Florida Department of TRANSPORTATION

RAP Binder Availability Overview

Flexible Pavement Committee Meeting

Greg Sholar

August 15, 2024

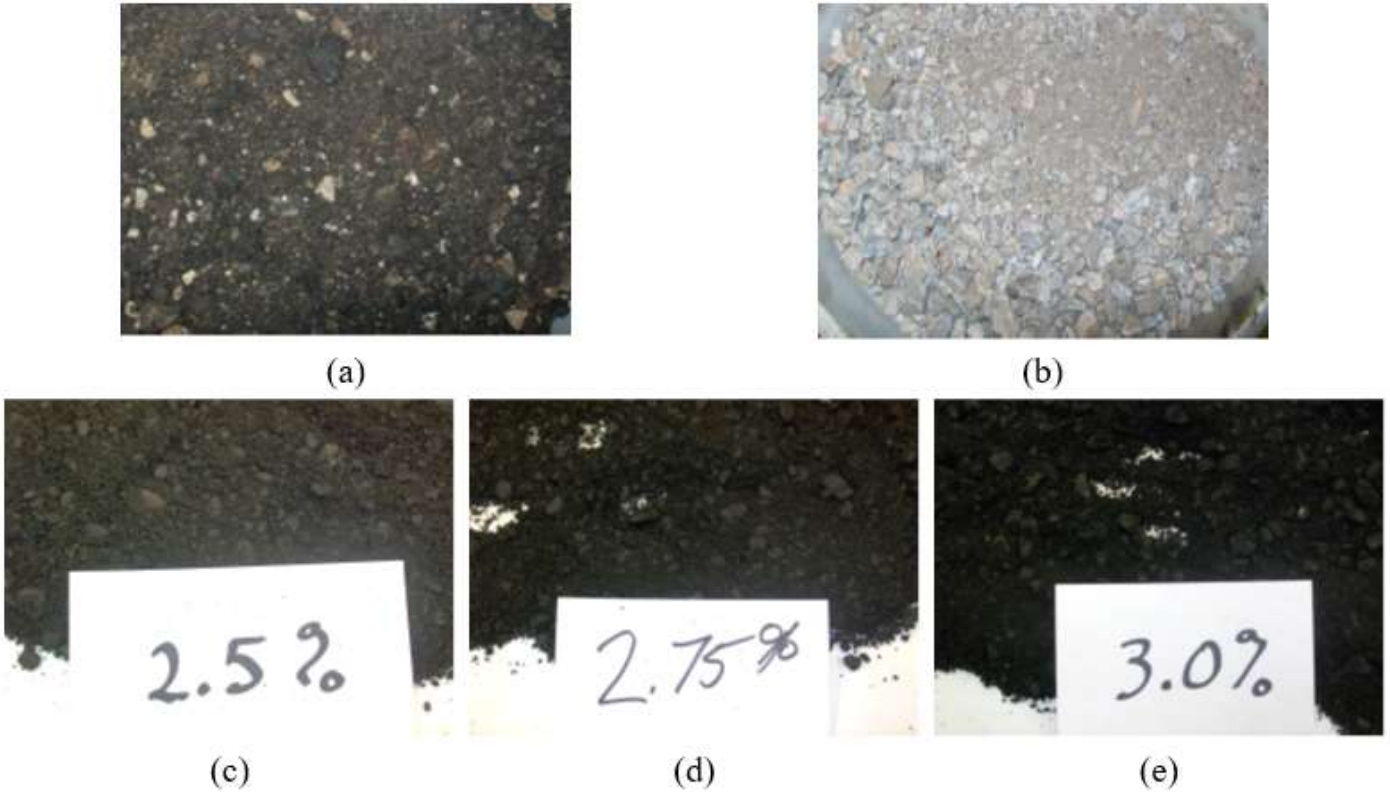
Florida Department of TRANSPORTATION

What is RAP Binder Availability (RBA)?

- Acknowledgment that not all of the binder in RAP may be active in the mix. RAP may partially act as a black rock.
- Some states add extra binder back into the mix to account for this.
  - In 2012, GDOT started adding new binder in the amount of 25% of the RAP binder content.
  - In 2019, GDOT changed the amount added to 40%.
  - Alleviates concerns of “dry” mixtures, which can be prone to cracking.

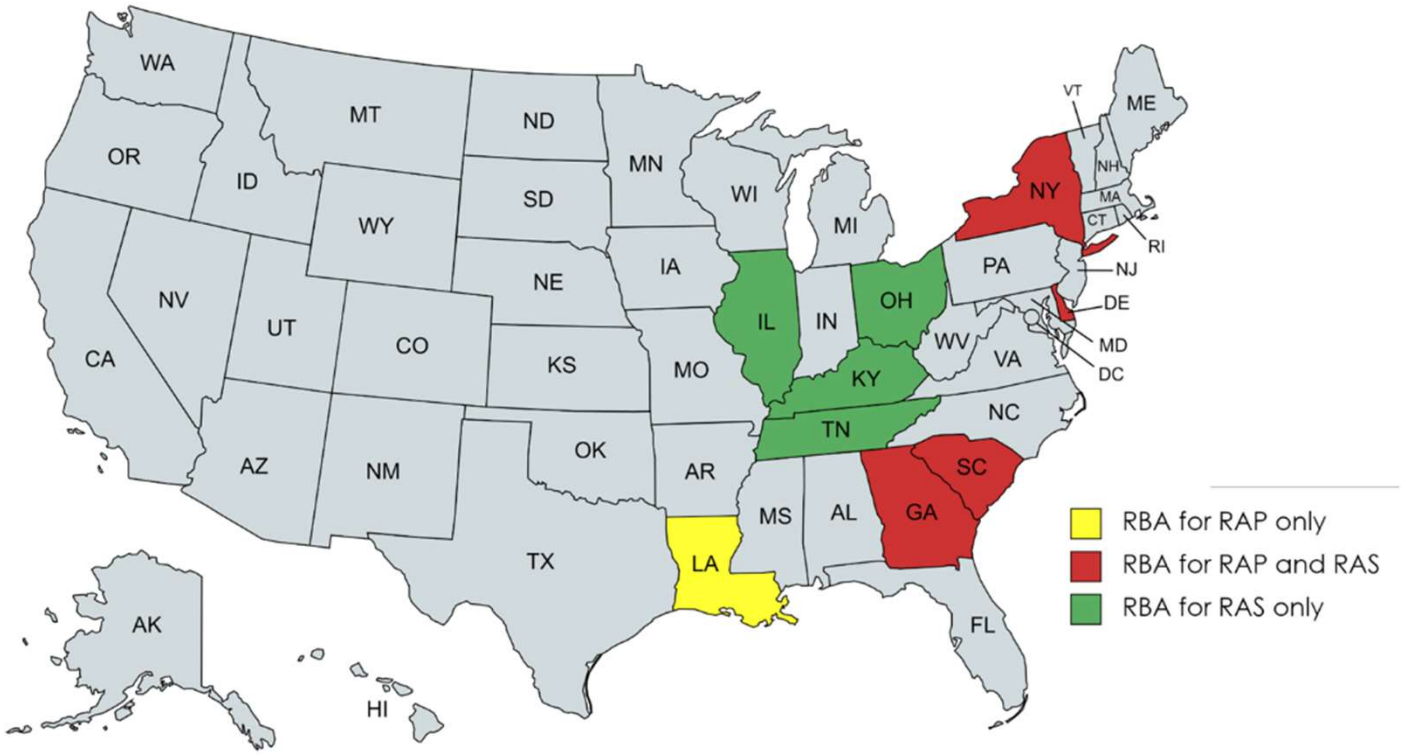
Florida Department of TRANSPORTATION

GDOT Research



Florida Department of TRANSPORTATION

Implementation of RBA for RAP/RAS



Florida Department of TRANSPORTATION

FDOT Funded Research Study

- NCAT completed a project to examine RBA for Florida.
- Recommended an availability factor of 80%. I.e., 20% of RAP binder is inactive. (More conservative than GDOT. Good starting point).
- Measured cracking and rutting performance in the lab.
  - Improved cracking performance using RBA.
  - In some instances, slight increase in rutting, but minor.
- LCCA showed pavement only needs to last 2 months longer to justify increased cost of RBA binder.

Florida Department of TRANSPORTATION

Ideas and Challenges

- Eliminate softest binder, PG 52-28, to address rutting concerns due to increased binder content.
- Replace PG 58-22 with PG 58-28 to address cracking concerns due to higher percentages of RAP.
- Create new table with changed RAP percentages for binders.

Table 334-2 Asphalt Binder Grade for Mixes Containing RAP	
Percent RAP	Asphalt Binder Grade
0 - 30	PG 67-22
>30	PG 58-28

Florida Department of TRANSPORTATION

Ideas and Challenges

- Mix Design
  - Adding extra binder reduces air voids. Two approaches:
    - Reduce gyrations to get back to 4% air voids.
    - Change air void target.
  - Other ideas?

Florida Department of TRANSPORTATION

Ideas and Challenges

- Mix Design
  - Approximately 0.1% AC added for every 10% RAP (based on 5% AC content in RAP).
  - NCAT “Rule-of-Thumb”:
    - For every 0.1% AC added, gyrations reduce by 10. Simple approach.
    - Ex: If adding 0.3% AC to a 75-gyration mix, then new gyration level would be 75 - 30 = 45.
    - May not always agree with backcalculation method.

Florida Department of TRANSPORTATION

Thank you.

Comments/Questions?