TEST SCREEN

KENT HENDERSON

- Petroleum Sciences, Spokane, WA 1983 – 2006
- HCI Services, LLC 2007 to 2012 and currently
- Managed Asphalt Labs at 2 Geotech firms
  - 2013-2015 (Contractor Mix Design & QC testing)

RECYCLED ASPHALT PAVEMENT QUALITY CONTROL AND MIX DESIGN

(And related bits of information.)

50th anniversary of the
inspiration for
the modified lottman
(AASHTO T283)….

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sort of…

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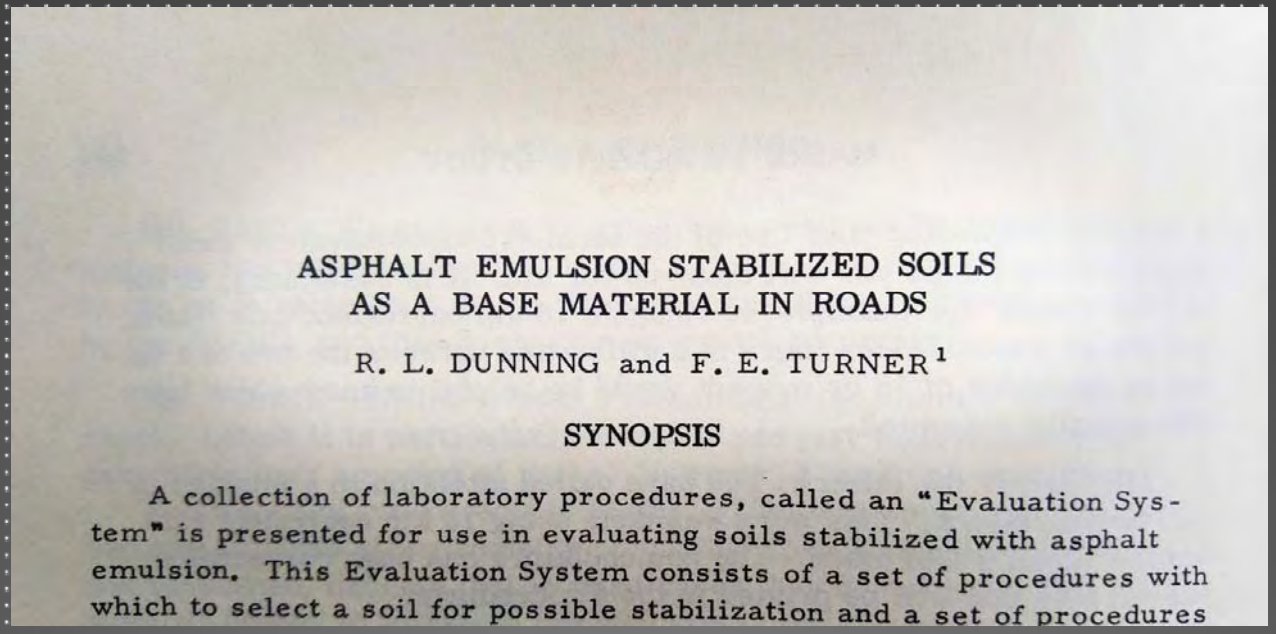

ASPHALT EMULSION STABILIZED SOILS
AS A BASE MATERIAL IN ROADS

R. L. DUNNING and F. E. TURNER[1]

SYNOPSIS

A collection of laboratory procedures, called an "Evaluation System" is presented for use in evaluating soils stabilized with asphalt emulsion. This Evaluation System consists of a set of procedures with which to select a soil for possible stabilization and a set of procedures

50th anniversary of AASHTO T283 (TSR) (sort of….)

- 1965 AAPT paper by Robert Dunning
- Procedure for designing Emulsion Stabilized Bases
- Introduced vacuum soak procedure for quicker saturation

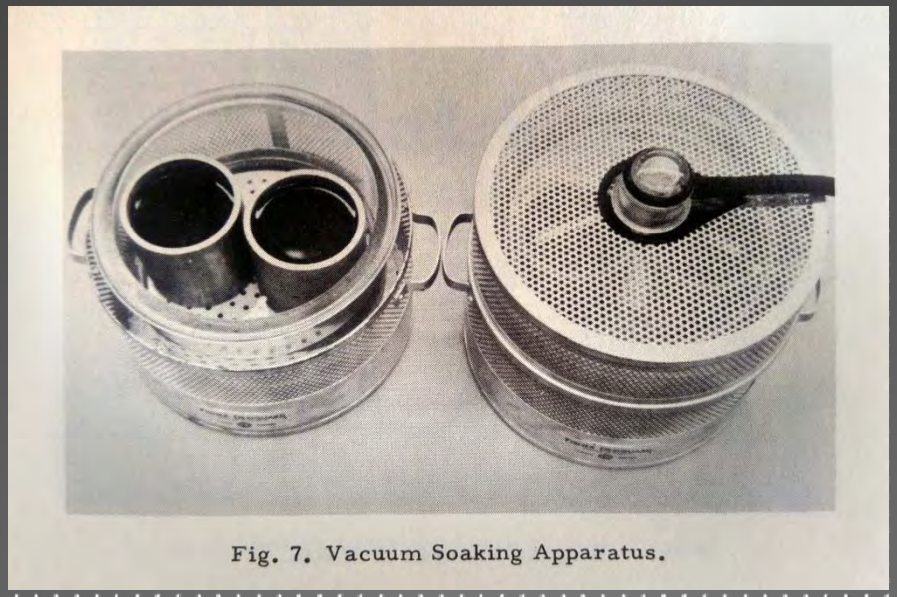

Fig. 7. Vacuum Soaking Apparatus.

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- NCHRP 1978

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PREDICTING MOISTURE-INDUCED DAMAGE TO ASPHALTIC CONCRETE

FIELD EVALUATION PHASE

ITD-RP081-INT

INTERIM REPORT

Prepared for
National Cooperative Highway Research Program
Transportation Research Board
National Research Council

University of Idaho
R.P. Lottman
Moscow, Idaho 83843

UI Project 677-K297

September 1978

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- "Lottman Test" and "Modified Lottman" = AASHTO T283.

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- A survey in 2002 showed 36 states and the District of Columbia used T283 in one form or another-
- Alabama, Colorado, Conneticut, District of Columbia, Delaware, Florida, Georgia, Iowa, Illinois, Indiana, Kansas, Kentucky, Louisiana, Maine, Maryland, Michigan, Minnesota, Mississippi, Missouri, Montana, Nebraska, Nevada, New Jersey, New York, North Carolina, North Dakota, Ohio, Oklahoma, Oregon, Pennsylvania, South Carolina, Tennessee, Texas, Utah, Virginia, Vermont and Washington State.

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IDAHO

RECYCLED ASPHALT PAVEMENT QUALITY CONTROL

(And related bits of information.)

RECYCLED ASPHALT PAVEMENT QUALITY CONTROL

- Save Money

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- Sustainable Development

RECYCLED ASPHALT PAVEMENT QUALITY CONTROL

- Save Money
- Sustainable Development
- make a Good Product.

RAP QUALITY CONTROL- CRADLE TO GRAVE

- Production- Milling & Full-Depth Reclamation
- Processing & Stockpiling
- Testing/Properties
- Mix Design
- One new idea on Production QC with RAP mixes

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- Core evaluation to determine depth
- Monitor milling progress, ensure RAP is not contaminated
- Avoid or minimize base rock, native grade, excessive geo fabric

FULL-DEPTH DEMO/RECLAMATION

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- Primarily used as shoulder or base material.

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  - Meet agency specs- ITD 5/8" requirement
  - Control P200's in the final stockpile
- Testing…

UNPROCESSED & PROCESSED STOCKPILES

UNPROCESSED STOCKPILE(S)

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  - Separate piles for separate sources?

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  - Separate piles for separate sources?
  - Not a place for small dumps of soil, base or concrete rubble.

PROCESSED STOCKPILE(S)

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  - Return at intervals to verify use of pile and witness production sample

PROCESSED SINGLE STOCKPILE

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- Dedicated or Replenished?

PROCESSED SINGLE STOCKPILE

- Dedicated or Replenished?
- Does the QC data in a mix design reflect 10,000 tons from the beginning of the year, but your job isn't paving until September?

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- Easier to blend RAP into multiple size mixes (3/4" & 1/2")
- More consistent product, better end result?

FRACTIONATING

- MnDOT 2013 report

FRACTIONATING

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- "The performance of RAP, FRAP and other test cells did not differ significantly when it came to distress, ride quality, structural characteristics or noise and friction. RAP percentage and fractionation did not greatly influence low temperature cracking and did not influence ride performance more than seasonal variation and base type. Structural performance changed little over four years and did not vary greatly between test cells."

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- Binder should be evaluated for both piles
  - Fine pile- higher surface area, higher proportion of softer binder

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- LA Wear and/or a degradation test also required by many agencies

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- Bulk Specific Gravity of aggregate component for mix design volumetric calculations.
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- Assumes the correction factor between Solvent and Ignition is accurate
- Option to measure directly on recovered aggregate

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- Solvent Extraction (AASHTO T164)
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- Solvent Extraction (AASHTO T164)
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  - Cons- higher test variability for percent binder
- ITD assumes the Solvent Extraction is the correct value and establishes an Ignition Furnace correction factor

MEETING PG GRADE

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- Low- assume negligible impact
- Medium- Binder Bump one grade
- High- recover binder and custom blend virgin asphalt with RAP asphalt to meet the PG grade


600
140
140

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  - Screen for batching or quarter into sample sizes

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- HMA with RAP needs to meet same criteria as non-RAP HMA
- Verifying RAP quantity
- Research on use of IR measurement for RAP percentage

MEASURING RAP CONTENT IN HMA BY INFRARED SPECTROSCOPY

- On-going research project through Idaho Transportation Department
- Delmar Salomom, Pavement Preservation Solutions, Boise, ID
- Measure IR signals on virgin binder (0%)
- Measure IR on 100% recovered RAP binder
- Measure increments appropriate for each mix design
- Tentative- screening HMA on a fine sieve
- Obtain signal from a "pill"

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