Cold Weather Paving: Best Practices and Techniques

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1/22/2025

Learning Objectives

- Technical resources available to agencies/industry
- Challenges and opportunities in cold weather paving
- Knowledge and skills to ensure cold weather success.

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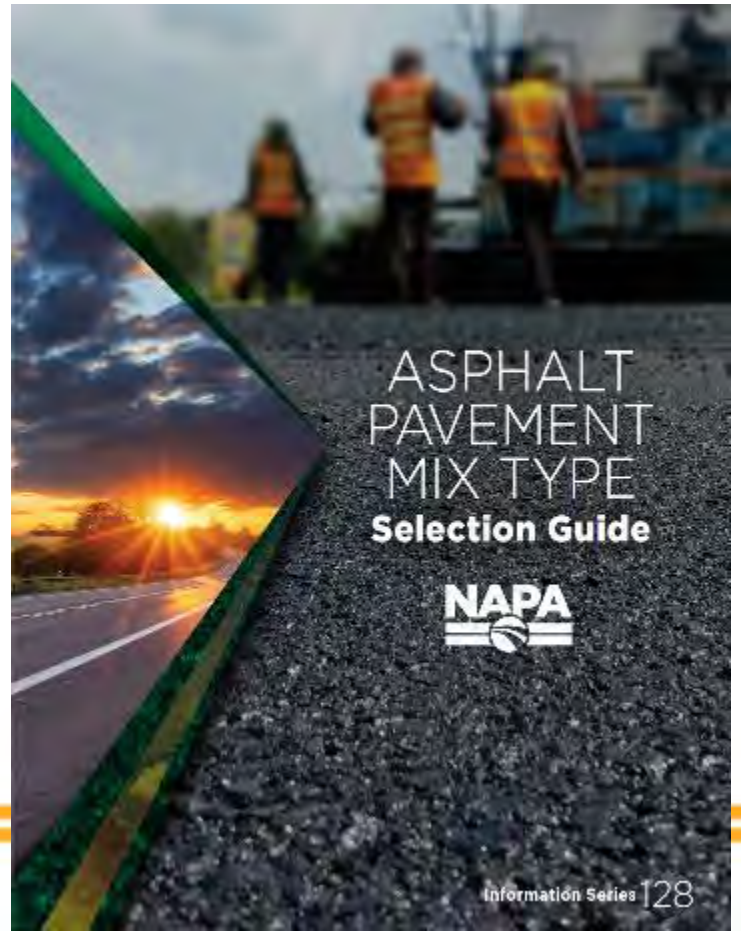
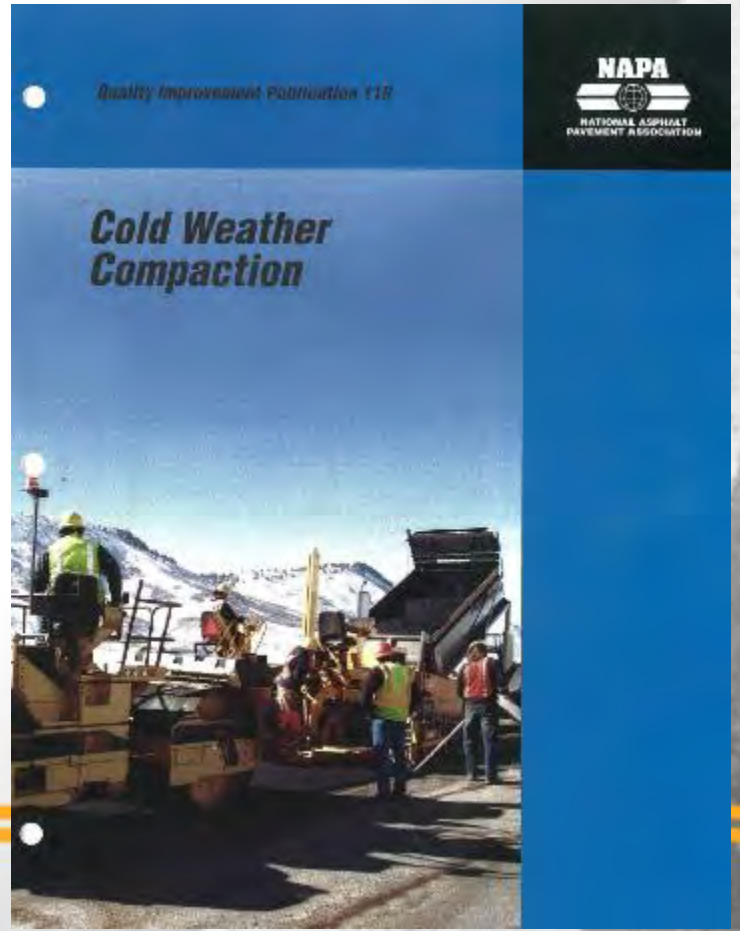
Technical Resources

- www.DriveAsphalt.org – Asphalt Pavement Alliance
- www.AsphaltPavement.org – National Asphalt Pavement Association
- www.dot.state.mn.us/MnROAD – Minnesota Road Research Project
- www.ChatGPT.com – general information about roads and highways
- www.HeyNAPA.com – specific information about asphalt pavement.

References at www.AsphaltPavement.org

- IS-128: Asphalt Pavement Mix Type Selection Guide
- QIP-118: Cold Weather Compaction





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NAPA
NATIONAL ASPHALT PAVEMENT ASSOCIATION

XBE

Welcome to Hey NAPA

What asphalt pavement questions can I answer for you?

I've been trained on hundreds of NAPA publications and have broad general knowledge of asphalt pavement topics. Ask me anything that you'd like and I'll do my best to provide a concise answer and point you to additional resources.

What are the keys to mastering cold weather paving?

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HeyNAPA Response for Cold Weather Paving

- Planning and scheduling
- Materials considerations
- Equipment preparation
- Paving techniques
- Joint construction
- On-site management
- Safety and crew management
- Continuous improvement.

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Planning and Scheduling

- Continuously monitor the weather in the days prior to starting
- Air and base temperatures are ideally at least 40F (and rising)…
- Check applicable specifications because it can vary
- Coordinate plant, trucking, paving, and compaction
- Intense focus on minimizing delays and optimizing workflow
- Arrive early to prestart all essential equipment
- Don’t initiate until everything is idling.

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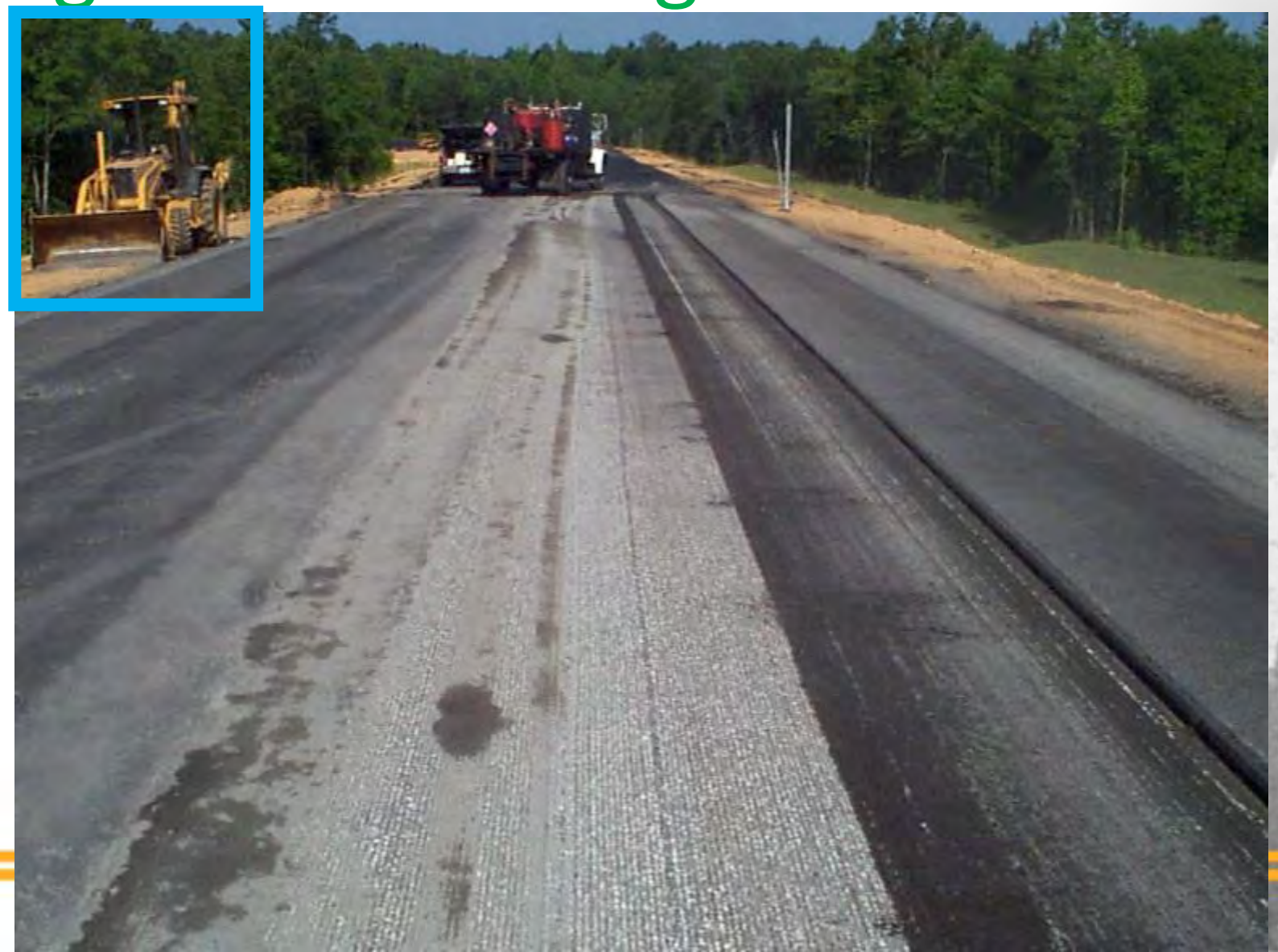
Planning and Scheduling



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Material Considerations

- Warm mix asphalt (WMA) technology for lower temperature rolling
- Preheat equipment before paving operations begin
- First load(s) run hot for more preheat temperature gain
- Consider adjusting to a soft virgin binder grade
- Increase binder content slightly to improve compaction
- Importance of quantity and quality of effective binder content (BMD)
- Question conventional wisdom (↑NMAS, ↓AC with depth)
- Mix selection (use, loading, structure, climate, appearance, safety).

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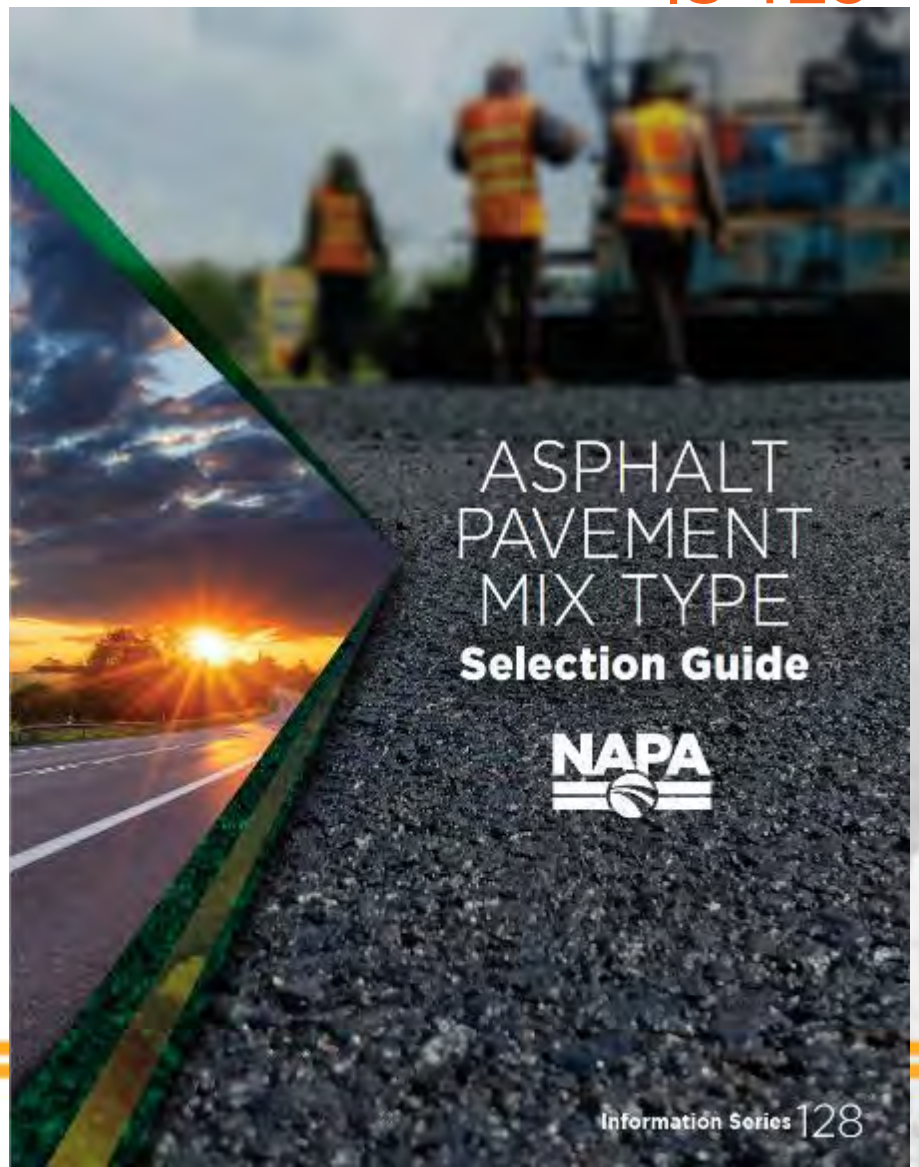
Asphalt Mix Type Selection IS-128



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Asphalt Mix Type Selection IS-128

- Roadways: range of structural and functional needs
- Airfields: P-401/403, specialty loads, fuel resistant
- Parking Lots: workability, low permeability, scuffing
- Heavy-Duty Pavements: QIP-123 NAPA resource
- Sports & Recreational Facilities: racing, running, etc.
- Never compromise performance for cold weather constructability!

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Mix Type Selection <50F

- Lower viscosity binders compact at lower temps
- Time available for compaction shifts (not changed)
- May need different compaction temps for same PG
- SMA generally requires higher compaction temperature, but…
- Warm mix asphalt (WMA) may expand time window
- Tonnage rate may limit temp (3%=10F), drying aggregate
- Mix modifiers, additives, recycling can have big effect (BMD).

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Equipment Preparation

- Preheat as much equipment as possible (truck, MTD, paver, etc.)
- Use torches wherever needed and safely possible
- Ensure corrective and preventive maintenance is up to date
- Be additive mindful with screed heating systems.

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Paving Techniques

- Thicker layers retain heat longer (MultiCool)
- Consider strategically thickening lower layers, thinning upper
- Operate rollers to run right up behind the paver
- Deploy more rollers to work within shorter compaction window
- Avoid aggregate segregation and ensure uniform material temperature
- Material transfer vehicle (MTV) for consistent mix temperature
- Consider adding rubber tire roller(s) to paving train
- Flash stiffening as temperature drops.

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Increasing Compaction Time <50F

- Increase mix production temperature
- Optimize silo management
- Tarp loads and use insulated beds
- Manage trucking to avoid wait times
- Pave with at least a 2-inch lift to minimize risk
- Use highest frequency roller setting (low amplitude)
- Breakdown in echelon with two double drums
- Reduce paver speed as possible.

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Preheating/Reheating the Mat

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Importance of Higher Density

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Joint Construction

- Pay special attention to both longitudinal and transverse joints
- Ensure proper temperature and compaction
- Utilize joint heaters if they provide needed advantage
- Apply tack coat to achieve proper interlayer bonding
- Consider echelon paving to reduce number of cold joints
- ~~Dilute tack material to accommodate colder temperatures~~
- Mill quality, brooming, drying, residual rate, break
- Take care not to scorch mix with heaters.

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Preheating the Joints

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Void Reducing Asphalt Membrane (VRAM)

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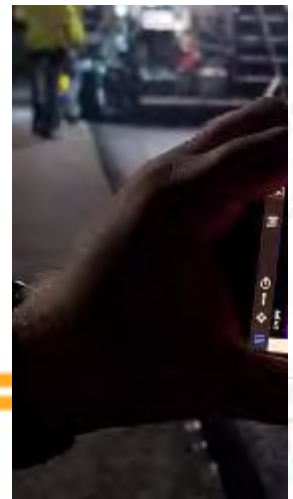
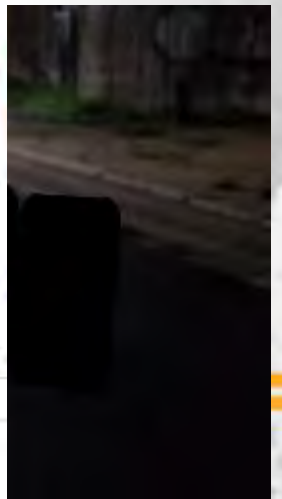
Onsite Management

- Reduce time mix spends in transit to prevent it from cooling
- Use tarps to cover asphalt loads to retain heat during transport
- Continuously monitor the mix temperature at the plant
- Continuously monitor the mix temperature at the paver
- Take steps to ensure mix stays within optimal range
- Consider equipping person[illegible]rared camera dongles.





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Safety and Crew Management

- Protect workers from cold weather conditions
- Train entire crew in cold weather paving techniques
- Ensure everyone understands the importance of each step
- Provide appropriate personal protective equipment (PPE)
- Make sure the whole team is wearing warm clothing
- Provide opportunity for regular breaks to warm up
- Safety is essential(!), but also key to workforce development.

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Continuous Improvement

- Collect data on paving operations and outcomes
- Identify areas for improvement via feedback loop
- Utilize affordable and efficient tools for optimization
- MultiCool to calculate cooling rates and compaction windows
- Ensure you have the right equipment for the job
- Ensure entire process is precisely timed
- careful planning, attention to detail, techniques, and materials
- Deliver high quality asphalt pavement!
- We must win both the short game and the long game.

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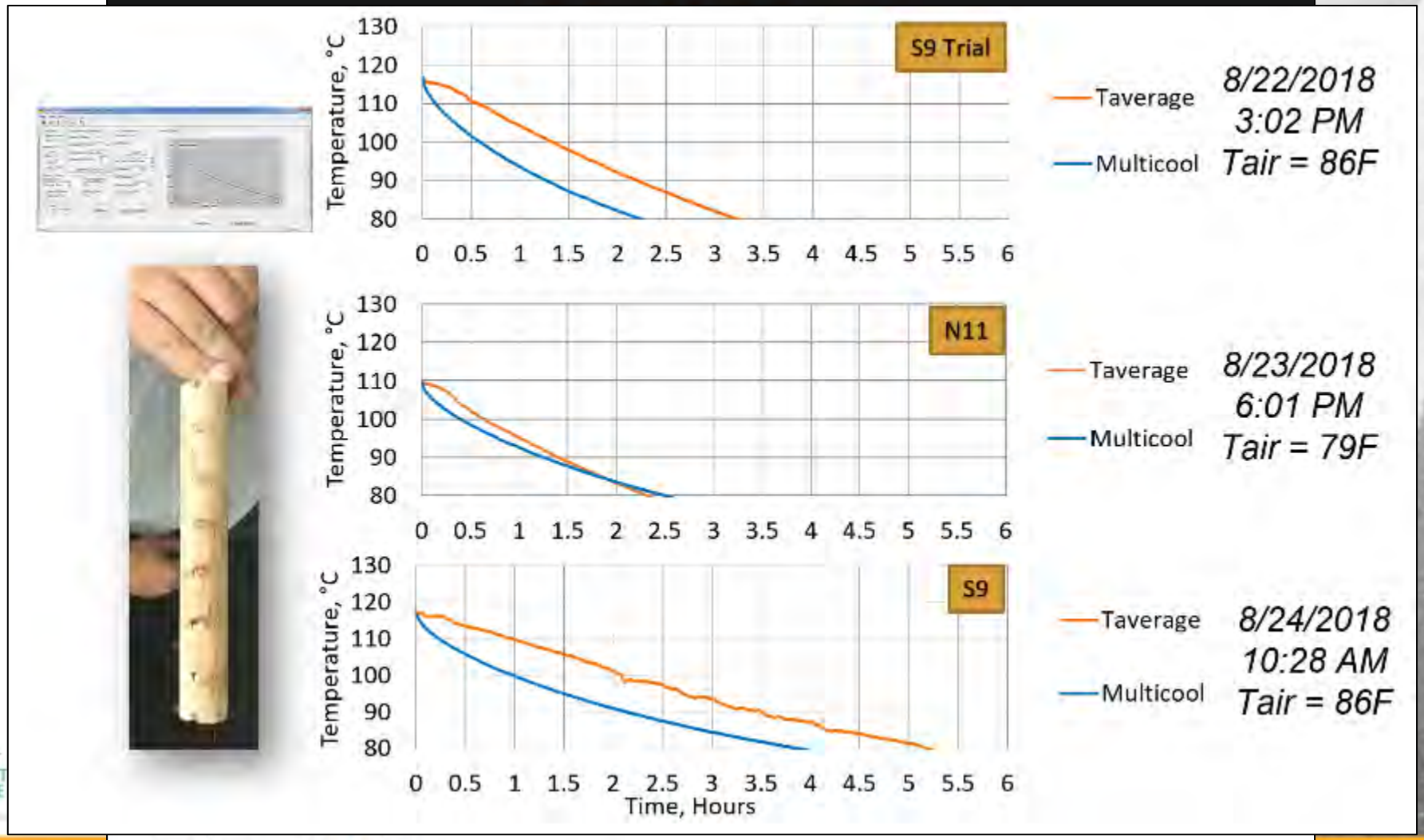
https://www.asphaltpavement.org/expertise/engineering/resources



Latitude: 38 Degrees N
Longitude: -85 Degrees E

HeyNAPA Prioritized on Cold Weather Paving

- Safety and crew management
- On-site management
- Materials considerations
- Planning and scheduling
- Equipment preparation
- Paving techniques
- Joint construction
- Continuous improvement.

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