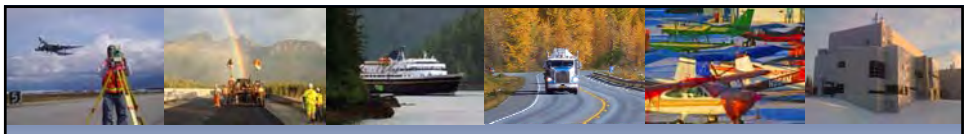
Alaska Department of Transportation & Public Facilities

Sitka Airport Overlay Project

Bruce Brunette & Amanda Gilliland

November 19, 2013

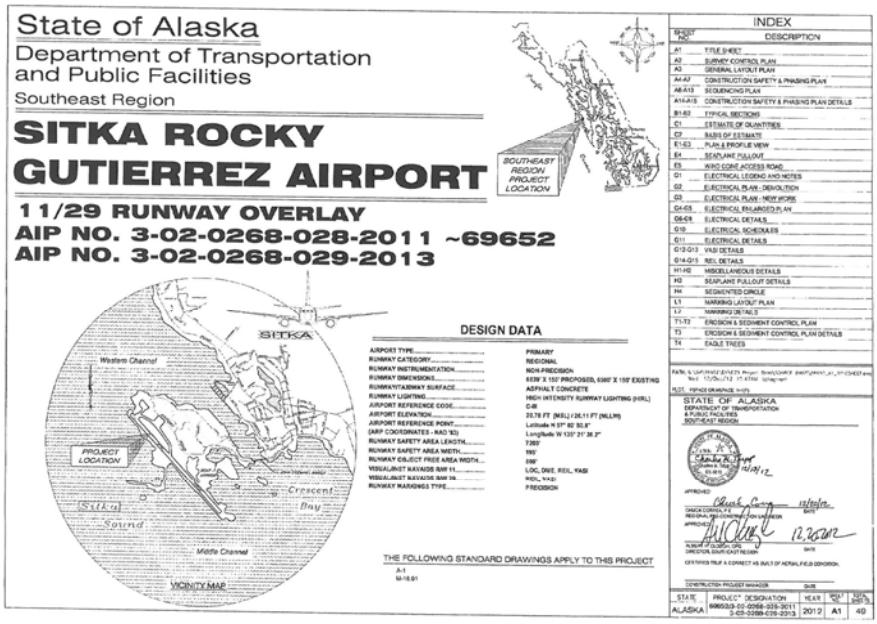


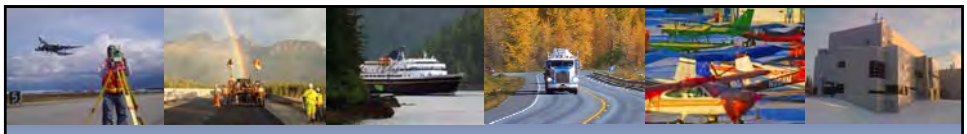
Sitka Airport Overlay

- Advertised Dec 24, 2012, completion July, 31 2013
- Fast Track due to AS rescheduling
- AS characterized SIA as an aircraft carrier
- Award to Knik Construction Feb. 22, 2013
- Mobilized to the project March 4, 2013
- Started crushing rock a few days later
- Completed project on schedule
- Finished paving May 22, 2013

Aircraft Carrier?

Nov. 2011, Storm



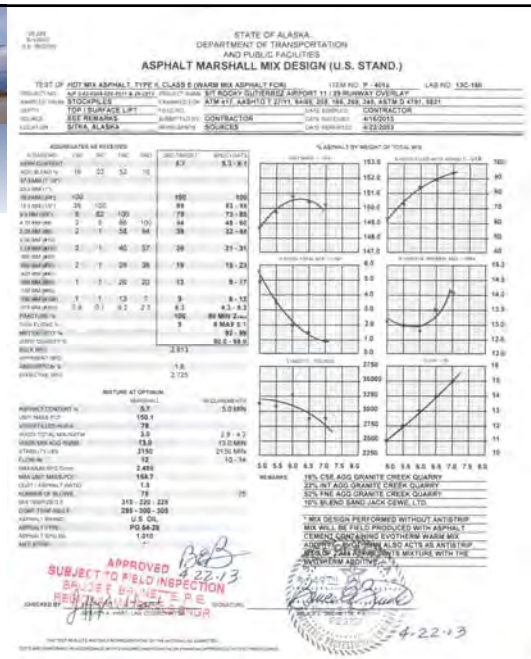


Project Features

- 32,700 tons of AC placed on the project
- Repaired full length 11 longitudinal joints + 2 spot repairs
- Added 300 feet of new RW (total 7200’ x 150’)
- Echelon paving all top lift
- Required MTV (shuttle buggy) for all top lift
- Intelligent Compaction (2 IC rollers required)
- 500 TPH plant for final paving
- Permissive spec for WMA

Project Features (cont.)

- Equipment
- Knik selected Evotherm WMA additive
  - Added at refinery before shipment to Sitka
- MD submitted on 3/26 and completed on 4/4
- Final wearing course added 10% blend sand
- PG 64-28 for paving grade asphalt
- Evotherm dosed at 0.3%, substituted for liquid anti-strip. Served as a compaction aid



STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION
AND PUBLIC FACILITIES

ASPHALT MARSHALL MIX DESIGN (U.S. STAND.)

- 4 Stockpile blend
- 5.7% AC
- 3% Air Voids

ITEM P-632 INTELLIGENT COMPACTION FOR HOT MIX ASPHALT PAVEMENT

DESCRIPTION

632-1.1 This work shall consist of the compaction of the asphalt mixtures utilizing Intelligent Compaction (IC) rollers within the limits of the work as described in the plans. IC is defined as a process that uses vibratory rollers equipped with a measurement/documentation system that automatically records various critical compaction parameters correlated to agency standard testing protocols in real time during the compaction process. IC uses roller vibratory measurements to assess the mechanistic properties of the underlying compacted materials to ensure sufficient compaction is achieved through continuous monitoring of the operations.

CONSTRUCTION REQUIREMENTS

632-3.1 GENERAL. The Contractor shall supply one intelligent compaction roller per paver and other associated equipment necessary to complete the compaction requirements for the specific material. The Contractor shall determine the number of IC rollers to use depending on the scope of the project. The primary position for the IC roller is in the initial phase (breakdown) in the paving sequence. IC rollers can also be used in the intermediate phase as long as the mat temperatures are sufficient for compaction. The use of IC rollers in the finish phase is not recommended.

632-3.2 IC Roller - The IC roller(s) shall meet the following requirements:

1. IC rollers shall be self-propelled double-drum vibratory rollers equipped with accelerometers mounted in or about the drum to measure the interactions between the rollers and compacted materials in order to evaluate the applied compaction effort. IC rollers shall also be equipped with non-contact infrared temperature sensors for measuring pavement surface temperatures.
2. The output from the roller is designated as the Intelligent Compaction Measurement Value (ICMV) which represents the stiffness of the materials based on the vibration of the roller drums and the resulting response from the underlying materials.
3. GPS radio and receiver units shall be mounted on each IC roller to monitor the drum locations and track the number of passes of the rollers.
4. The IC rollers shall include an integrated on-board documentation system that is capable of distributing real-time color-coded maps of IC measurement values including the stiffness, operator status, location of the roller, number of roller passes, pavement surface temperatures, roller speeds, excitation frequencies and amplitudes of roller drums.
5. The display unit shall be capable of transferring the data by means of a USB port.
6. An on-board printer capable of printing the identity of the roller, the date of measurements, constructed area being mapped, percentage of the construction area mapped, target IC-MV, and areas not meeting the IC-MV target values.
7. Utilize one of the following IC systems or approved equal:

SIT – 11/29 Runway Overlay
State Project No. 6868g
AIP No. 3-02-0268-29-2011
AIP No. 3-02-0268-29-2013

P-632-1

Intelligent Compaction

(generic FHWA spec modified for airport)

IC Technology

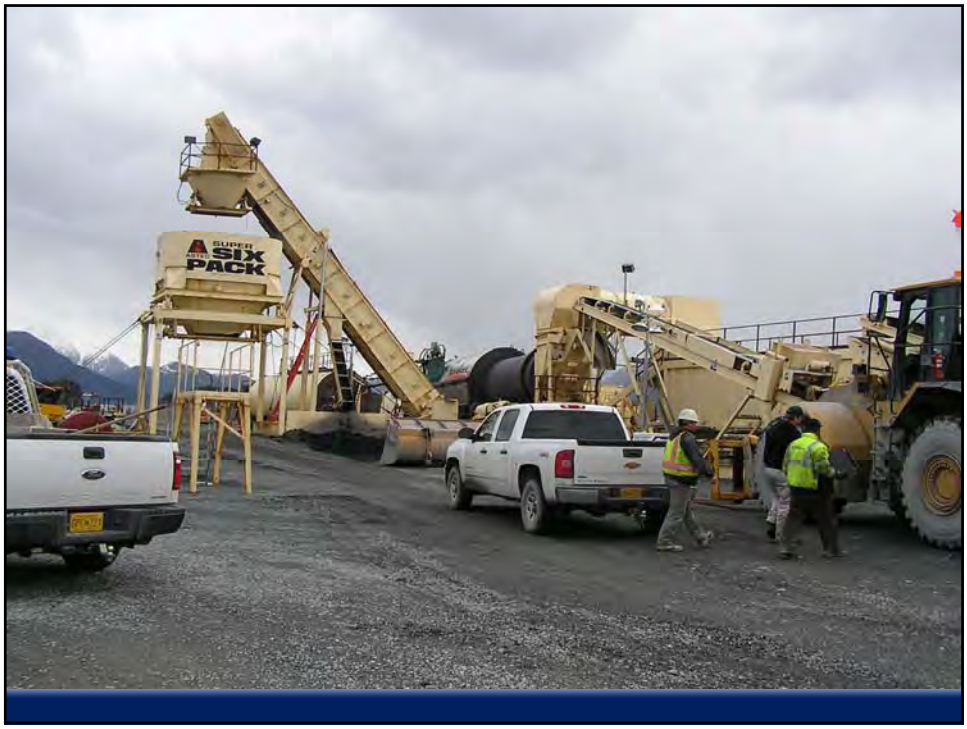
- Uses high precision GPS (2” accuracy)
- On board accelerometer and temperature sensors
- Heads up display allows operator accurate position
- Records tracking and temperature for all passes
- Calculates a stiffness response, related to density
- Operator - knows how many passes in real time
  - knows mat temperature at any instant
  - knows what stiffness is at any instant

Advantages of IC

- Provides immediate feedback to operator
- Operator can complete compaction more efficiently
- Ensures100% compaction coverage
- Enhances roller operators job
- Increases chances to obtain density bonus
- Works well day or night
- IC is not a substitute for traditional compaction testing

ROADTEC
SHUTTLE BUGGY
KNIK

ROADTEC
KNIK
PF-5510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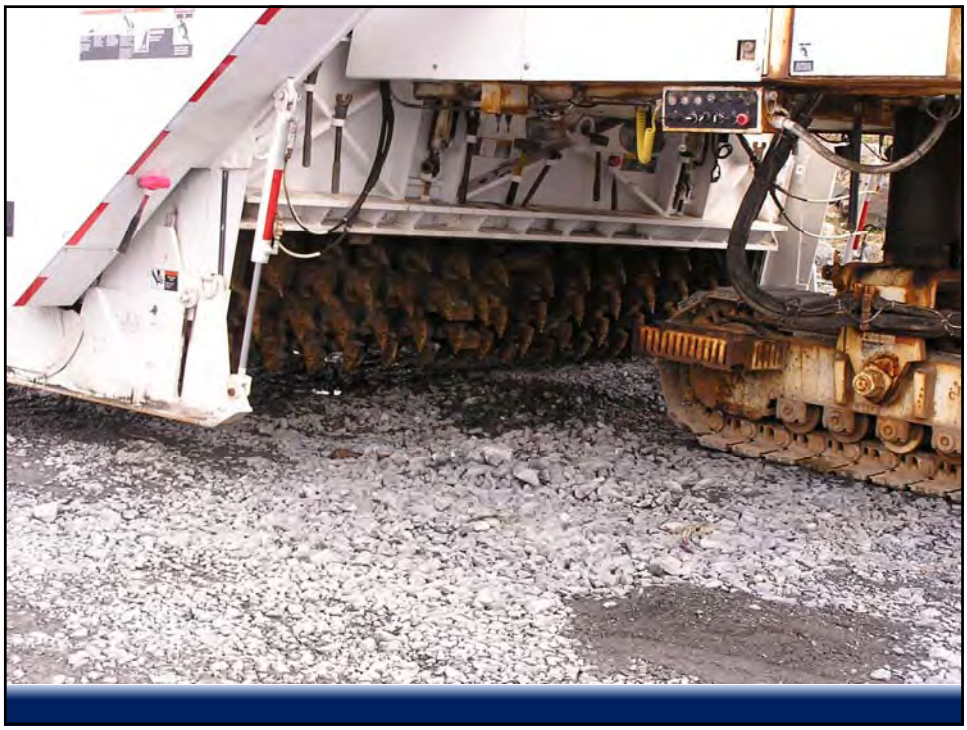

KNIK
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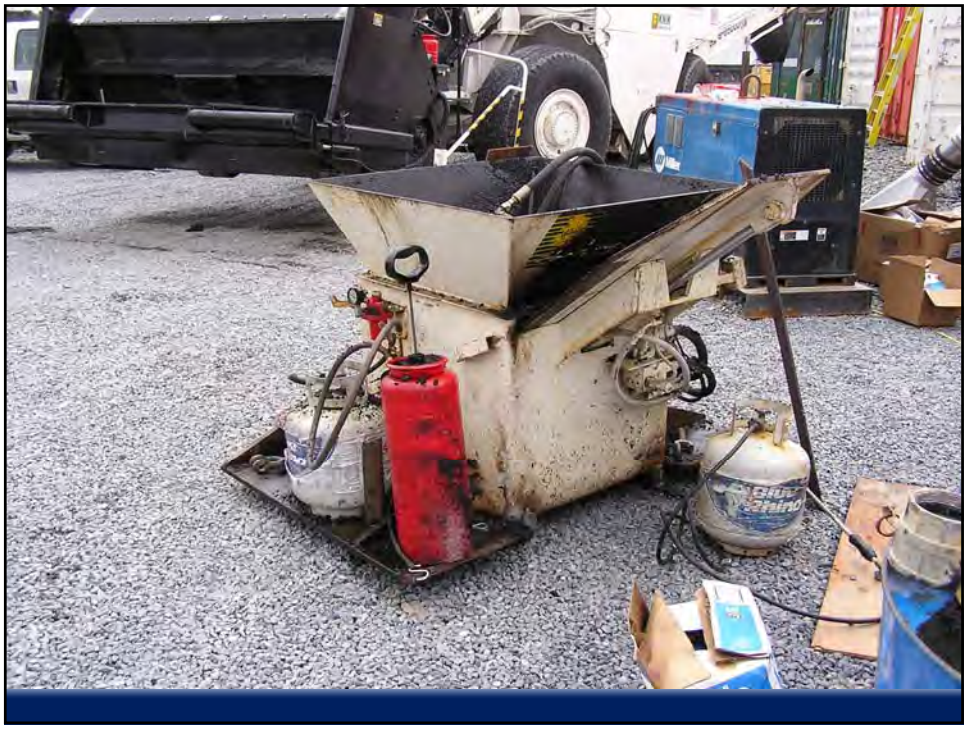


Project Sequencing

- All night time paving (6:30 pm to 7:30 am)
- Pave add'l RW length base layers
- Longitudinal joint repair (mill & fill 2' wide 2" deep)
- Remove airport grooving (1/2" mill) and place 2.5" of AC for central 75 feet (~1700' each night)
- Seaward 38' width next in sequence
- Final paving was landward 38' width
- Must maintain 3000' RW open for medivac aircraft

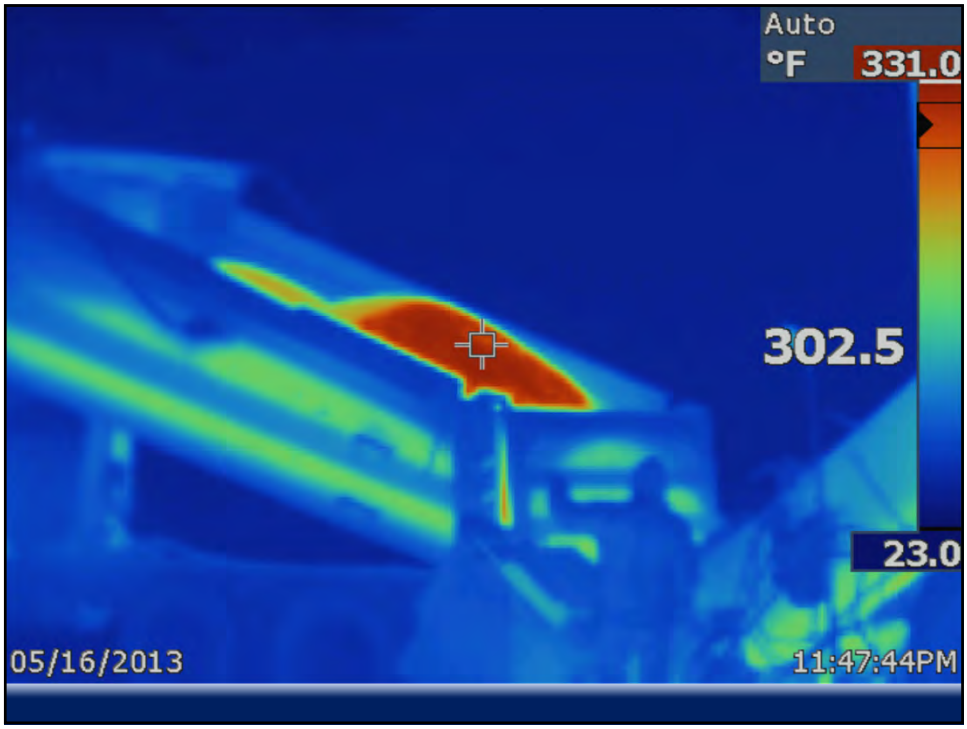
Longitudinal Joint Repair

- Prior to Project
- Post Repair

Central 75' Critical Segment

- Mill ½" grooving 37.5' either side of CL (1700' x 75')
- Clean up/broom & use of vac truck remove all FOD
- Tack & allow time for break
- Echolan paving (< 50' separation)
- Pave transition ramps (30') to match existing asphalt
- Allow time for AC to cool to < 100° F
- Apply temporary paint
- Remove all equipment & personal before 7:30 AM
- Completed critical segment in 5 paving days

3 Pavers in echolan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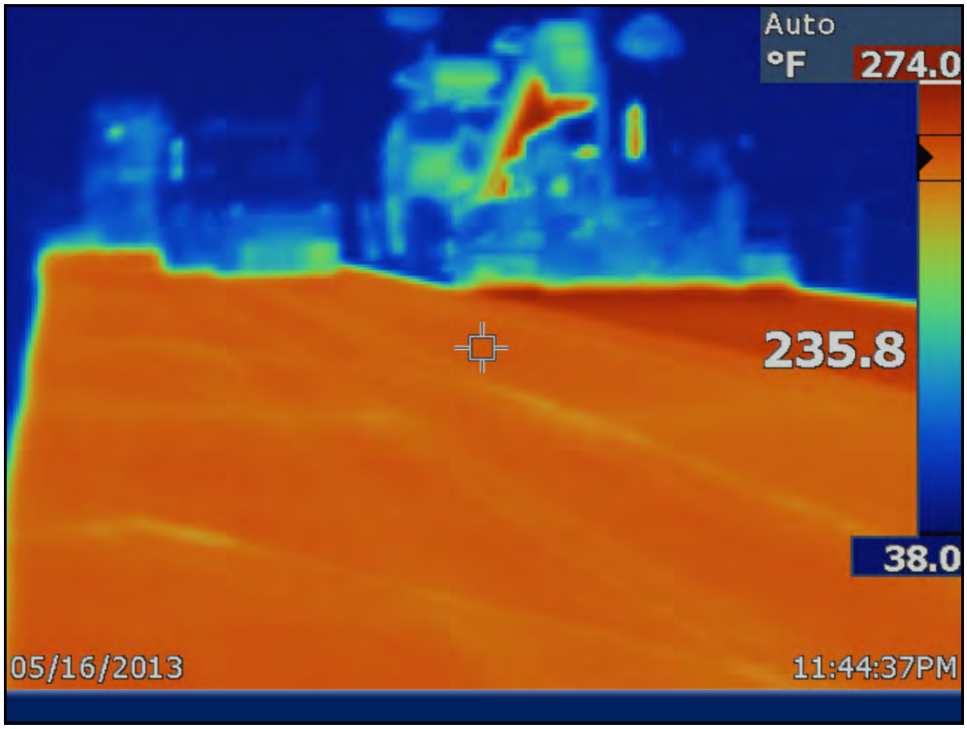
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State of Alaska
Department of Transportation and Public Facilities
ASPHALT PAVEMENT REPORT

PROJECT: AIP 3-02-068-020-20 # 69652 PROJECT NAME: Sitka Rocky Gutierrez Airport 11/29 Runway Overlay
LOT NO. 1 AGGREGATE: JM Pit, Sitka AK ASPHALT CEMENT SOURCE: US Oil
ITEM NO. 2401(a)2 MATERIAL: HMA Type II E ASPHALT CEMENT TYPE: PG 64-28
COURSE: Runway Extension 29 and 11 and Top Lift DATES FROM: 5/6/13 TO: 5/8/13

Hours of Construction	Lane & Width	Station to Station	Distance (Station)	Pounds of Material	Yield	Asphalt Used	Asphalt Ratio
		99+80 to 91+03 &					
20	75 LT CL, 25 LT CL	165+50 to 145+00,	600, 1800, 290'	6000 ton	Plan Quantity	PG 64-28	5.7

MIX DESIGN NUMBER: 13C-100

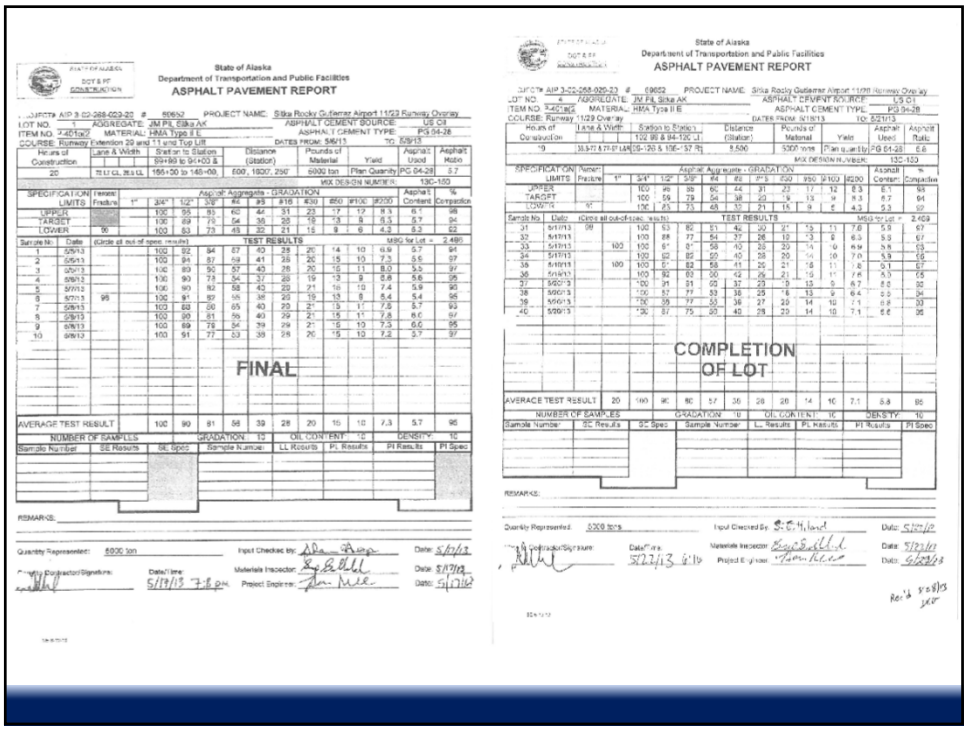
SPECIFICATION LIMITS	Tensile Fracture	1"	3/4"	1/2"	3/8"	#4	#8	#16	#30	#50	#100	#200	Asphalt Content	% Compaction
			Asphalt Aggregate - GRADATION											
UPPER			100	95	85	65	44	31	23	17	12	8.3	6.1	98
TARGET			100	89	75	54	36	26	19	13	9	6.3	5.7	94
LOWER	95		100	83	73	45	32	21	15	9	6	4.3	5.3	92

Sample No.	Date	(Circle all out-of-spec results)					TEST RESULTS							MBG for Lot = 2.480	
1	5/8/13			100	92	84	57	40	28	20	14	10	6.9	5.7	94
2	5/8/13			100	94	87	59	41	28	20	15	10	7.3	5.6	97
3	5/8/13			100	89	90	57	40	28	20	16	11	8.0	5.3	97
4	5/8/13			100	90	73	54	37	28	19	13	9	6.8	5.6	95
5	5/8/13			100	90	82	58	42	29	21	16	10	7.4	5.9	96
6	5/8/13	95		100	91	82	55	38	26	19	13	8	5.4	5.4	95
7	5/8/13			100	88	80	65	40	29	21	15	11	7.8	5.7	93
8	5/8/13			100	96	81	56	40	29	21	15	11	7.8	6.0	97
9	5/8/13			100	89	78	54	39	29	21	16	10	7.3	6.0	95
10	5/8/13			100	91	77	53	38	28	20	15	10	7.2	5.7	97
							FINAL								
AVERAGE TEST RESULT				100	90	81	56	39	28	20	15	10	7.3	5.7	95

NUMBER OF SAMPLES			GRADATION: 10		OIL CONTENT: 10		DENSITY: 10	
Sample Number	SE Results	SE Spec	Sample Number		LL Results	PL Results	PI Results	PI Spec

REMARKS:

Quantity Represented: 6000 ton
Contractor Signature: Date/Time: 5/19/13 7:00 pm
Input Checked by: Date: 5/19/13
Materials Inspector: Date: 5/19/13
Project Engineer: Date: 5/19/13



State of Alaska
Department of Transportation and Public Facilities
ASPHALT PAVEMENT REPORT

PROJECT: AIP 3-02-068-020-23 # 69652 PROJECT NAME: Sitka Rocky Gutierrez Airport 11/29 Runway Overlay
LOT NO. 4 AGGREGATE: JM Pit, Sitka AK ASPHALT CEMENT SOURCE: US Oil
ITEM NO. 2401(a)2 MATERIAL: HMA Type II E ASPHALT CEMENT TYPE: PG 64-28
COURSE: Runway 11/29 Overlay DATES FROM: 5/16/13 TO: 5/21/13

Hours of Construction	Lane & Width	Station to Station	Distance (Station)	Pounds of Material	Yield	Asphalt Used	Asphalt Ratio
		102 RB & 94-120 LT					
19	35.5-72 & 77-81 LM	95-120 & 136-157 RT	8,500	5300 tons	Plan quantity	PG 64-28	5.6

MIX DESIGN NUMBER: 13C-100

SPECIFICATION LIMITS	Tensile Fracture	1"	3/4"	1/2"	3/8"	#4	#8	#16	#30	#50	#100	#200	Asphalt Content	% Compaction
			Asphalt Aggregate - GRADATION											
UPPER			100	95	85	65	44	31	23	17	12	8.3	6.1	98
TARGET			100	89	75	54	36	26	19	13	9	6.3	5.7	94
LOWER	95		100	83	73	45	32	21	15	9	6	4.3	5.3	92

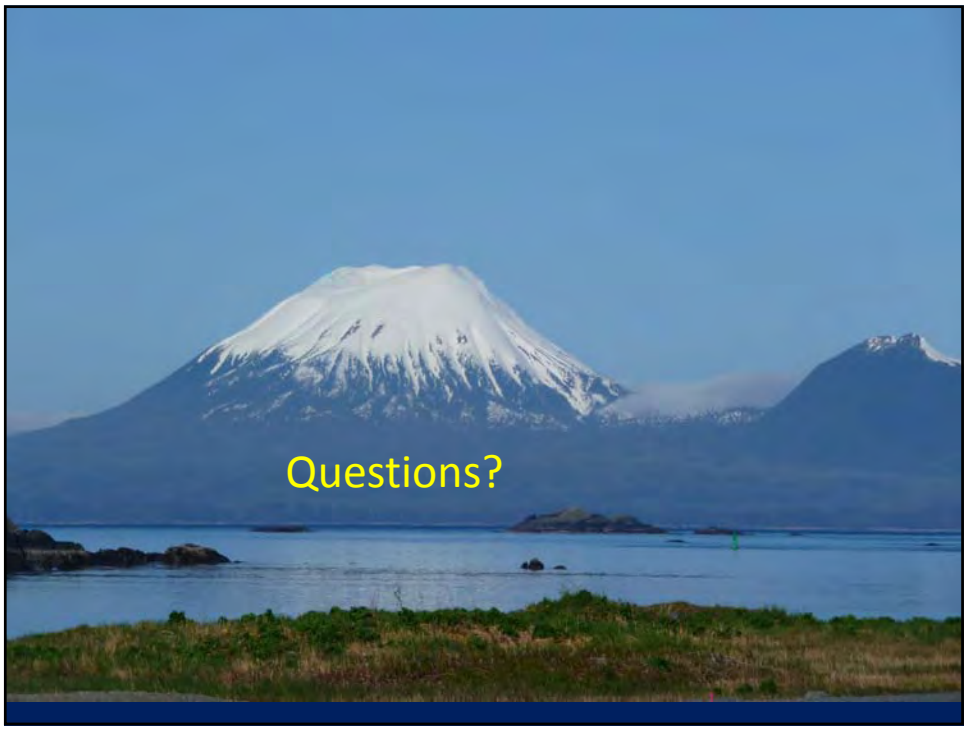
Sample No.	Date	(Circle all out-of-spec results)					TEST RESULTS							MBG for Lot = 2.469	
31	5/17/13	98		100	93	80	51	42	30	21	13	11	7.6	5.9	97
32	5/17/13			100	88	77	54	37	28	19	13	9	6.5	5.5	97
33	5/17/13		100	100	91	87	58	40	28	20	14	10	6.9	5.5	93
34	5/17/13			100	92	85	55	40	28	20	14	10	7.0	5.9	98
35	5/18/13		100	100	91	82	58	41	29	21	16	11	7.6	5.1	97
36	5/18/13			100	92	83	50	42	29	21	16	11	7.6	5.5	95
37	5/20/13			100	91	81	60	37	23	15	13	9	6.7	5.6	92
38	5/20/13			100	87	77	53	36	25	16	13	9	6.4	5.5	94
39	5/20/13			100	89	77	53	36	27	20	14	10	7.1	5.8	93
40	5/20/13			100	87	75	50	40	28	20	14	10	7.1	5.6	95
							COMPLETION OF LOT								
AVERAGE TEST RESULT		20	100	90	80	57	36	28	20	14	10	7.1	5.8	95

NUMBER OF SAMPLES			GRADATION: 10		OIL CONTENT: 10		DENSITY: 10	
Sample Number	SE Results	SE Spec	Sample Number		LL Results	PL Results	PI Results	PI Spec

REMARKS:

Quantity Represented: 5300 tons
Contractor Signature: Date/Time: 5/22/13 6:15
Input Checked by: Date: 5/22/13
Materials Inspector: Date: 5/22/13
Project Engineer: Date: 5/22/13
Rec'd 5/28/13

Observations
- Project was very successful and completed on time
- CPF results 1.05
- Knik received maximum longitudinal joint incentive
- Knik Construction and their QC team performed outstanding
- The IC technology helped immensely in project success
- SE Region plans on using IC on several new projects and encourages its use elsewhere in Alaska


Questions?