

# NCHRP

NATIONAL  
COOPERATIVE  
HIGHWAY  
RESEARCH  
PROGRAM

Project 9-46

## Improved Mix Design, Evaluation, and Materials Management Practices for Hot Mix Asphalt with High Reclaimed Asphalt Pavement Content

# Background

- RAP used by some states on a regular basis
- Usage often limited to 10-25%
- A limitation of higher RAP usage is a mix design procedure
  - High RAP content= 25% or greater

# Objectives

- Develop a mix design for high content RAP mixes
  - As good or better long term performance as virgin HMA
- Recommendations to current mix design procedures

# Phase I

- Review current specifications for high RAP content mixes
- Review research on high RAP content mixes
- Review materials management, production, and placement practices
- Propose a mix design procedure

# Phase I: Proposed Mix Design

- Account for binder, aggregate, and mix properties
- Address modifiers
- Address compaction effort
- Address performance testing
  - Conditioning
  - Tests
- Account for blending

# Phase I: Performance Properties

- Surface, intermediate, and base
- Vary binder (modified & unmodified), aggregate, RAP, RAP content
- Distress of concern
  - Permanent deformation
  - Fatigue
  - Low-temperature cracking
  - Moisture susceptibility

# Phase II

- Evaluate proposed mix design in laboratory
- Develop mix design recommendations
- Compare high RAP content to virgin mixes
- Revise mix design procedure based on evaluation of high RAP mixes and comparison with virgin mixes
- Evaluate three field projects using mix design procedure

# End Products

- Mix design recommendations for high RAP mixes
- Guidelines for materials management, production, and placement
- Final report detailing findings and recommendations
- More information:  
[http://www.trb.org/NotesDocs/NCHRP\\_Announcement.pdf](http://www.trb.org/NotesDocs/NCHRP_Announcement.pdf)