

30 Days of Night



Barrow Airport Improvement Project

- Barrow Paving 2004-2010




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Presentation Overview

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

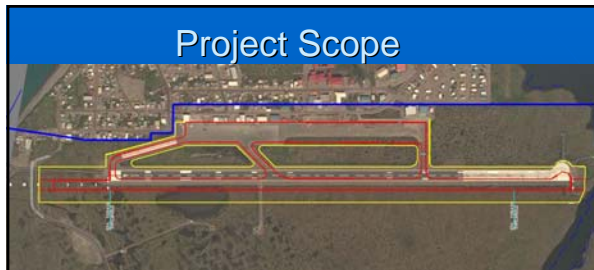


Project Goals



- 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

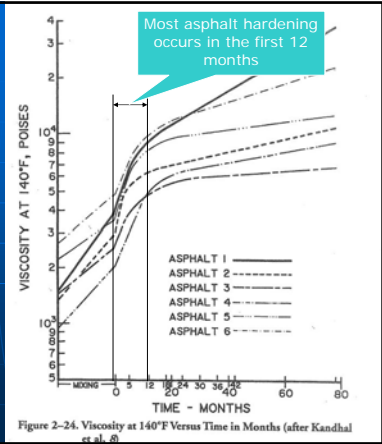
- Fine Mix?
- Too much oil?
- Warm summer?
- New Asphalt?
- Vampires?



3/8" minus mix

Sieve Size	JMF % Passing	Broad Low	Broad High	Narrow Low	Narrow High
1/2	100	100	100	94	100
3/8	94	79	99	88	99
No. 4	66	58	78	60	72
No. 8	47	40	60	41	53
No. 16	34	27	45	29	39
No. 30	25	18	33	21	29
No. 50	15	12	24	11	19
No. 100	7.5	7	16	4.5	10.5
No. 200	3.5	3	6	1.5	5.5

Most of the AC hardening occurs in the first 12 months





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 Hard 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.



Fig. 4 The Hardstand Site on the Harbor Ties.

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

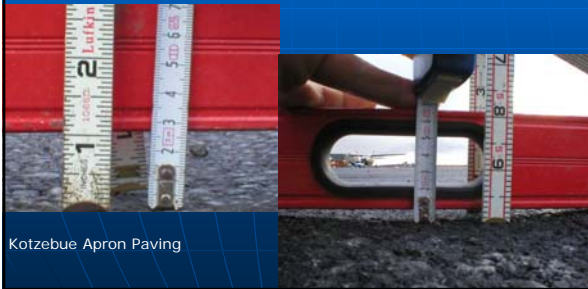
Import Course Aggregate for HMA

- 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.

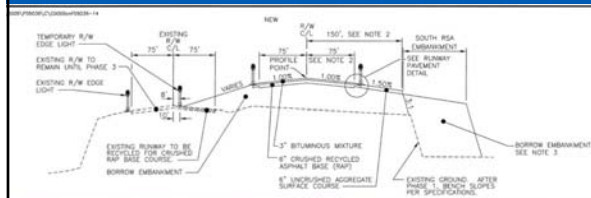
Quote from Jon Sallstrom Barrow Runway Paving 1982

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 tank. A fabricated heat reclaiming flue 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.



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

Problem – Base course failing to provide enough strength.

- ATB and HMA Options

	Total Cost**	Total Cost	Additional Materials Cost	Oil escalation Cost	Life Used in 20 Yrs %
5 Inches Asphalt Concrete @ 5% oil	\$3,354,153.06	\$672,000.00	\$2,423,433.06	\$258,720.00	123%
6 Inches Asphalt Concrete @ 5% oil	\$4,822,759.90	\$888,000.00	\$3,592,879.90	\$341,880.00	61%
4 Inches ATB @ 3% oil & 3 Inches Asphalt Concrete @ 5% oil	\$5,320,090.86	\$864,000.00	\$4,123,450.86	\$332,640.00	78%
4 Inches ATB @ 3% oil & 4 Inches Asphalt Concrete @ 5% oil	\$6,849,510.20	\$1,092,000.00	\$5,337,090.20	\$420,420.00	43%


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.



Alaska Department of
Transportation & Public Facilities

Thank You

Questions?
Comments?

