Presentation Overview

- Project overview
- Construction issues
  - Dimpled Asphalt
  - Unstable RAP base course
- Impacts to Construction Schedule
Project Goals

- Eliminate white paint
- Protect permafrost from thawing
- Pave operations areas
- Expand RSA

Project Scope

- Pave runway, taxiways, apron areas
- Move Runway 210’ south and construct 500’ X 8500’ Safety Area

Barrow Airport Paving

Constructability and Contract time
Paving in Barrow

• HMA from original paving had no crushed material
• HMA from runway and apron paving in early 80s had 20% crushed and marshal stabilities around 200 and performed well for 25 years.
• Specification for HMA in Barrow today call for 50% of fines to be manufactured and a min stability of 1200.

Dimples in pavement left by 737-400

Dimples in pavement left by 737-400
Problem…
HAP dimples under static load on parking apron

Possible Contributing Factors

• Fine Mix?
• Too much oil?
• Warm summer?
• New Asphalt?
• Vampires?

3/8" minus mix

<table>
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<tr>
<th>Sieve Size</th>
<th>JMF % Passing</th>
<th>Jammed Broad Low</th>
<th>Jammed Broad High</th>
<th>Narrowed Low</th>
<th>Narrowed High</th>
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<td>6</td>
<td>1.5</td>
<td>5.5</td>
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</table>
Original Mix design used 5.5% oil.

Specification was changed in Construction to allow lower oil content.

Unusually high temp

Unusually high temp

Very Short Construction Season
Most of the AC hardening occurs in the first 12 months.

Figure 3-24: Viscosity at 140°F versus Time in Months (after Kastner et al).

Could we have uncovered something sinister during our winter blasting?

Problem – Asphalt dimples under static load on apron

Possible solutions:
- Add Gilsonite to Oil to increase high temp stability
- Use higher grade of oil
- Barge in larger rock to mix with paving aggregate
- Construct Hot Stands
- Wait and See
- Barge in supply of holy water, garlic and wooden stakes
Problem – Asphalt dimples under static load

Gilsonite
- Gilsonite is a naturally occurring asphalt.
- Studies have found that 3\% gilsonite may stiffen a mix without making it more brittle.
- Gilsonite could be added to oil already in Barrow.

Major modification to plant needed to mix gilsonite on site.

Problem – Asphalt dimples under static load

Purchase 64-28 instead of 58-28
- Two years to get oil to Barrow
- Increase of $100/ton in cost of oil
- Could only be used on ½ width of the runway, apron and taxiways.

Problem – Asphalt dimples under static load

Hardstands
- Does not accommodate future increase in jet traffic
- Expensive
Problem – Asphalt dimples under static load

Import Course Aggregate for HMA

- Would be available for apron paving.
- Expensive... $100 to $150 per Ton.

Wait and See?
Experience from the last Barrow and Kotzebue paving projects suggest that the deformation under static loads dissipates with time.

Vampires?
While garlic, wooden stakes and Holy water won't be available by barge until 2009, The TSA informs me that an asphalt core is a dangerous weapon. Hopefully we have enough.
Options

Gilsonite – 1 year delay
Import Aggregate
Hardstands
64-28 oil
Wait and See

All but gilsonite can be applied to future apron paving without project delay.

Quote from Jon Sallstrom
Barrow Runway Paving 1982

Everything went relatively smoothly from this point on - oh a little pavement removal here and there, daily equipment breakdowns, fire at the batch plant; but nothing to get too excited about. The fire on September 7, 1982 started in the plywood that skirted the cutting tanks. A fabricated heat reclaiming flare ran from the burner through

Barrow Typical Section
Project designed around using milling existing AC for RAP base course
RAP base course rutting as trucks back up to paver.

Effect on Taxiway A...
- Couldn’t use vibratory roller
- Roller marks left in pavement
- Didn’t meet density requirements
Causes
- Existing HMA placed in 1970 and 1983-1985. Older oil much more brittle
- Existing HMA had little or no crushed material

Problem – Base course failing to provide enough strength.
Possible solutions
- Strengthen borrow material
- Strengthen RAP with oil
- Replace RAP with ATB
- Replace RAP with HMA

Problem – Base course failing to provide enough strength.
- Strengthens borrow material
- Adds 1 year to contract time
- New completion 2011
Problem – Base course failing to provide enough strength.

- Strengthen RAP with Oil

Would require new equipment be brought to Barrow. New Equipment could not arrive until the end of the construction season 2008.

- Adds 1 year to contract time
- New completion 2011

ATB and HMA Options

<table>
<thead>
<tr>
<th>Option</th>
<th>Total Cost</th>
<th>Total Oil</th>
<th>TOTAL 2008</th>
<th>Oil escalation</th>
<th>Life used in 20 yrs</th>
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Options

- Treat Borrow – 1 year delay
- Treat RAP – 1 year delay
- Replace RAP with ATB or HAP

Replacing RAP with ATB or HAP can be done without project delay.
Additional Costs from extending contract
Gilsonite, Geofibers, and Treated RAP

- Extended Labor
- Equipment Rental
- Additional Mob/ Demob costs
- Materials Escalation
- Field Overhead
- Home office overhead

Testing Needed

Design, Construction, DOT Regional materials Lab and UAF Transportation Research Center working together for solutions.

Thank You

Questions?
Comments?