

## LATE SEASON PAVING

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## Why do we worry about it?

- Pavement cools faster in cool weather
  - Harder to get compaction
  - Harder to get good joints
- PaveCool (MnDOT) – 40 mm lift
  - For 25C air and 15C dry granular, it takes 13 min to cool to 90C
  - For 10C air and 2C dry granular, it takes 10 min to cool to 90C
  - For 10C air and 2C wet granular, it takes 8 min to cool to 90C – same conditions but frozen granular, 6 min

## Why does it happen?

- Owner viewpoint
  - “Its our own damn fault”
  - Calling late tenders, unrealistic schedules, unforeseen utility conflicts, funding issues, etc.
- Contractor viewpoint
  - Manpower/equipment availability, weather delays, unrealistic schedules, weather delays, material approvals, weather delays, etc.

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## We have all been on this site



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## Joint density?



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## There's one way to melt the snow



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## Owner Perspective

### - Avoiding late season paving

- Plan for late season work
- Plan for late season work
- Call critical contracts early in the year to allow them to be completed in favourable weather
- Call night work early in the year when weather is more favourable
- Consider rescheduling work until spring if late award is unavoidable

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## Contractor Perspective

### - Avoiding late season paving

- Schedule work for priority
- Always have good weather
- Have sufficient manpower/equipment to complete the work and service the equipment so it is in good working order
- Always have good weather
- Complete mix designs and approvals in advance of the work
- Always have good weather

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## Owner Perspective

### - Dealing with late season paving

- We will always have late season paving because #@&t happens
- Have experienced CAs on site to deal in a timely and constructive manner with issues as they arise
- Don't try to be a meteorologist – sometimes you have to allow paving in borderline conditions on work that can't be postponed but if you do, accept that performance may be compromised

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## Owner Perspective

### - Design issues that assist late season work

- Plan for late season work
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- Finer mixes – easier to place, easier to get compaction
- Echelon paving
- Warm mix – starts lower but loses heat slower
  - No one would ever suggest paving on frozen grade but if you have to, it improves your odds
- Thicker lifts
  - Keep heat longer so easier to place, easier to get compaction

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## Municipal Perspective

- Design issues that assist late season work

	25C/15C Dry	10C / 2C Dry	10C/2C Wet	10C/2C Frozen
<b>HMA 40</b>	13	10	8	5
<b>50</b>	16	13	11	9
<b>60</b>	21	17	15	12
<b>WMA 40</b>	16	12	10	7
<b>50</b>	22	16	14	11
<b>60</b>	29	22	19	15

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## Warm Asphalt – What is it?

- Used to reduce environmental impact but has added construction benefits – compaction aid
- Heating of aggregate greatly reduced so CO<sub>2</sub> reduced, NO<sub>x</sub> and SO<sub>x</sub> are cut in half and cost reduced
- Many processes
  - Chemical packages to change surface interaction, Organic additives, Foaming (mechanical or admixture), Thiopave
- All run at lower temperature of placement
  - Typically 25°C lower than HMA for same conditions
- Used for airport and highway work in Europe
- Many trials in US and Canada

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## Contractor Perspective

### - Construction practices for late season work

- Tarps to keep heat in
- Heated/insulated boxes
- Preheat screed and rollers
- Plan for continuous operations
- MTVs for remixing and holding temperature
- Be aware of weather patterns
- Consider requesting postponement until the spring

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## Contractor Perspective

### - More sophisticated options

- Infrared heaters to warm the grade/asphalt
  - Removes dampness
  - Allows faster tack cure time
- Infrared heaters to pre-warm the rollers
- If using MTV, run some HMA through the MTV to warm up the metal
- Non-diluted tack coat at  $\frac{1}{2}$  application rate
  - Allows faster cure times
- Infrared joint heaters

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## Infrared Heaters



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## Applied joint sealant



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## Thank you



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