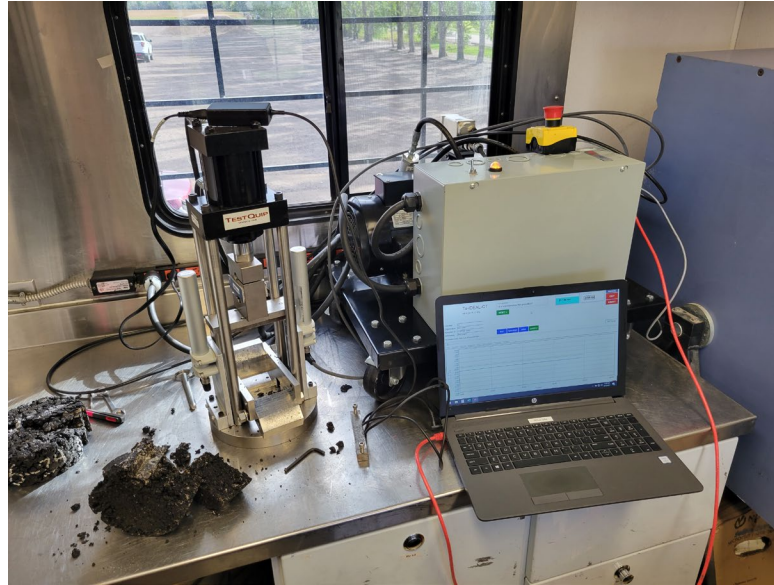
BUT FIRST...

WHAT LED THE NDDOT TO BMD?

FHWA MATC TRAILER VISITS ND IN 2021



MATC TRAILER EQUIPMENT



BMD TRAINING

NCAT Advanced mix design workshop
Dec 2021



MATC Quality in the Asphalt Paving Process
Apr 2022

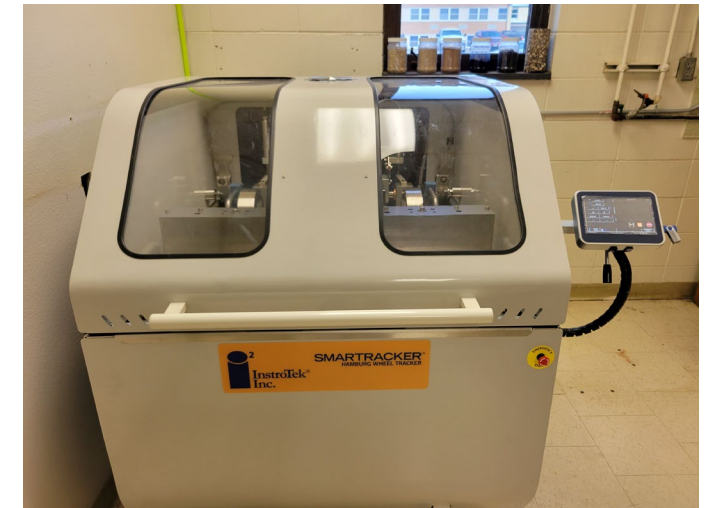


FHWA Implementing BMD Workshop
Jan 2023



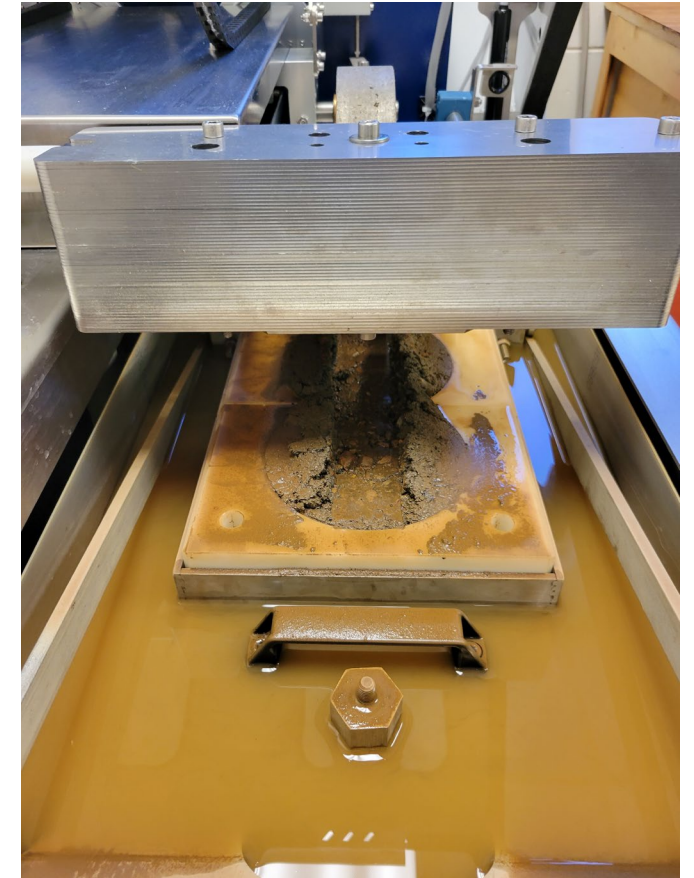
2022 NDDOT PURCHASED BMD EQUIPMENT

- Hamburg Wheel Tracker
- Ideal CT and RT
- Disc Shaped Compact Tension (DCT)
- Used STIC Grant funds



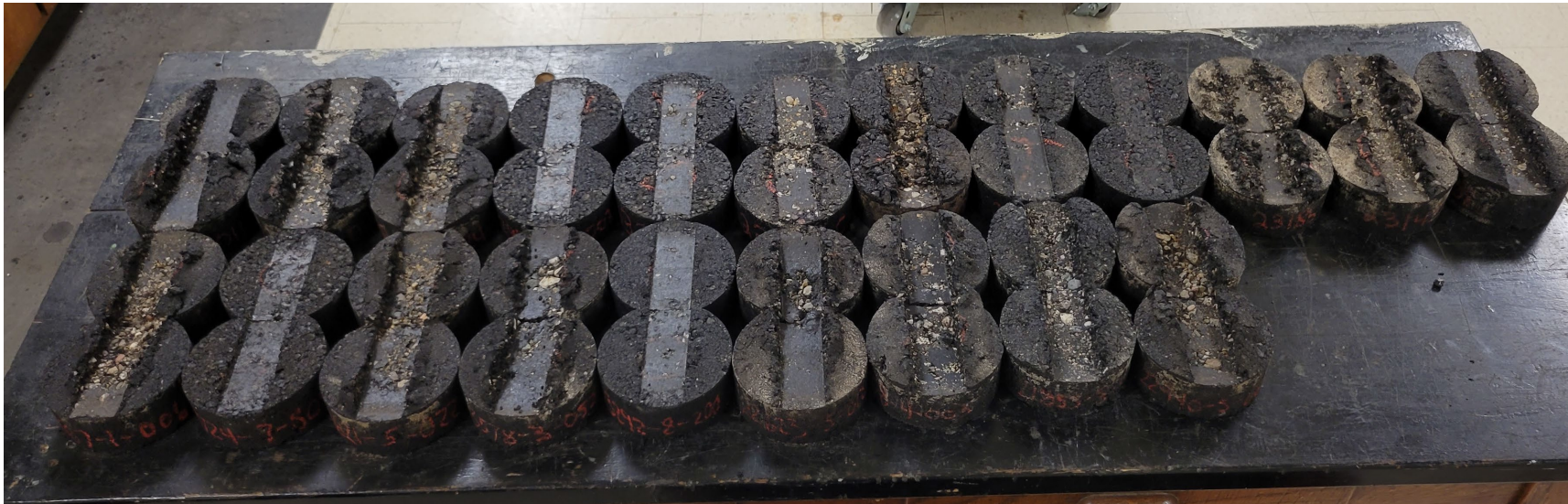
HMA PERFORMANCE TESTING 2022

- 39 projects tested by Bituminous Mix lab
- Hamburg wheel tracker, Ideal CT, DCT
- Benchmarking ND mixes



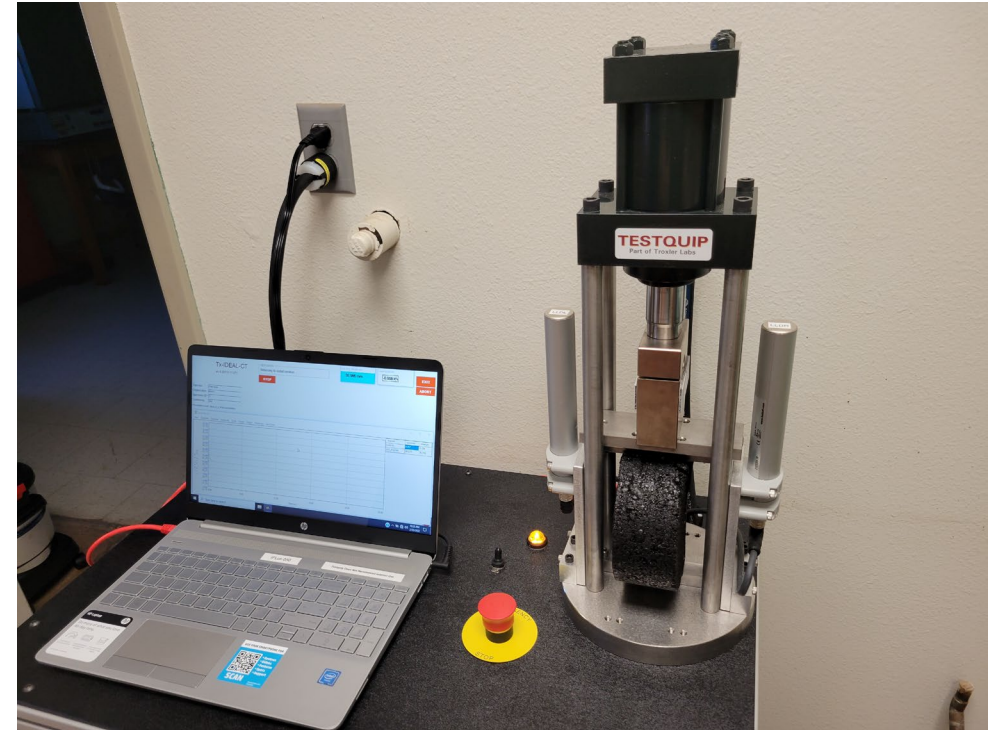
HMA PERFORMANCE TESTING 2022

- Hamburg wheel tracker
 - Avg. passes to 12.5 mm: 17,362
 - Range to 12.5 mm: 9,323 to 20,000
 - Avg. passes to SIP: 13,701
 - Range to SIP: 5,172 to 20,000



HMA PERFORMANCE TESTING 2022

- Ideal Cracking Test
 - Test 5 specimens to get Avg Index
 - Index Range: 8 to 444
 - Index Avg: 66



WE SEE THE BENEFITS OF BMD... HOW ARE WE GOING TO IMPLEMENT AND PAY FOR IT?

TPF-5(478) DEMO TO ADVANCE NEW PAVEMENT TECH

- Selected BMD as our new pavement tech
- Awarded \$250,000 to use towards our project

SELECTED NCAT AS OUR RESEARCH PARTNER

- Proposal from National Center for Asphalt Technology (NCAT)
 - Project Timeframe: 2023 to 2026
 - Benchmark ND mixes in 2022 and 2023
 - Total Proposed Cost: \$350,000
 - \$250,000 from Pooled Fund
 - \$100,000 SPR research funds
 - Build BMD test sections for field validation
 - Develop BMD specifications
 - Implement through pilot projects



WHY THIS PROJECT IS DIFFERENT?

Because North Dakota is different

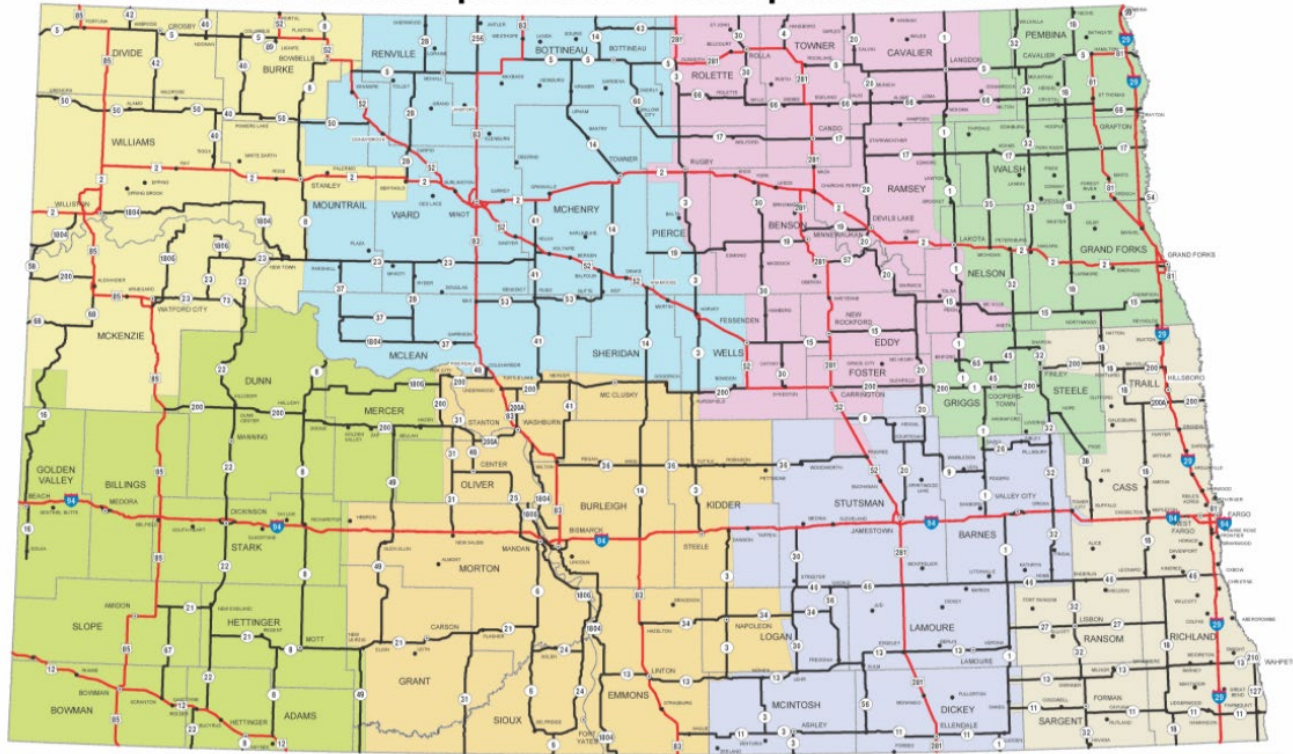


NORTH DAKOTA DIFFERENT

- Wide Open Spaces
- 3 times as many cows as people
- More road miles per person than any other state
- Cold in the Winter, Hot in the summer
 - Lowest recorded temp -60° F (without windchill)
 - Highest recorded temp 121° F



North Dakota Department of Transportation Districts



- | | | | |
|---|---|---|---|
|  Bismarck |  Dickinson |  Grand Forks |  Valley City |
|  Devils Lake |  Fargo |  Minot |  Williston |

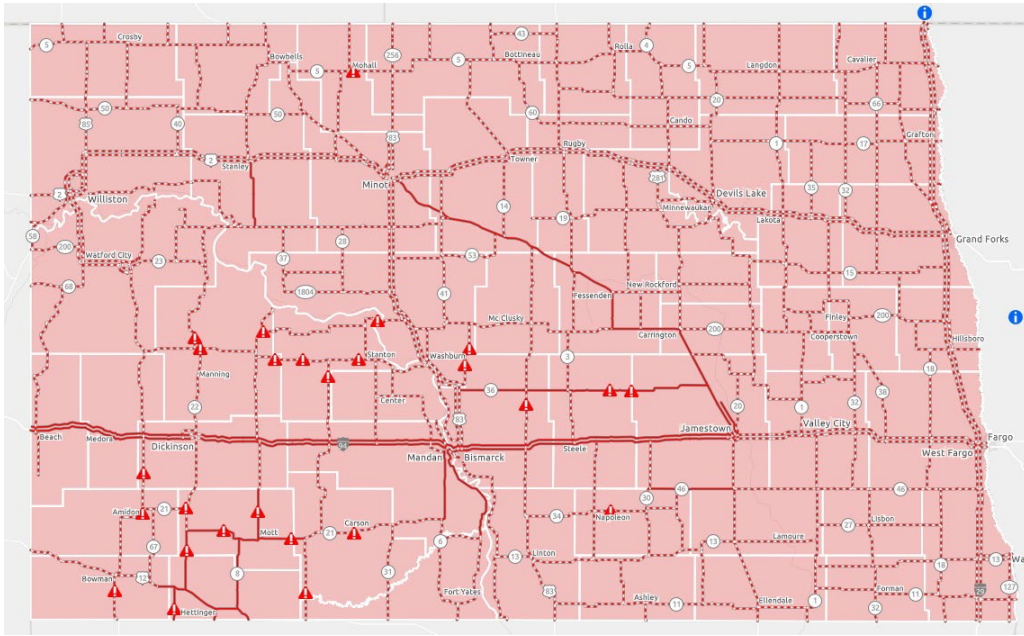


NDDOT

- 2nd smallest DOT by # of employees
- 982 full time employees

WINTER

- 2022/2023 – 2nd highest snowfall on record
- Snow lasted from October 2022 to May 2023



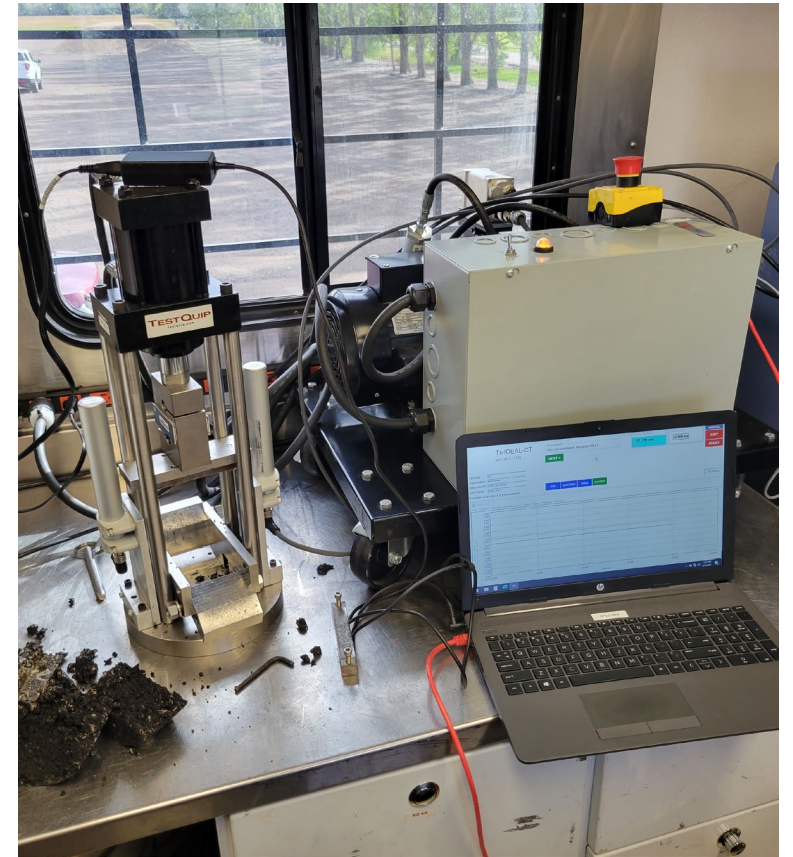
BMD Validation... What type of Project?



- Thermal Cracking a concern with an overlay
- Transverse Cracks reflect in year 1
- Picked a cement treated FDR with widening
- 4" HMA on 10" cement treated base

STAKEHOLDER TEAM

- Contractors
- Mix Designers/Testers
- Aggregate Suppliers
- NDDOT
- NCAT





CHALLENGE #1

- Portable asphalt plants
- Hard to change materials on the fly



CHALLENGE #2

- Unknown Aggregate Source
- Crushing and mix design happen weeks before paving
- Not much time for multiple mix designs and testing



CHALLENGE #3

- Constructing a large project in a short season
- Pave from June thru October

STAKEHOLDER MEETING TOPICS

- Contractors asked for 1500 to 2000 tons of production before changing the mix
- Keep the variables to a minimum
- Portable plants typically only have 1 main liquid asphalt tank
- Crushing extra material to account for mix design variations would cost \$\$



8 TEST SECTIONS

- Each section is 2 miles in length
- 2 binder types, 58S-28 & 58H-34
- Vary the AC Binder content by 0.5% from optimum, add RAP in 2 sections
- 5.5%, 6.0%, 6.5%, 4.5%+RAP
- Same Aggregate gradation thru-out



1941, Cogswell, ND Population 73

PROJECT DETAILS

- Plan to bid in February 2024
- Construct in Summer 2024
- Estimated Project Cost: \$24 million



QUESTIONS?

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