Cold Weather Paving Plan

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CONFERENCE

Cold Weather Paving Plan

Issues

- Hard to achieve proper density
- Possible increase in permeability
- Can lead to poor ride
- Shorten life of pavement

NDDOT Standard Paving Temperatures

Table 430-08
Standard Paving Temperatures

Compacted Thickness	Air Temp for Surface Course	Air Temp for Subsurface Course and Approaches	Existing Mat
1-1/2 inches or less	45°F	40°F	40°F
More than 1-1/2 inches	40°F	35°F	40°F

If placing bituminous mix according to Table 430-09, submit the supplementary admixture manufacturer's dosage rate and any changes to the mix design. The supplementary admixture may be added to the asphalt binder by the supplier or refiner, or by the Contractor at the asphalt plant. Add the admixture to the binder according to the supplementary admixture manufacturer's recommendations. If the admixture is added at the plant, equip the plant with a metering device that records the rate of admixture. Tie the metering device into the same system that measures the other components of the mix.

Table 430-09
Paving Temperatures Using Supplementary Admixtures

Compacted Thickness	Air Temp for Surface Course	Air Temp for Subsurface Course and Approaches	Existing Mat
1-1/2 inches or less	40°F - 45°F	35°F - 40°F	35°F - 40°F
More than 1-1/2 inches	35°F - 40°F	35°F or above	35°F - 40°F

NDDOT Standard Mixes Temperatures

Table 430-09
Paving Temperatures Using Supplementary Admixtures

Compacted Thickness	Air Temp for Surface Course	Air Temp for Subsurface Course and Approaches	Existing Mat
1-1/2 inches or less	40°F - 45°F	35°F - 40°F	35°F - 40°F
More than 1-1/2 inches	35°F - 40°F	35°F or above	35°F - 40°F

Measure the existing mat temperature using one of the following methods:

- Using an infrared sensing thermometer; or
- Insert a conventional thermometer into a 1 inch deep hole in the pavement. Fill the hole with water, oil, or grease.

3. **Mix Temperature Requirements.**
Discharge mix from the mixer with a temperature no higher than the bituminous material manufacturer's recommendation. If there are no recommendations on maximum mix temperature, discharge mix with a maximum temperature of 300°F.

When the ambient temperature is 60°F or higher, place mix with a minimum laydown temperature of 230°F. When the temperature is below 60°F, place mix with a minimum laydown temperature of 250°F.

Tack

- Issues
  - Slow curing of emulsions
  - May take hours if it breaks all
  - Availability maybe limited for emulsions
- Solutions
  - Heat emulsion up to maximum application temperature
  - Use cutbacks in place of emulsion
  - Use spray paver

Spray Pavers

Protect Mix

Tarp all loads

Use heated and insulated boxes if possible

Trucking and unloading HMA

- Load trucks at last minutes
- Minimize delays un-loading truck
  - If using pickup machine time unloading to match paver pace
- Think about using a shuttle buggy or remixing paver
  - This will help re mix cold crust in HMA

Material Transfer Buggy

Paving

- Maximize paving lifts thickness
  - One 3 inch lift is better than two 1.5 inch lifts
- Think about using inserts in paver hopper
- Keep paver moving
- Limit stops to limit cooling in front of screen.

Compaction

- Use good compaction practices
- May need addition steel rollers
- Watch for pickup on rollers
- Use curtains on rubber rollers
- Keep breakdown rollers near paver
- Don’t stop on mat

Resources

- MnDOT's PaveCool app.
  - http://www.dot.state.mn.us/app/pavecool/
- Asphalt Institute Article
  - The reality of cold weather compaction | Asphalt magazine
- NAPA
  - asphaltpavement.org/multicool.
- NDDOT offices

PaveCool

Asphalt Pavement Cooling Tool

Download PaveCool 3.1 (EXE 6 MB)

January 2020 (CD available upon request)

PaveCool for Android 3.0

PaveCool for iPhone/iPad 3.0

PaveCool.exe (save this file to your desktop to run **PaveCool 3.0** without installing it)

Download PaveCool 2.5 (For Windows 95, 98, NT, 2000 or XP)
This version includes an export button that will export old .pcl files to a .pc3 file that can be read by PaveCool 3.0

Note about Version 3.0:

There is a bug associated with increasing the **Start Rolling** temperature after clicking **Calculate**. The **Start Rolling** minutes may be incorrect. This will be corrected in the next mobile release.

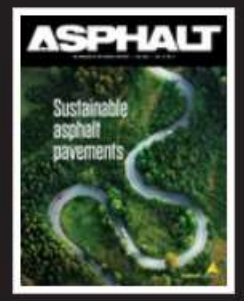
Workaround:

To set a higher **Start Rolling** temperature, open a new **PaveCool** window by selecting **File... New**.

System Requirements

Windows XP, Vista, 7, 8 or 10
20 MB disk space
For problems installing PaveCool or viewing PaveCool Help

Digital Version



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The reality of cold weather compaction

By Dave Johnson, P.E.

Paving seasons vary across the United States from areas that can pave year round to those that have a very limited window for the laying of asphalt mixtures.

For those that are blessed with a year-round scenario, when conditions are less than ideal on a given day, the solution may simply be to wait a day or two for conditions to improve. For the majority, however, the wait option may not be advantageous as that could be six months before a return to improved conditions.

The primary goal of any paving operation should be to achieve the appropriate degree of compaction. For most dense-graded asphalt mixtures that is at least 93 percent of theoretical maximum density (Rice density).

Experienced paving crews recognize that the same practices that produced the desired level of compaction when conditions were ideal will not always do so as those conditions deteriorate. We hope to provide recommendations on how to best reach compaction goals when it gets cold.

Compaction basics

Tips

- Postpone paving till next year if possible
- Have a plan if you have to pave in cold weather
- Make sure HMA is at maximum temperature when loaded at plant
  - Use warm mix additives
- Protect mix during trucking
- Pave maximum thickness possible
  - One thick lift is better than two thin lifts
- Limit time in mix placement
- Use spray paver if possible
- Follow your plan

Options if cold paving was done unsuccessfully

- Apply surface treatment as soon as weather allow
  - Fog seal
  - Chip seal
  - Micro surfacing
- Goal of surface treatment is limit water infiltration
- Slow raveling
- Help to extend pavement useful life

Questions?

Thanks

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