

# 2021 DPS - Contractor Perspective -

TPF-5 (443) Density Profiling System User Group Peer Exchange  
November 10, 2021

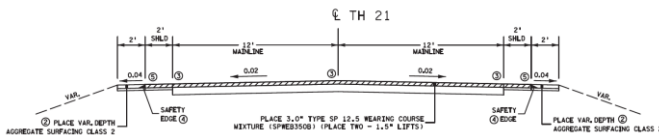
Matt Oman, PE  
Mathy Construction



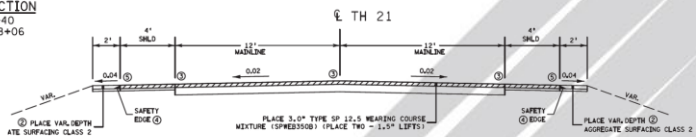
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## TH 21

- Paving May 21 through June 9, 2021
- Mill 1.5 inches
- Place two 1.5-inch lifts



PROPOSED TYPICAL SECTION  
STA 5+56 TO STA 98+40  
STA 201+30 TO STA 428+06



PROPOSED TYPICAL SECTION  
STA 98+40 TO STA 201+30

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# TH 21 Data Collection

- Daily Lab Measurements
  - Used MnDOT's equipment
  - All production pucks ~95% Gmm
  - Dielectric measurements on one set of additional pucks
    - ~91% Gmm (-250 grams)
    - ~89% Gmm (-500 grams)
    - Compacted to same height as production puck
  - Quickly became part of the process **prior to submerging**

71 total

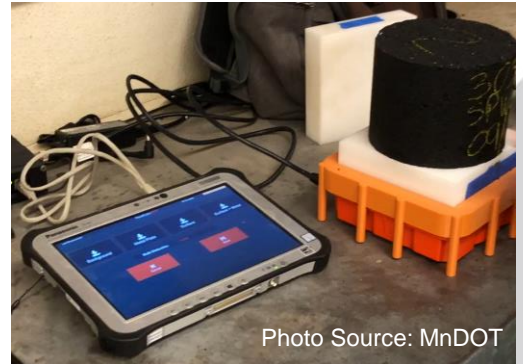


Photo Source: MnDOT

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# TH 21 Data Collection

- Field
  - Closed lane w/ flaggers
  - Pay item based on 500-foot segment
    - Started with **joint / swerve / swerve** but...
      - MnDOT CO requested change
      - We realized that we supported changing as real-time output was not visible in the Swerve Module
    - Switched to process to
      - **joint / mat / mat**
      - + swerves at beginning and ending of day
  - Integrated QC-level evaluation of DPS, non-nuke densities, PMTP, IC, and e-Ticketing


158 total



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## TH 21 Data Collection

- Data management
    - File naming and documentation
      - Fine-tune data naming for MnDOT CO Veta import and analysis
    - Documentation
      - Precipitation
      - Construction notes
      - Sensor temporarily removed
      - GPS errors
      - etc.
  - Change Order did not include data analysis
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## TH 21 Comments

- DPS data
    - Sensors randomly disconnecting
    - Hanging air calibration
      - Turned out to be something with survey wheel connection and resolved by switching sensor connected to survey wheel
    - Could not view real-time data during swerve passes
  - GPS data connectivity
    - Ended up using MnDOT's GPS antenna & controller
  - Safety concerns on busy two-lane flagger-controlled roadway
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# TH 21 Keys to Success

- Training



- Patience

- Data re-collection (early on swerve data verification)
- 100% functioning
- Weather
- Traffic



- Collaboration



- Lab staff
- Paving crew
- Field QC team
- PM & Leadership
- MnDOT D6 & CO

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## General DPS Thoughts – QA (Acceptance)

- Following cold roller = evaluation & documentation only
- Requires highly accurate, precise, and verified data components
- Careful data management & analysis (Veta)
  - Considerable user training and experience
- Cart configuration works for 100% coverage data collection
  - Core-specific core measurements adds substantial time and logistical issues with loading / unloading the cart

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## General DPS Thoughts – QC

- Nominal user training
- Cart configuration is difficult to evaluate process control
  - Have tried with sensors over hot mat but sensors overheat
- Can measure near cores with satisfactory correlations
- DPS collection between intermediate and cold roller can work with the cart configuration
  - Collect in time mode without saving file (minimize data management and post-processing requirements)
  - Roller water affects measurements



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## General DPS Thoughts – Laboratory

- Positives
  - I really like this aspect of DPS data collection
  - Provides very good correlations to core densities
  - Testing even just a couple pucks at different air void levels allows good process control evaluation
- Negatives
  - Additional cost for two RDM controllers
  - Additional costs for 4<sup>th</sup> sensor for complete set up
  - Equipment needs to be at the lab prior to submerging
    - Water can affect measurements for a day up to several weeks

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# Parting Thoughts and Questions

- Great documentation tool
- Provides fun data analysis opportunities
- The cart configuration is mobile but not very portable
  - What about a something like a trimmer or metal detector, particularly for QC?
- Yesterday NCAT indicated that lifts <2 inches can reflect underlying material
  - Okay on TH 21 but over milled HMA; what about other materials/surfaces?
  - Project selection guidelines?
- Will agencies capture and quantify pavement performance benefits from DPS and incorporate into LCCA calculations?

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# Thank you for your time!

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