1

Thin Lift Overlays: Points to Ponder

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Traditional Definition

- Thin Lift Overlays are typically defined as surface mixes of 1.5” or less in compacted thickness
- They can be a simple overlay or part of a mill-and-fill operation
- They are not typically intended to strengthen the pavement structure, but instead to address functional problems as part of Pavement Preservation

2

Pavement Preservation

- Agencies have often applied maintenance *reactively* to roads in poor condition rather than *proactively* to roads still in good structural condition
- The Pavement Preservation concept applies several minor treatments while the road is minimally distressed at a far lower cost than one major rehabilitation or reconstruction

Question – How often is this actual practice?

3

When to use a thin asphalt overlay

Water-Proofing

Dense-graded mixes used for thin overlays have smaller void sizes, low-to-no permeability

4

When to use a thin asphalt overlay

To restore skid friction

5

When to use a thin asphalt overlay

To treat excessive weathering / ravelling

6

When to use a thin asphalt overlay

Longitudinal Cracking

(Not in Wheelpath)

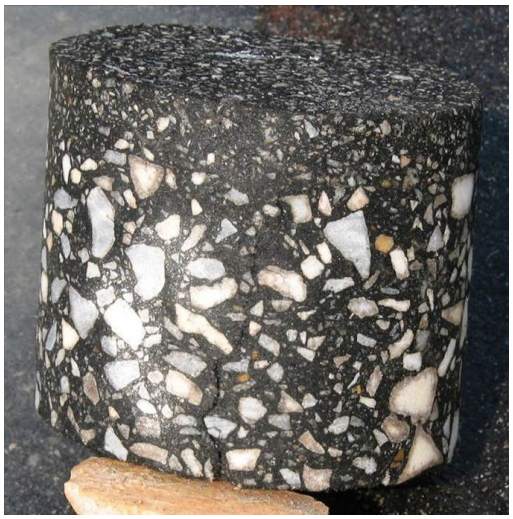
Low-severity thermal cracking

7

When *not* to use a thin asphalt overlay

8

When *not* to use a thin asphalt overlay



Bottom-up cracking

Fatigue cracking

9

But what about this?

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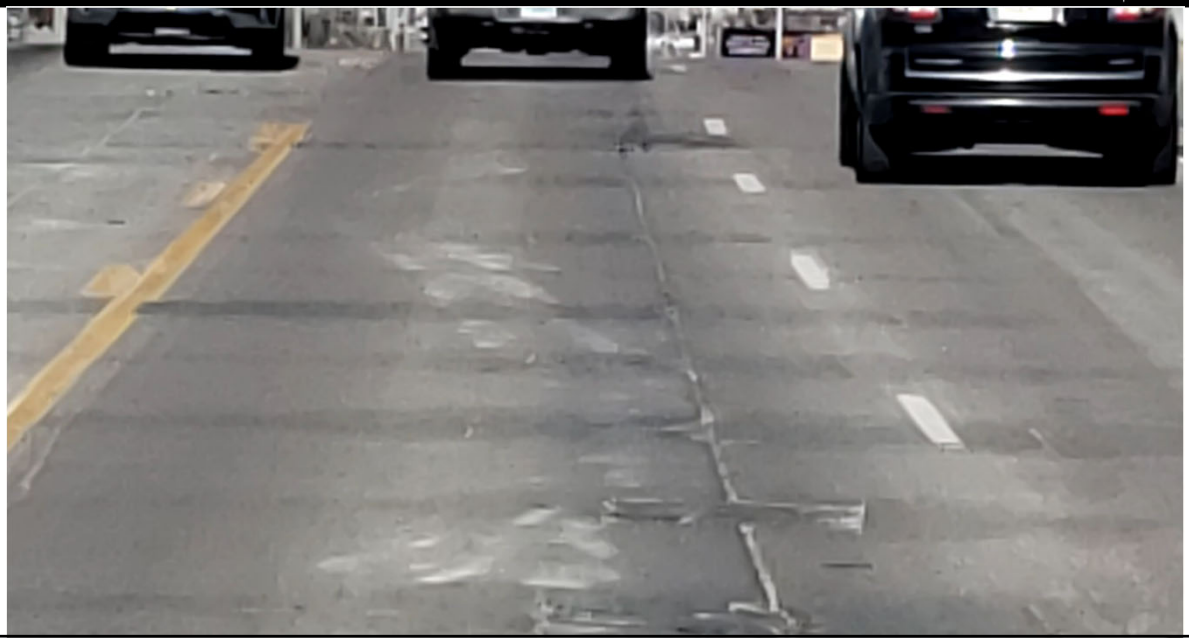
Once upon a time (About 1-1/2 Mayor's years ago)



11

C of SF is a growing place

- The City of Sioux Falls maintains almost **900** miles of streets/pavements
- Approximately **10-15** miles are added to the system annually with growth in the City. These "new" lane miles are primarily located in the periphery of the City in growth areas, particularly the NW, NE and SW parts of the City.
- Approximately 84% of these roads are paved with asphalt, 14% with portland cement concrete pavement, and 2% are gravel.

Rank	Name	State	2022 Pop.	2010 Census	Change	Density (mi²)	Area (mi²)
129	Grand Rapids	Michigan	201,093	188,040	6.94%	4,493	44.76
130	Huntington Beach	California	200,455	189,992	5.51%	7,423	27.00
131	Sioux Falls	South Dakota	200,243	153,888	30.12%	2,560	78.23
132	Grand Prairie	Texas	200,240	175,396	14.16%	2,771	72.25

12

Residential Streets are Primarily Asphalt

13

Arterials are primarily concrete (41st St)

14

41st St - 2019

15

41st St

16

41st St – Surface was milled - Video

17

41st St – Surface was milled

18

41st St - Joint Filler

19

A Lot of other unexplainable things were found

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What to do with bad joints

21

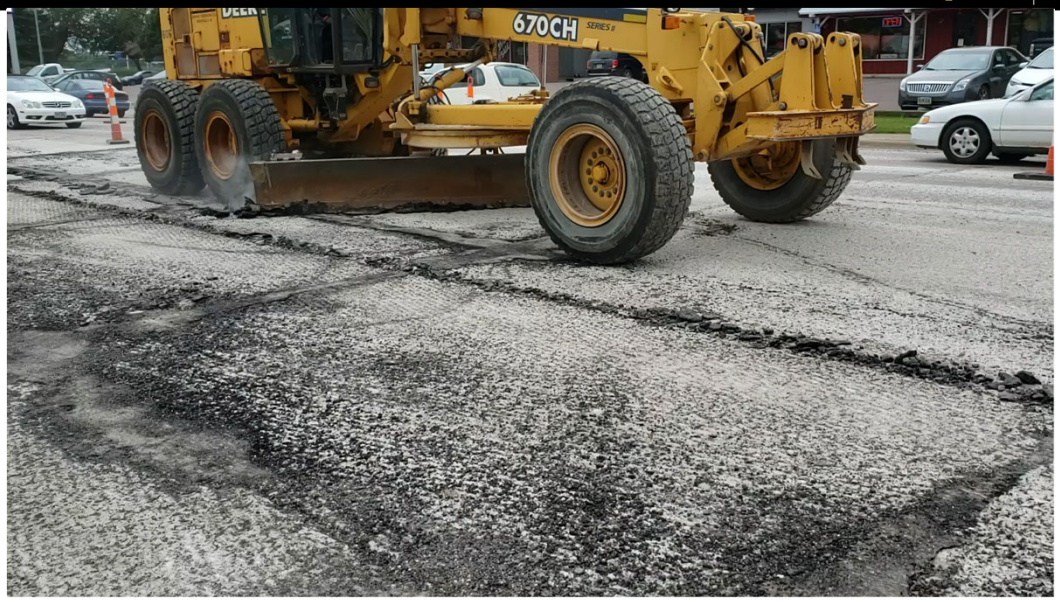
Dig them out and patch them

22

Trimming joints

23

Trimming joints



24

Rolling joints

25

Paved in no time

26

27

Thin-Lift Asphalt Overlay Projects to Date

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Asphalt Mix No.	Project Site	NMAS (mm)	Virgin Binder Type	RAP (%)	FRAC (Yes/No)	Mix Collection Status
1	41st Street	9.5	PG 64-34	-	-	Collected (2019)
2	41st Street	9.5	PG 58-28	20%	Yes	Collected (2020)
3	41st Street	9.5	PG 58-34	20%	-	Collected (2020)
4	Cliff Avenue	9.5	PG 70-34	20%	-	2022


41st St. Between Kiwanis and Western (2019)


41st St. Between Kiwanis and Western (2019)

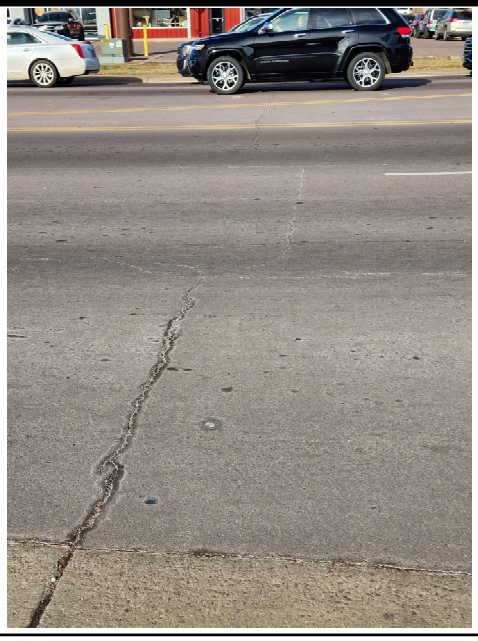
41st St. Between Kiwanis and Western (2019)

28

41st St – Spring 2022

29

41st St – Fall 2022 - after 3 winters



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41st St – Fall 2022 - after 3 winters

31

41st St – Fall 2022 – Sections 2 & 3 after 2 winters

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41st St – Fall 2022 – Sections 2 & 3 after 2 winters

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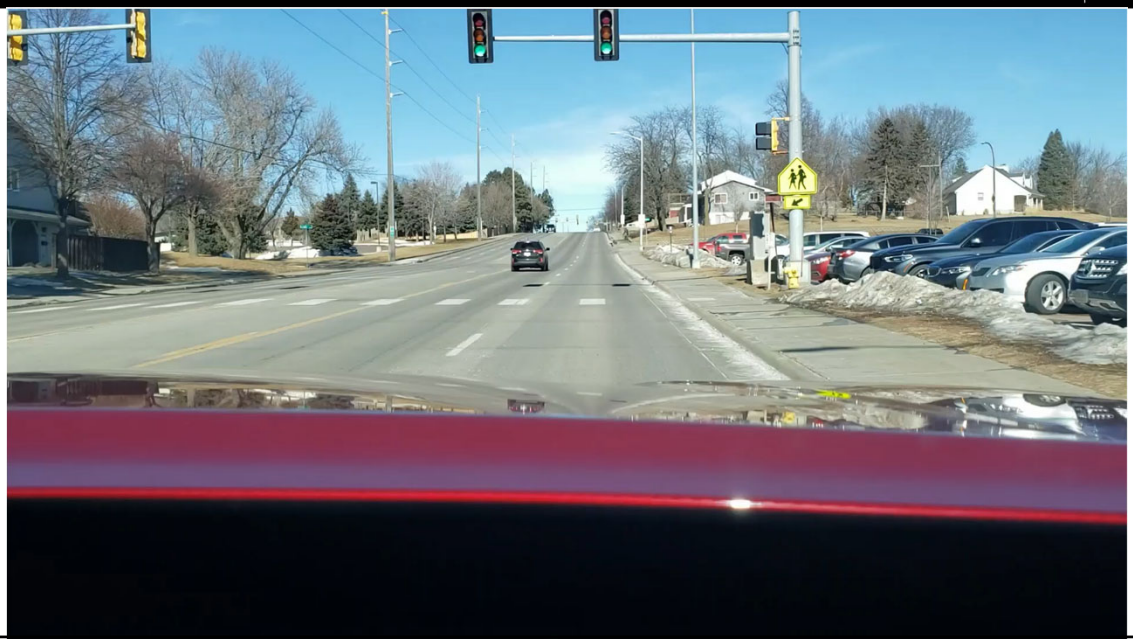
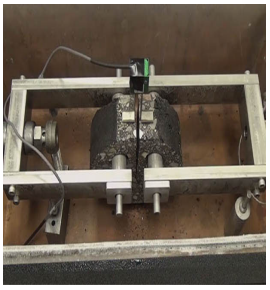
Section 4 did not get completed in 2022



34

SD State Asphalt Research Lab

Prof. Rouzbeh Ghabchi has established a complete Binder, Mix Design and Mixture Performance test lab including four point beam fatigue testing.



35

Thin-Lift Asphalt Overlay

Performance Assessment Options (Lab Tests)

Option 2

Table 3. Proposed Test Matrix for Option 2

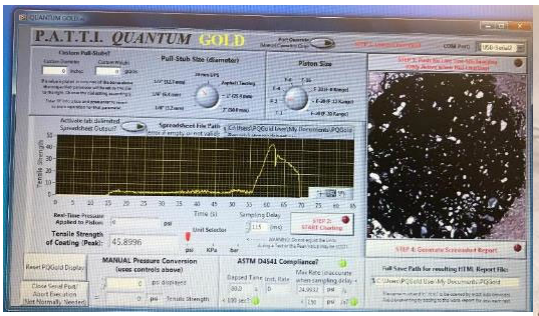
Asphalt Mix Testing Program (Option 2)												
Asphalt Mix No.	NMAS (mm)	Virgin Binder	RAP (%)	Fiber	Proposed Mix Tests*							
					HWT AASHTO T 324	SCB ASTM D8044	TSR AASHTO T 283	4-PFB AASHTO T 321	DCT ASTM D7313	TOT TEX-248-F	IDEAL-CT ASTM D8225	
1	9.5	PG 64-34	-	-	✓	✓	✓	✓	✓	✓	✓	
2	9.5	PG 58-28	20%	Yes	✓	✓	✓	✓	✓	✓	✓	
3	9.5	PG 58-34	20%	-	✓	✓	✓	✓	✓	✓	✓	
4	9.5	PG 58-34	20%	-	✓	✓	✓	✓	✓	✓	✓	
5	9.5	PG 70-34	20%	-	✓	✓	✓	✓	✓	✓	✓	

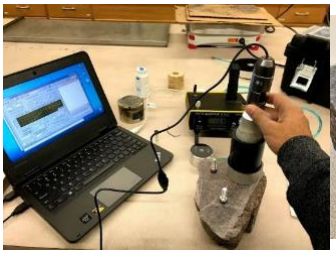
Asphalt Binder Testing Program (Option 2)										
Binder Blend No.	Virgin Binder	RAP (%)	Fiber	Proposed Binder Tests						
				DSR AASHTO T 315	BBR AASHTO T 313	PG Grade AASHTO M 320	MSCR AASHTO T 350	BBS AASHTO T 361 (Wet/Dry)		
								Quartzite	Granite	
1	PG 64-34	-	-	✓	✓	✓	✓	✓	✓	
2	PG 58-28	20%	Yes	✓	✓	✓	✓	✓	✓	
3	PG 58-34	20%	-	✓	✓	✓	✓	✓	✓	
4	PG 70-34	20%	-	✓	✓	✓	✓	✓	✓	

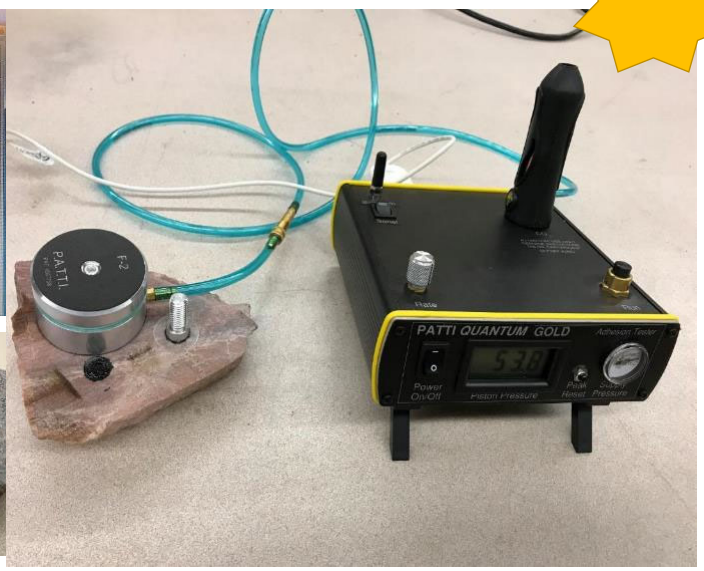
**Note: Tests on asphalt mixes will be conducted on samples compacted to have 7.0%±0.5% air voids.*

36

Binder Bond Strength Tester (BBS)







37

TLO Summary

- SD State is looking for research funding.
- Removing and replacing urban arterials with PCC is cost prohibitive.
- We are hoping to develop a lower cost 15–20 year alternative
  - Remove and replace PCC - $15M / mi.
  - Premium TLO $2M / mi.
- Fargo ND recently placed Kevlar fibers.
  - CSF $11 per mix ton for fiber
  - Fargo $15 per mix ton
    - Supplier wanted to try a double dose.
- There many premium grades of asphalt binder available. I encourage specifiers to be bold in binder selection on specialty projects. Many alternatives will perform better at a lower LCCA.
- The 2022 CSF project will use PG 70-34 with 90%R at 64°C

38

Training Opportunities at AI

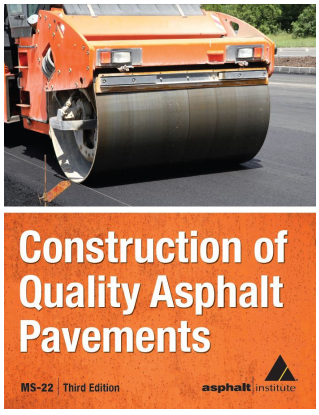
The Asphalt Institute
Paving Inspector Certification Series

39

Why did we make PIC?

There is a need for inspector training and certification on many levels:

- *City*
- *County*
- *State*
- *Federal*
- *Contractor*
- *Consultant*



Asphalt Institute's MS-22 "Construction of Quality Asphalt Pavements" naturally lends itself to asphalt pavement inspection training.

40

Why should an organization have their employees take PIC?

Constructing high-quality asphalt pavement is the goal of the asphalt paving industry, and effective inspection plays an important role.

- Online course format allows students to work at their own pace
  - ✓ *Exam after each module (8 total) must be passed to proceed*
  - ✓ *16 PDHs total*
  - ✓ *Certification upon completion demonstrates understanding*
- PIC is an ideal orientation course for new inspectors
  - ✓ *provides broad overview of construction process*
  - ✓ *builds confidence of new inspector*
  - ✓ *assures owners that inspection staff has level of competence to be effective*
- PIC provides great deal of information to augment knowledge of experienced inspectors

41

More on PIC

- **Course Outline**
  - —Module 1: Inspector's Authority and Responsibility
  - —Module 2: Materials
  - —Module 3: Mixtures and Mix Design
  - —Module 4: Plants & Production
  - —Module 5: Transportation, Delivery, & Preparation
  - —Module 6: Placement
  - —Module 7: Compaction
  - —Module 8: Acceptance and Testing
- **Each module roughly 90-120 mins**
- **Modules consist of ppt slides with audio, exam**
- **Rollout in early 2021**

http://www.asphaltinstitute.org/training/seminars/paving-inspector-certification-pic/

42

Thank you !!


GLOBAL MEMBERS
ExxonMobil Imperial
Husky Asphalt
REGULAR MEMBERS
ERGON
VALERO
WORLD OIL
ASSOCIATE MEMBERS
BLACKLIDGE
Idaho Asphalt Supply, Inc.
Polyco
Vecenergy
CANADIAN MEMBERS
IRVING
LAFARGE
swtgroup
yellowline
INTERNATIONAL MEMBERS
Ergon. Asfaltos México
NYNAS
RUBIS
Shell Bitumen
YPF
COMMERCIAL MEMBERS
CertainTeed
COLAS
GAF
Henry
Malarkey
MGQ
Payne+Dolan
POLYGLASS
SOPREMA
TAMKO
AFFILIATE MEMBERS
ASTEC
AVISTA OIL GROUP
BAKER HUGHES
BASF
BLUEKNIGHT
Cargill
COOK CHEM
CRAFCO
Crystal Clean
DOW
Dynasol
GREENMANTRA
HEXPOL
Honeywell
AICL
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JIVE
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LG Chem
Nouryon
PRI ASPHALT
sasol
Sprague
Vitol

43