Purdue Road School 2012

Reducing Your Cost for Asphalt Pavements
Asphalt Pavements at Less Cost

Reduce your Asphalt Pavement costs by:

• Specifications
• Pay Item Selection
• Placement Savings Opportunities
• Pavement Savings Opportunities
Asphalt Pavement Specifications

• Specifications
  – INDOT Specification Sections 401 vs. 402
  – Reused Asphalt Pavement
  – Recycled Asphalt Shingles
    • Tear-offs
    • Manufacturer Seconds/Tabs
  – Warm Mix Asphalt
INDOT 401 vs. 402

• Same
  – Mix Designs for same traffic levels
  – Quality of Mix
  – Mix Production Quality Control
  – Desired Pavement Quality

• Difference
  – Acceptance of mix procedures
  – Compaction process and acceptance of density
  – Smoothness of Road acceptance

• 401 Creates much more work and cost for Agency
Same Mix Designs

• Gerry covered the Mix Design process.
• Surface, Intermediate or Base mix for a traffic category is the same for 401 or 402.
• An aggregate size mix does not change in mix design for usage as a Surface, Intermediate or Base course for Class A or B mixes.
• Example - A 12.5 mm mix is the same used in any course.
Same Quality of Mix

• 401 and 402 require the same
   – Liquid Binder
   – Aggregate
   – Quality Control at plant

• 402 - Contractor certifies with a Type D certification the mix meets quality specs.

• 401 - Agency must do acceptance testing to accept the mix as meeting quality specs.
Pavement Acceptance

• 401 Specification
  – Density – contractor determines method and equipment, acceptance per compaction tests
  – Smoothness – acceptance per profilograph results

• 402 Specification
  – Density – contractor accomplishes per specified rolling equipment and pattern
  – Smoothness – acceptance per 16’ straight edge
Mix Acceptance

• 402 no additional cost to the Agency

• 401 Agency responsibilities:
  – On site to view collection of sample, contractor collects from pavement.
  – Proper transport of sample to not compromise
  – Complete gyratory compaction and ignition oven tests
  – Pay incentive/disincentive payment per test results
  – Additional testing if contractor requests appeal
Pavement Acceptance

• 402 no additional cost to Agency

• 401 Agency responsibilities for Density
  – Witness and take possession of density cores accomplished by contractor
  – Transport cores to protect
  – Density tests
  – Additional tests if contractor appeals results.
  – Pay incentive/disincentive on results
Pavement Acceptance

- 401 - Agency responsible for Pavement Smoothness acceptance testing
  - Less than 45 MPH, straight edge acceptance.
  - Greater than 45 MPH, Profilograph acceptance
    - Agency present for running of profilograph
    - Agency takes profilograph results
    - Agency determines the results per specs
    - Agency pays incentive/disincentive per specs
401 or 402

• Agency receives the same quality of mix with no additional acceptance cost with 402.
• Agency receives specified quality pavement with no additional acceptance cost with 402.
• Agency does not have to budget for incentive/disincentive for 402.
Specification allow RAP/RAS

• Reduce Cost – Reuse/Recycle
  – Reused Asphalt Pavement
  – Recycled Asphalt Shingles
  – Allowed per INDOT specification up to 40% of binder replacement in mix.
  – Quality of mix is not compromised and may be enhanced.
  – Substantially reduces mix cost.
Reused Asphalt Pavement

- Source is milled roads, chunked out pavements and plant run mix
- Crushed to ½” minus or ¾” minus passing
- Quality control is similar to virgin aggregate
- Find std deviation less than virgin aggregate
- Computer metered conveyed into plant
- Valuable as is 5% +/- asphalt @ $600 = $30/T, aggregate is about $12 for $42 value
Recycled Asphalt Shingles

- Source is Manufactured tabs or seconds or tear-off from residential houses.
- Must be tested for asbestos, but no residential shingles have been made with since early 80s.
- Ground to 3/8” minus sieve for proper mixing.
- IDEM letter of legitimate usage.
- Computer metered conveyed into plant.
- Valuable 19% asphalt Manuf; 23% TO.
Virgin 9.5 Surface Mix Cost

- 9.5 Aggregate 58% @ $15/T = $8.70
- Sand 20% @ $12/T = $2.40
- Manuf. Sand 15% @ $20/T = $3.00
- RAP 0.0% @ $20/T = $0
- PG 64-22 6.0% @ $600/T = $36.00
- TOTAL = $50.10
RAP 9.5 Surface Mix Cost

- 9.5 Aggregate 38.5% @ $15/T = $5.78
- Sand 20% @ $12/T = $2.40
- Manuf. Sand 0% @ $20/T = $0.00
- RAP (5%) 30% @ $20/T = $6.00
- PG 64-22 4.5% @ $600/T = $27.00
- TOTAL = $41.18
- Virgin = $50.10 Savings = $8.92
RAS 9.5 Surface Mix Cost

- 9.5 Aggregate  58%  @ $ 15/T = $ 8.70
- Sand  28.5%  @ $ 12/T = $ 3.42
- Manuf. Sand  0.0%  @ $ 20/T = $ 0.00
- RAS(fac, 19%)  8.0%  @ $ 38/T = $ 3.04
- PG 64-22  4.5%  @ $600/T = $27.00

TOTAL = $42.16

Virgin = $50.10  Savings = $ 7.94
RAS 9.5 Surface Mix Cost

• 9.5 Aggregate 58% @ $ 15/T = $ 8.70
• Sand 31% @ $ 12/T = $ 3.72
• Manuf. Sand 0.0% @ $ 20/T = $ 0.00
• RAS(TO, 23%) 6.5% @ $ 28/T = $ 1.82
• PG 64-22 4.5% @ $600/T = $27.00
• TOTAL = $41.24
• Virgin = $50.10  Savings = $ 8.86
### RAP/RAS 9.5 Surface Mix Cost

- **9.5 Aggregate**: 40% @ $15/T = $6.00
- **Sand**: 36.5% @ $12/T = $4.38
- **Manuf. Sand**: 0.0% @ $20/T = $0.00
- **RAP (5%)**: 15.0% @ $20/T = $3.00
- **RAS (fac, 19%)**: 4.0% @ $38/T = $1.52
- **PG 64-22**: 4.5% @ $600/T = $27.00
- **TOTAL**: $41.90
- **Virgin**: $50.10  
  **Savings**: $8.20
RAP 9.5 Surface Mix Cost

- 9.5 Aggregate 30.0% @ $ 15/T = $ 4.50
- Sand 18.4% @ $ 12/T = $ 2.21
- Manuf. Sand 0.0% @ $ 20/T = $ 0.00
- RAP (5%) 48.0% @ $ 20/T = $ 9.60
- PG 58-28 3.6% @ $650/T = $23.40
- TOTAL = $39.70

Virgin = $50.10

Savings = $10.39
9.5 Surface Mix Cost Summary

• Virgin material cost $50.10

• 25 % Binder Replacement
  – RAP - $8.92
  – RAS, Factory - $7.94
  – RAS, Tear-Offs - $8.86
  – RAP/RAS (Factory) - $8.20

• 40 % Binder Replacement
  – RAP - $10.39
19.0mm Open Graded Mix Cost

- 19.0 Aggregate 86.0% @ $15/T = $12.90
- Sand 10.9% @ $12/T = $1.31
- RAS(TO, 23%) 0.0% @ $28/T = $0.00
- PG 76-22 3.1% @ $740/T = $22.94

TOTAL = $37.15
19.0mm RAS Open Graded Mix Cost

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<th>Percentage</th>
<th>Cost/Unit</th>
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<td>PG 70-22</td>
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Warm Mix Asphalt

• INDOT no longer has WMA as a special mix.
• INDOT maximum mix temperature is 320 F
• INDOT has no lower temperature requirement
• INDOT allows water foaming of asphalt binder by water injection method for all mixes.
• Realizes a savings of about 15% to 25% of fuel usage, about $0.75 per ton
Pay Item Selection

• HMA vs. QC/QA
  – HMA is 402 Specification
  – QC/QA is 401 Specification
  – HMA items are less cost to Agency at same quality

• Tack - Have as a separate item
  – Tack decreases surface problems and increases life
  – Tack improves longitudinal joint properly applied
  – Well worth the cost and quantity used
Placing Savings Opportunities

• Full-Width Paving
  – Improved production, reduces costs
  – Eliminate centerline joint, future maintenance
  – Haul trucks stay in center of road, edge issues

• Safety Edge
  – Safe edge for traffic, creates a 30 degree edge
  – Shoulder material placement stays or not placed
Pavement Savings Opportunities

• What are you trying to accomplish?
  – Protect existing good pavement, improve surface
    • 4.75mm Surface Overlay w/wo profile milling
  – Improve ride, rid surface cracks seal
    • Milling – profile or 1.5” depth
    • Overlay with 1.5” or 2” 9.5 or 12.5 Overlay
  – Improve strength
    • Profile mill or wedge and level to level existing
    • Place leveling or intermediate course and surface