Virginia Pavement Research and Innovation Symposium

ADVANCED MIX DESIGN SERVICES

By
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Bluegrass Testing Laboratory
Bluegrass Testing Laboratory

- Who we are:
  - A subsidiary of Louisville Paving Company
  - An AASHTO Accredited lab facility located in Louisville, KY
  - We are in compliance with ASTM D3666 and provide asphalt mix design testing for FAA projects across the United States
  - At present we provide asphalt mix design and construction materials testing services in eleven states
HIGHWAY PAVEMENTS
Airfield Pavements
RACE TRACKS and ROAD COURSES

Miller Motor Sports Park, Toole, UT

Kern Co. Speedway, Bakersfield, CA
Pavement Mixtures for Bridge Decks

I-65, Lincoln Bridge
Asphalt Mixture Design

• Types of Hot Mix Asphalt Mix Designs Performed:
  • Superpave Volumetric Mix Designs
    • Dense Graded Designs
    • SMA
    • OGFC
  • 4 inch Marshall Mix Designs (some states/FAA)
    • Static Base
    • Rotating Base
    • Manual
Asphalt Mixture Testing

• Moisture Damage Susceptibility Testing
  • AASHTO T283
  • ASTM D4867
  • ASTM D1075 (Idaho)
  • AHTD 455 (Arkansas)
  • AASHTO T324 (Hamburg Loaded Wheel Testing)
    • Stripping Inflection Point
Asphalt Mix Designs

• Types of Asphalt Mix Designs Performed:
  • Hot Mix Asphalt
  • Warm Mix Asphalt (Foamed Asphalt and/or Chemical)
  • Additive evaluations (Mix and Binder)
AGGREGATE TESTING

• Aggregate Testing:
  • Aggregate Specific Gravity and Absorption
  • Sand Equivalent
  • Flat and elongated
  • % Lightweight
  • LA Abrasion Loss
  • Micro-Deval
  • Aggregate Soundness Loss (Sodium and Magnesium Sulfate Soundness)
  • Plastic Limits
  • Proctor/Modified Proctor
Asphalt Mix TESTING

• Pavement Analysis
  • Forensic investigations of **UNDER PERFORMING** pavements
  • Failure is a word to use cautiously
  • Typical investigation involving:
    • Site visit to map out what needs to be accomplished to develop a picture of what has/is happening
    • Testing accomplished to secure the support test data
    • Drone over flight from multiple perspectives to record any visual problems if needed
    • Report and then defense of position as needed
Asphalt Binder Testing

• Asphalt binder testing
• AASHTO M320 Performance Graded Binder Spec.
• AASHTO M332 Multiple Stress Creep Recovery Binder spec.
Asphalt Mix Design

• Development of Alternative Mix Design Gradings
  • To develop a mix design grading that will address project specific needs
    • Mixture type needed to address heavy loading (1.5 inch base, 0.75 inch surface)
    • Mixture type to address needed speed of construction and still address:
      • Durability (compaction, permeability, adequate structure for loading conditions)
PROCESSED RAP
Asphalt Mixture Design

• Recycle Mix Designs
  • Most every state DOT has specification limits on how much and type of recycle [unprocessed RAP, Coarse RAP, Fine RAP, RAS (manufacturer waste, post consumer waste)] that is allowed.
  • When agencies/mix producers have large quantities of recycle material:
    • Can the recycle %’s be increased safely?
    • Can it be proved?
  • Some agencies/owners allow the opportunity for higher recycle %’s if you can:
    • Prove what is being proposed is a safe/responsible use
    • Relevant specification limits (most typically low temperature binder grade) are not violated
    • A Balanced Mix Design approach is adhered to
      • Cracking test (to see if the proposed product(s) adequately address cracking susceptibility)
      • Loaded wheel testing (to see if the proposed product(s) increase the potential for rutting)
Asphalt Mix Testing Services

• Testing Services
  • Indiana DOT Acceptance Testing Services Contract
    • 2500-3000 samples per year
    • 4 year contract
    • Daily sample pickup (532 miles roundtrip daily)
    • All samples come from paving site plate samples
    • Ignition oven rejected and ACCEPTANCE % AC by Trichlor Solvent Extraction
    • Combined Aggregate bulk specific gravity verified during production using extracted mineral aggregate from paving site plate samples
  • To date:
    • Some days 40 + solvent extractions (trichloroethylene)
    • Some days 60 + aggregate gradations
    • Supplemental dryback procedures for most maximum specific gravity samples due to absorptive aggregate