1

Times They Are A Changin

2

We are Judged by the Public

- Smooth ride
- Rutting
- Potholes
- Noise

3

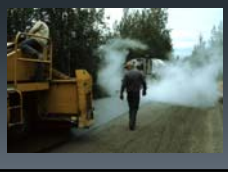
Public Preceptions

- It's their right to have good roads
- There's plenty of money for roads
- The government will pay for them
- Roads should last forever
- Construction shouldn't affect the traveler
- The state is inept
- Contractors are crooks

Reality Check

4

- Roads are a product of public funding
- Highway funding is insufficient
- The average life of a road is about the same as a car
  - The cost/ sq. yd. is also about the same
- The state has some of the best transportation professionals
- Contractors take pride in their work



Legislative Pressures

5

- Construction Money Means Jobs at Home
- Pressure to Improve Roads at Home
- Project Oriented
- No Tax Increases
- Roll Back Fuel Costs

Industry Reality

6

- Less Money
- Increasing Construction Costs
- Greater Public Demands
- Stricter Environmental Demands
- Aging Infrastructure
- Aging Workforce

Bottom Line

7

- Don't Expect More Money
- Expect Pressure to Improve Performance With Fewer Resources
- Expect Demands on Roads to Increase
  - Alaska increased from 4.3 billion VMT in 1997 to 4.9 billion in 2002 a 14% increase in 5 years
- Expect Costs to Continue to Rise
- Expect Environmental Costs to Increase

Better Management a Must

8

- Improve Designs, Construction and Maintenance Techniques
- Asset Management
  - Pavement Management
  - Maintenance Management
  - Pavement Preservation

Take Advantage of Innovation

9

- Better Control of Materials
- Reduce Construction Costs
- Increased Pavement Life

Use of the Micro-Deval Test for Assessing Alaska Aggregates

10

- Tests for properly characterizing aggregate durability are critical
- Investigate whether the Micro-Deval test can be a better alternative to the current abrasion and degradation tests

Micro-Deval Tester

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Micro-Deval Test

12

- recommended for its relation to “toughness and abrasion resistance” (NCHRP study)
- showed a very high potential in evaluating aggregate durability with higher precision and accuracy (Virginia DOT)
- a rapid, simple test, not “technician sensitive”

Characterization of Asphalt Treated Base Course Material

13

- AKFPD and statewide policy stipulate the use of stabilized layers for the majority of roadway pavements
- Problem - lack of engineering characteristics for typical Alaskan base materials
- Need - proper characterization to better understand the effects of temperature and asphalt content on ATB behavior

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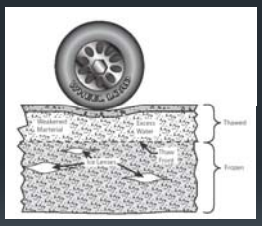
Findings

15

- ATBs exhibited stress state dependent properties
- M_R of ATBs increased with a decrease of temperature.
- Lower binder content produced higher M_R of HATB down to 2.5% residual binder content,
- FATB reached the highest M_R
- Northern region ATBs had lowest M_R among three regions
- Equations were developed to predict the M_R of HATB and FATB

Impact of Fines Content on Resilient Modulus Reduction of Base Courses during Thawing

16



- Base course saturation and weakening - reflected by reductions in the resilient properties
- Excess fines content will cause springtime softening
- Critical excess fines content with different aggregate sources, gradations, and moisture contents

Frost Heave Test Setup

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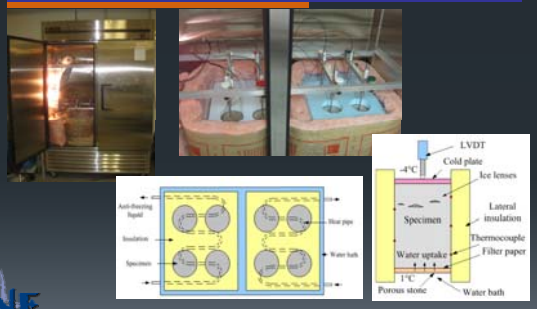


Findings

18

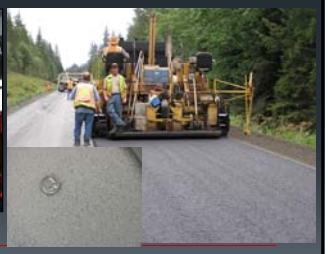
- A two to three order of magnitude increase in the strength of all materials at subfreezing temperatures
- Significant loss of stiffness occurs upon thawing of most soils tested
- Fines content and moisture content co-affect the resilient moduli of D-1 materials before and after the freeze-thaw cycle
- Under high initial moisture content there is not big difference of resilient moduli before and after the freeze-thaw cycle with the increase of fines content.

Financial Impact of Fines in the Unbound Pavement Layers

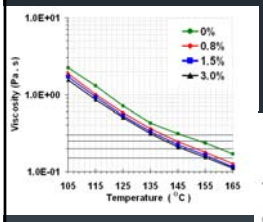
19

- Determine the critical excess fines content (i.e. threshold fines content) allowed in the unbound base course
- Determine the situations when AKDOT&PF can relax stabilized base policies and/or reduce costs by allowing more fines in base layers for highway construction
- Through further investigating the impact of fines content when frozen under different temperature gradients and with limited water access

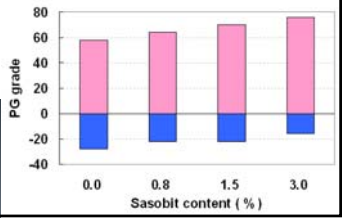
WMA for Alaskan Conditions



Constructability and Binder PG



Sasobit (%)	Mixing Temp (°C) (Viscosity 0.15~0.20 Pa.S)	Compaction Temp (°C) (Viscosity 0.25~0.30 Pa.S)
0	160~170	146~153
0.8	151~160	139~144
1.5	148~158	137~142
3.0	146~155	135~139



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Findings

- Benefits of WMAs using Sasobit reduced mixing and compaction temperatures
  - increased dynamic modulus with the increase of Sasobit content
  - improved workability and rutting resistance
  - insignificant effect on moisture susceptibility
  -
- Slightly degraded resistance to low temperature cracking

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Verification of JMF for Alaskan HMA

- How the quality of HMA is assured is a critical issue
- Variability is inevitable
- Investigate how the properties of HMA mixtures vary due to mixture production
- To verify the HMA JMF, and evaluate how well contractors meet the requirements of mix designs

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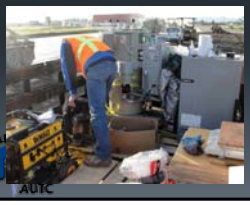
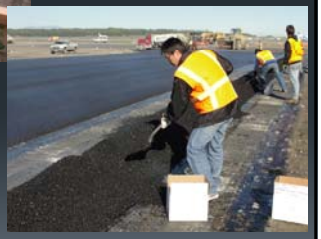
Nenana

Anchorage International Airport





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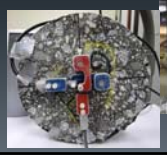
Sample Collection and Tests

- Four scenarios for production of HMA specimens
  - Lab mixed and lab compacted
  - Field mixed and field compacted
  - Field mixed and lab compacted
  - Field cores
- Volumetrics, aggregate gradation and asphalt content
- Performance tests
  - SPT
  - IDT



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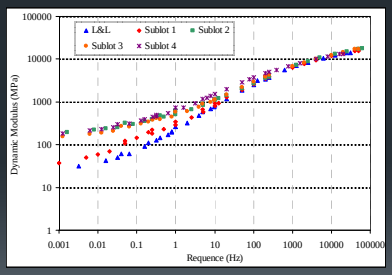
Preliminary Results



Dynamic Modulus (AIA Project)

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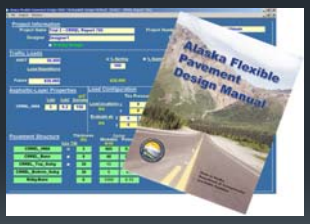
Inclusion of LCCA in AKFPD Software



- to create a single software package capable of executing the economic cost analysis and structural analysis functions

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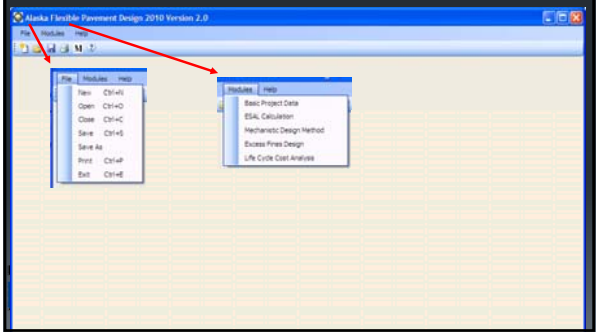
Graphic User Interfaces



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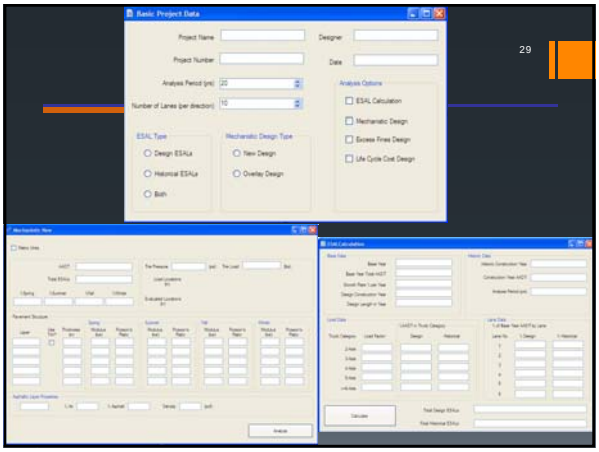

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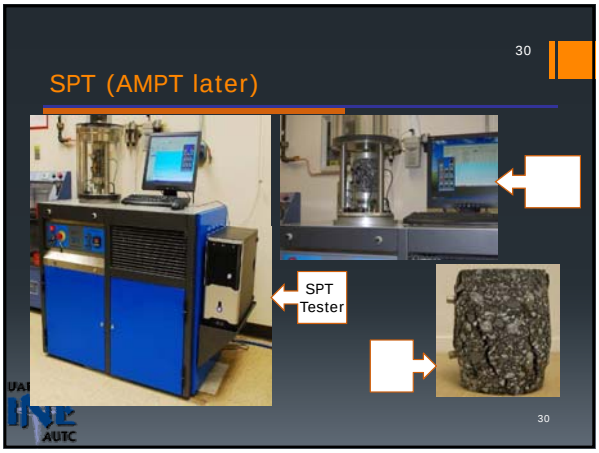
SPT (AMPT later)



Characterization of Alaskan HMA Mixtures with the SPT

31

- Problems
  - mechanistic flexible pavement design requires accurate characterization of paving materials
  - resilient modulus (M_R) can not characterize HMA over temperature and loading frequencies
  - need correlations between SPTs and HMA performance for typical Alaskan HMA mixtures
- Objectives
  - establish a catalog of |E*| for typical Alaskan HMA
  - evaluate the correlations between SPTs results and HMA performance
  - validate the prediction models of the |E*| for local HMA

Field Evaluation of Crack Sealing of AC Pavements in Alaska

32

(Richardson Hwy, Fairbanks)

Field Evaluation of Crack Sealing of AC Pavements in Alaska

33

- The AKDOT&PF has promoted routine sealing of cracks in AC pavements for many years.
- Certain cracks (including map/grid cracks) may sometimes be ignored, i.e., left completely unsealed, for the life of the pavement with no negative effects.
- It is economically wise,
  - if possible, to delineate areas of the State where such sealing is (or is not) necessary.
  - to study repair treatments for major transverse cracks to see what does and doesn't work — and where.

33

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Objectives

- studying current crack sealing practices and materials coupled with field examination of various maintenance methods
- defining areas of Alaska where common sealing and light patching methods are best used or avoided
- forming recommendations aiming at saving a significant portion of M&O funds now spent on crack sealing and minor patching

34

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Pavement Preservation

- A Partnership Between DOT&PF, CalTrans, Chico State and AUTC
- Objectives
  - Develop a Catalog of Preservation Techniques Which Work in Alaska
  - Determine When to Apply Preservation Techniques
  - Integrate Information into Pavement Management and Asset Management

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Typical Pavement Preservation

- Thin Overlays
- Seal Coats
- Crack Sealing when Appropriate
- Mill and Fill

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In Summary

- We Must Work Together
  - To Increase Pavement Live
  - Reduce Costs
  - Improve Performance

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Further Information…

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