RAP Stockpile Management Best Practices

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Contents

Introduction

Reclaimed Asphalt Pavement (RAP) is critical for conserving natural resources, and when properly managed and incorporated into hot-mix asphalt (HMA), it supports sustainability without sacrificing pavement performance.

Effective management of RAP stockpiles is critical to reduce variability in HMA and ensure consistent pavement performance. Variability in RAP stockpiles, such as aggregate gradation and asphalt content (AC), can compromise mix quality and limit the percentage of RAP usage in HMA.

This document outlines some best practices that producers can use to minimize variability through improved stockpile handling and processing. Producers are encouraged to modify their Quality Control Plan to address the proper handling and processing of RAP.

Eliminate Contamination

Contamination is a primary source of RAP variability. To maintain RAP quality:

- Prevent inclusion of deleterious materials such as concrete, wood, steel, vegetation, and road debris.
- Avoid placing RAP on untreated ground to prevent soil contamination.
- Keep stockpiles free of geosynthetics, markers, and construction trash.
- RAP with decantation greater than 5% and a plasticity index greater than 8 is prohibited.

Separate Stockpiles by Source

Maintaining separate RAP stockpiles improves consistency:

- Avoid mixing RAP from various sources unless thoroughly blended.

- Separate RAP with Surface Aggregate Classification (SAC) A or lightweight aggregates.
- Separate large quantities of RAP from single projects when feasible.
- Keep Contractor-owned and Department-owned RAP stockpiles separate.
- Test incoming millings before adding them to unprocessed or usable RAP when feasible.
- Avoid blending uncoated plant waste with millings.

Blend Before Processing

Uniformity in processed RAP depends on thorough blending:

- Use front-end loaders to dig from various angles.
- Avoid sequential excavation as it does not adequately mix materials.
- Blending prior to processing ensures more homogeneous processed RAP.

Process and Fractionate RAP

Processing should be consistent and controlled:

- Fractionated RAP must have 95% passing the ½-inch sieve, unless overwise approved.
- Run processing plants at consistent speeds.
- Monitor screens for wear and experiment with screen types.
- Avoid over-crushing, as it creates excessive fines and dust that affect mix performance.

Store Processed RAP Properly

Moisture retention affects mix quality and cost:

- Use stackers with low discharge points to reduce segregation.

- Prefer tall, conical stockpiles over horizontal ones, and control height to limit segregation.
- Store RAP on paved or other suitable sloped surfaces to prevent contamination and aid drainage.
- Covered storage (e.g., open-sided roofs) can reduce moisture without trapping humidity.

Ownership

- Contractors may use Contractor-owned RAP, including HMA plant waste, unless restricted by project plans.
- If Department-owned RAP is available for the Contractor's use, the Contractor may use Contractor-owned fractionated RAP and replace it with an equal quantity of Department-owned RAP.
- RAP generated during contract work may be used if permitted; contractors are responsible for testing all RAP for suitability.
- The Department does not guarantee the quality of its RAP unless specified in the plans.

Testing and Quality Control

Maintain quality through regular testing:

- Collect samples while processing or from the processed stockpile. Sample from the active or working face of the RAP stockpile.
- Test RAP at the minimum frequency of **one test per 1,500 tons of RAP used in surface mixtures**.
  - Run asphalt content and aggregate gradation on each sample.
- Use control charts to monitor trends and adjust processing. Make the RAP control charts available to the Engineer when requested.

Loading and Plant Use

Ensure consistent feed into the plant:

- Create a surge pile from processed RAP to stabilize feed.
- Calibrate and maintain feed systems and weigh hoppers regularly.

Production Operations and End of Project

- Submit a new mix design when the AC of the RAP stockpile varies from the value used in the mix design **and** the new recycled binder ratio exceeds the allowable percentage in the specification.
- Remove unused Contractor's RAP from the project site upon completion of the project.
- For Department-owned RAP that must be returned, ensure unused RAP is delivered to designated stockpile locations.

Conclusion

Applying these best practices helps reduce RAP variability and enhances HMA performance. While not eliminating all variability, these guidelines provide a strong foundation for consistent, high-quality RAP use in pavement construction.

REFERENCES:

TxDOT 2024 Standard Specifications for Construction and Maintenance of Highways, Streets, and Bridges

Zhou, F. RAP Stockpile Management and Processing in Texas: State of the Practice and Proposed Guidelines, Texas Transportation Institute, Technical Report: 0-6092-1