6.3mm Thin Asphalt Overlay (Thin Hot Mix Asphalt Overlay or Thinlay)

Neal Fannin
Pavement Materials Engineer
CMD

pennsylvania
DEPARTMENT OF TRANSPORTATION
www.dot.state.pa.us

Research Project on THMAO

- **Four Year Project: June 2012 – June 2016**

- District 8-0, Dauphin County, SR 0022
- District 8-0, Lancaster County, SR 0230
- District 3-0, Lycoming County, SR 0220

Specification features

- New section 412 in Pub. 408
  - **SUPERPAVE MIXTURE DESIGN, CONSTRUCTION OF PLANT-MIXED HMA/WMA 6.3MM THIN ASPHALT OVERLAY COURSES**
- Pub 242 changes
  - Usage guidance in chapter 5.
  - Changes to add this new material to chapters 9, 10, 11, & 12.

Specification features

- Aggregates: Changes to Section 703
  - SRL
    - Coarse Aggregate – SRL as listed in Bulletin 14.
      - AASHTO #89 and #9 aggregate gradations being added to Pub. 408, Section 703.
      - AASHTO #9 aggregate will need to be sampled and pass quality and SRL testing to be used in 6.3mm asphalt.
      - AASHTO #89 aggregate will be approved based on the AASHTO # 8 aggregate quality test results.
    - Fine aggregate –
      - **Manufactured fine aggregate** must be manufactured from the same parent rock as SRL rated coarse aggregate.
      - **Natural Fine Aggregate** – Must be sent for SRL determination.

Specification features

- Aggregates:
  - Consensus properties:
    - Same as superpave except:
      - Flat and Elongated Maximum 10 percent for 1:5 ratio, **and** Maximum 20 percent for 1:3 ratio.

- Can make WMA or HMA.

- RAP & RAS
  - No RAP or RAS allowed

Specification features

- Design Gyrations for all roadways = 75
- Design VMA = 16.5% minimum
- Drain down test (AASHTO 305) required for mixes with greater than 7.0% asphalt content.
- Binder grade is PG 76-22 only. Possible future inclusion of PG 64-22.

Specification features

- Mixture Acceptance:
  - Certification or Lot.
    - Lot acceptance includes
      - Asphalt content.
      - Percent passing 200 sieve.

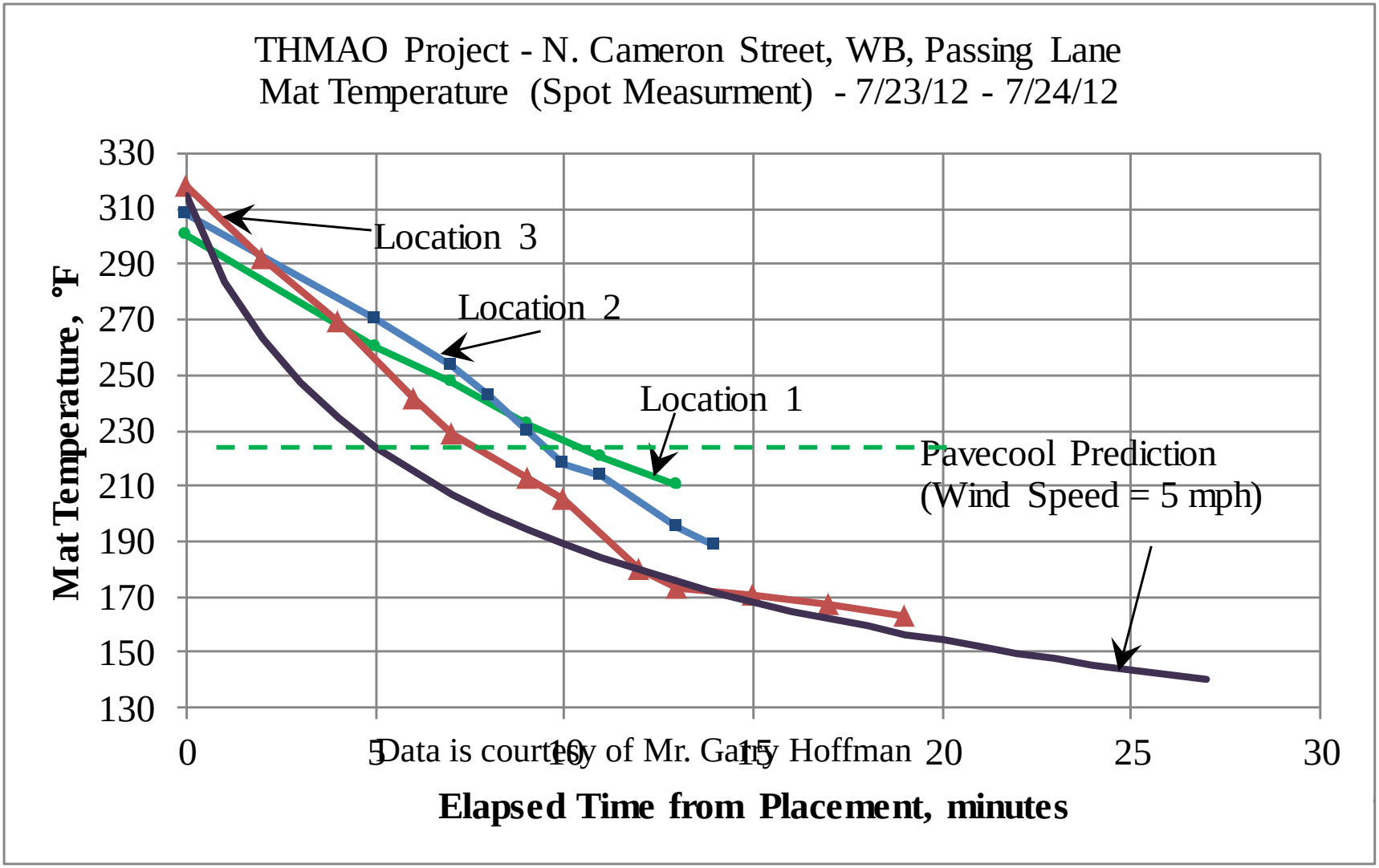
- Density Acceptance:
  - Optimum rolling pattern
    - Information only density core taken from the first lot and sent to LTS.

Specification features

- Tack coat:
  - Proper application and adequate quantity's of tack are very important for thin asphalt layers.
  - New tack specification SOL 481-17-01.

- Weather limitations:
  - Air and Surface Temperatures 50° and rising.
  - For paving season extensions, compaction needs to be completed in less than 10 minutes.

Weather limitations



Thinlay Compaction

PaveCool 3.0 Report

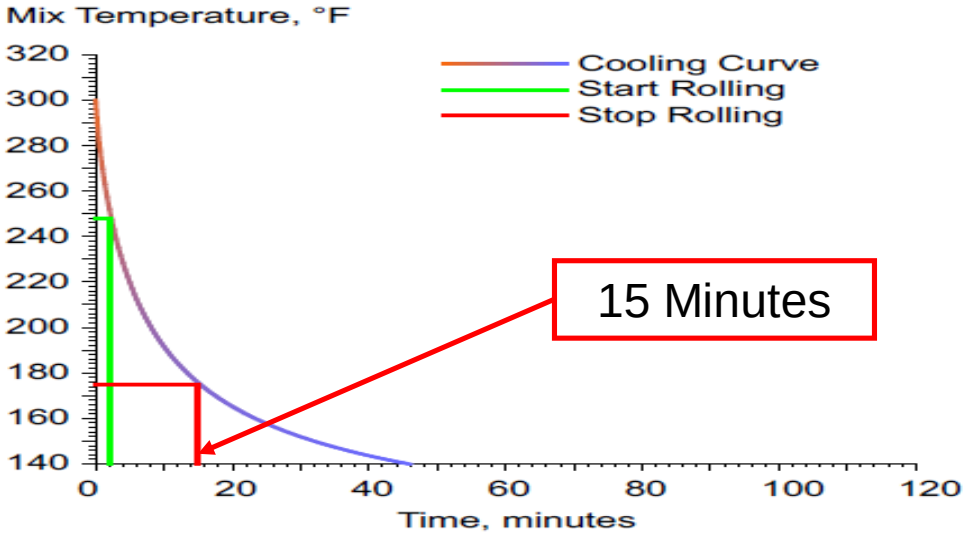
Project: 6.3mm Thinlay

Date & Time	Start Rolling*	Stop Rolling*
1/3/2017 9:25 AM	2 minutes (248 °F)	15 minutes (175 °F)

Mix Type	Binder Grade	Thickness	Delivery Temp.
Fine/Dense	PG 76-22	1.00 in.	300 °F

Air Temp.	Wind Speed	Sky	Latitude
70 °F	5 mph	Clear & Dry	41 ° North

Existing Surface	Moisture	State	Surface Temp.
Asphalt			110 °F



PaveCool File:
6.3mm Thinlay 40 deg.pc3

Thinlay Compaction

PaveCool 3.0 Report

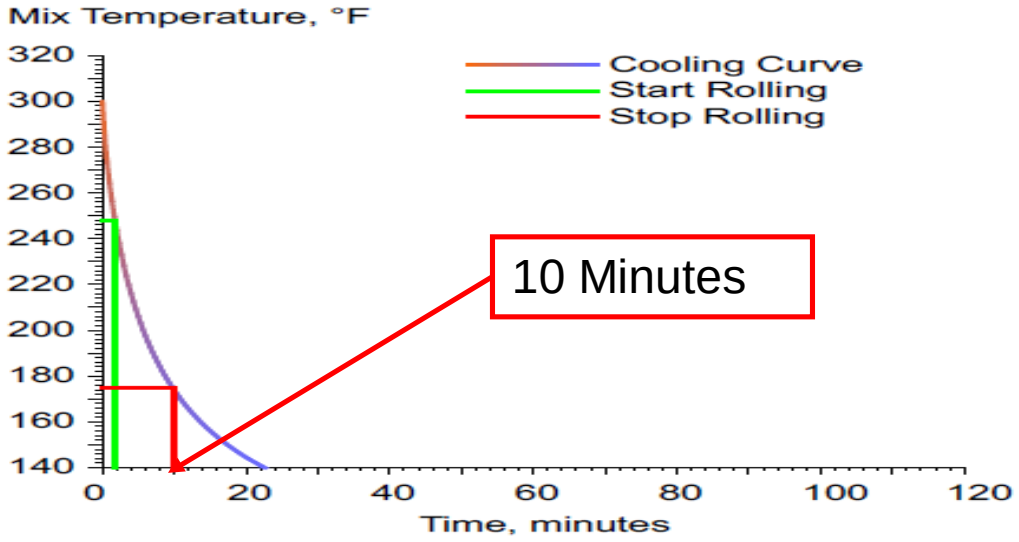
Project: 6.3mm Thinlay

Date & Time	Start Rolling*	Stop Rolling*
1/3/2017 9:25 AM	2 minutes (248 °F)	10 minutes (175 °F)

Mix Type	Binder Grade	Thickness	Delivery Temp.
Fine/Dense	PG 76-22	1.00 in.	300 °F

Air Temp.	Wind Speed	Sky	Latitude
70 °F	5 mph	Clear & Dry	41 ° North

Existing Surface	Moisture	State	Surface Temp.
Asphalt			70 °F



PaveCool File:
6.3mm Thinlay 40 deg.pc3

Thinlay Compaction

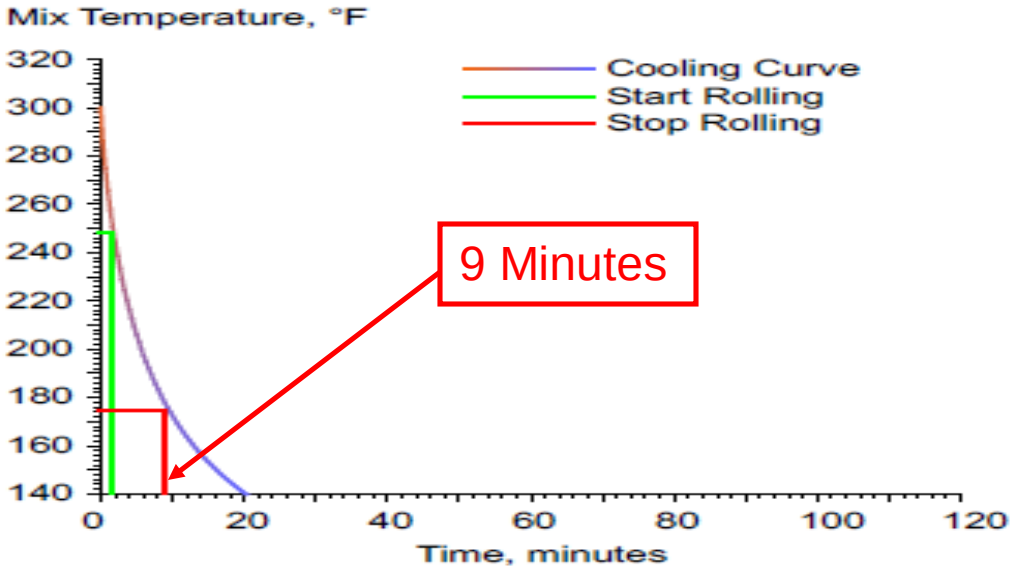
PaveCool 3.0 Report

Date & Time	Start Rolling*	Stop Rolling*
1/9/2017 10:20 AM	2 minutes (248 °F)	9 minutes (175 °F)

Mix Type	Binder Grade	Thickness	Delivery Temp.
Fine/Dense	PG 58-34	1.00 in.	300 °F

Air Temp.	Wind Speed	Sky	Latitude
50 °F	5 mph	Clear & Dry	41 ° North

Existing Surface	Moisture	State	Surface Temp.
Granular Base	Dry	Unfrozen	50 °F



PaveCool 3.0 Report

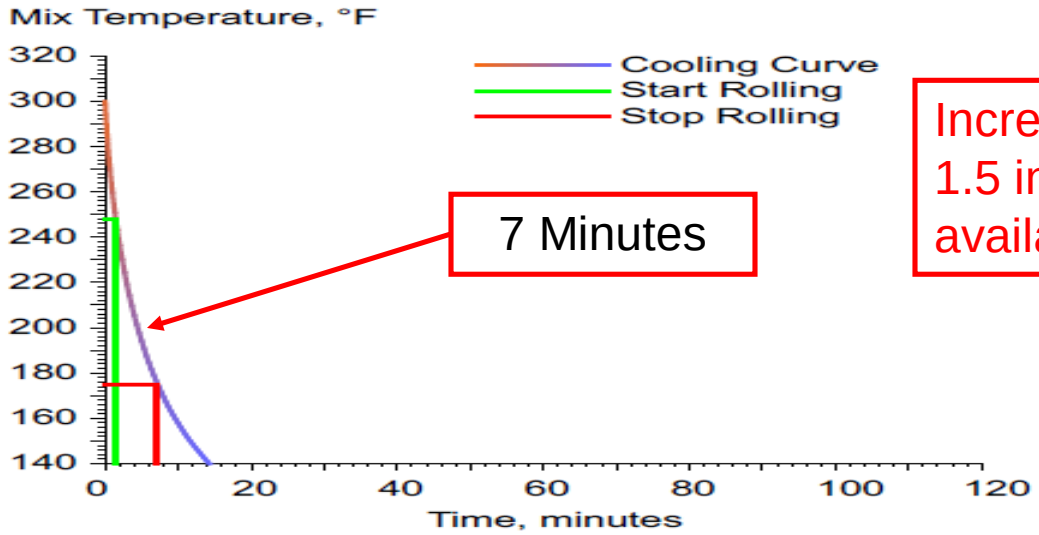
Project: 6.3mm Thinlay

Date & Time	Start Rolling*	Stop Rolling*
1/3/2017 9:25 AM	1 minutes (248 °F)	7 minutes (175 °F)

Mix Type	Binder Grade	Thickness	Delivery Temp.
Fine/Dense	PG 76-22	1.00 in.	300 °F

Air Temp.	Wind Speed	Sky	Latitude
40 °F	5 mph	Clear & Dry	41 ° North

Existing Surface	Moisture	State	Surface Temp.
Asphalt			40 °F



7 Minutes

Increasing the thickness to 1.5 inches increases time available to 14 minutes.

PaveCool File:
6.3mm Thinlay 40 deg.pc3

Where Is Use of Thin Asphalt Appropriate?

- Roadway Conditions:
  - Good base condition, well repaired base,
  - Patched pavement in good condition
  - Minor base depressions

- 6.3mm thin asphalt overlay can help with:
  - Excessive roughness,
  - Poor surface friction and polishing,
  - Bleeding and weathering,
  - Shoving/ low severity surface related rutting,
  - Minor/Moderate Raveling,
  - Bumps, settlements, and heaves.
  - Scratch / interlayer.

Where Is Thin Asphalt Use NOT Appropriate?

- Base problems
- Alligator cracking,
- High severity rutting,
- High severity longitudinal cracking,
- Active cracking.

Summary

- Thin Asphalt A Good Tool for Surface Treatment.
- Improved Ride and Friction.
- Minimal Rutting Observed.
- Reflective cracking will occur.

Summary

- Proper Base Repair is a MUST.
- Pay special attention to tack coat application.
- Thin layers loose heat faster and need to be compacted sooner. (Within 10 minutes.)

Current Status

- First round Clearance Transmittal comments where due 12/28/2016.
- Second round Clearance Transmittal will be out in a month or so.

Questions?

pennsylvania
DEPARTMENT OF TRANSPORTATION
www.dot.state.pa.us