Urban Concrete Overlays

2017 Municipal Streets Seminar
November 15, 2017
• Ice cream capital of the world.
• Home of Wells Blue Bunny
• And....
The first concrete pavement in Iowa

IOWA'S FIRST CONCRETE STREET
BUILT 1904
FIRST AVE. S.W. LE MARS
60TH ANNIVERSARY — JULY, 1964
History of PCC overlays in Le Mars

- 2009 12th Street and Business Highway 75 Intersection
- 2010 3rd Avenue SE
- 2011 1st Avenue SW and 3rd Avenue SE
- 2013 4th Ave SE
- 2017 6th Ave SW
- 2017 Park Lane
- 2017 Business Highway 75
12th Street SW and Business Highway #75 Intersection

- First project 2009
- 190 LF, 60’ Wide, 1270 SY
- Full removal of 4” ACC
- 4” PCC overlay. No Interlayer used. Large joint spacing.
- Constructed half width at a time.
- One half shows little to no distress to date.
- Other half has developed significant cracking.
12th Street SW and Business Highway #75 Intersection
2010 3rd Ave SE

- 1260 LF, 31’ Wide Urban Section, 4025 SY
- Composite pavement (ACC over PCC)
- Original PCC constructed in 1915 or 1916
- Removal of existing curb
- 4” unbonded PCC overlay
- C-4 Mix. Fiber Reinforced @ 1 ½ LBS per CY
- 6’ Max Joint Spacing. Narrow kerf sawcut (1/8”). Unsealed.
2011 1\textsuperscript{st} Ave SW & 3\textsuperscript{rd} Ave SE

- 1100 LF, 31’ Wide Urban Section, 3700 SY
- Composite pavement (ACC over PCC)
- Original 3\textsuperscript{rd} Ave PCC constructed in 1915 or 1916
- Original 1\textsuperscript{st} Ave PCC constructed in 1957
- Removal of existing curb
- 4” unbonded PCC overlay
- C-4 Mix. Fiber Reinforced @ 1 ½ LBS per CY
- 6’ Max Joint Spacing. Narrow kerf sawcut (1/8”). Unsealed.
2011 1st Ave SW & 3rd Ave SE
2013 4th Ave SE

- 3500 LF, 31’ Wide Urban Section, 12,500 SY
- Composite pavement (ACC over PCC)
- Original PCC constructed in 1923
- Removal of existing curb
- 4” unbonded PCC overlay
- C-4 Mix. Fiber Reinforced @ 1 ½ LBS per CY
- 6’ Max Joint Spacing. Narrow kerf sawcut (1/8”). Unsealed.
2013 4th Ave SE
2017 6th Ave SW

- 1150 LF, 31’ Wide Urban Section, 3900 SY
- Composite pavement (ACC over PCC)
- Original PCC constructed in 1923 & 1950
- Removal of existing curb
- 4” unbonded PCC overlay
- C-4 Mix. Fiber Reinforced @ 3 LBS per CY
- 6’ Max Joint Spacing. Narrow kerf sawcut (1/8”). Unsealed.
2017 Park Lane

• 1335 LF, 20’ Wide Rural Section, 3000 SY
• ACC pavement
• 2016 thin ACC overlay
• 4” unbonded PCC overlay
• C-4 Mix. Fiber Reinforced @ 3 LBS per CY
• 6’ Max Joint Spacing. Narrow kerf sawcut (1/8”). Unsealed.
2017 Park Lane
Lesson learned/Comments

- Curb removal can be challenging
- Concrete yields varied greatly from 12% to 40%
- Drainage can provide challenges
- Interlayer required for unbonded overlays
- Total overlay area for all 6 projects combined is approximate 28,000 SY
2017 Business Highway #75

- 9030 LF, 58,000 SY
- Variable section widths (49’ to 77.5’)
- Mixture of urban and rural paving sections
- 4” unbonded PCC overlay
- C-4 Mix. Fiber Reinforced @ 3 LBS per CY
- 6’ Max Joint Spacing. Narrow kerf sawcut (1/8”). Unsealed.
- Largest urban overlay to date in Iowa
- Largest fiber reinforced pavement to date in Iowa
History of Highway #75

- Major truck route from Sioux City to points north
- Original PCC pavement constructed in 1926
- Widened to current mainline width in 1956 & 1958
- ACC overlays every 15 years +/- since widening
• Turn lanes at 12\textsuperscript{th} Street SW intersection added in 1996
History of Highway #75

- 2009 & 2016 Curb & Gutter Replacement
Pavement Cores
Design Concerns

- Drainage
- Curb removal?
- Where is milling required?
Design Concerns

• Different pavement section widths
Design Concerns

- Traffic control/Staging

Section 1

CROSS SECTION 9 - STA. 953+92.4 TO STA. 973+77.6

Section 4

CROSS SECTION 8 - STA. 924+25 TO STA. 953+92.4

Section 2 & 3

CROSS SECTION 7 - STA. 920+00 TO STA. 924+25
Final Design

• 4” unbonded PCC overlay, Design yield 20%
• Milling section 1 and section 4 full width
• Geotextile interlayer at select locations
• Full closure with detours during construction
• 4 sections/stages
• Maturity method for concrete strength
• Leave curbs in place in sections 1 & 4
• 4 paving widths (22’, 24.5’, 28.5’ and 8’)
• Estimated cost $1,720,000
• Incentive/Disincentive for Street Closure
Project Team

• Sponsor: City of Le Mars, IA
• Engineer: Schlotfeldt Engineering, Le Mars, IA
• Prime/Paving: Steve Harris Construction, Homer, NE
• Milling: Manatt’s Construction, Brooklyn, IA
• Ready Mix: GCC Ready Mix, Le Mars, IA
• Traffic Control: Dakota Traffic Services, Sioux Falls, SD
• Pavement markings: Dakota Traffic Services, Sioux Falls, SD
• Staking/Inspection/Testing: Schlotfeldt Eng. , Le Mars, IA
Post Bid Changes

• Mill entire project full width with machine control
• Track paver grade off milled surface/existing gutter
• String for line only except for one edge of section 2 & 3 and shoulder
• 6” integral curb in sections 2 and 3
Construction Photos

• Milling with machine control. Begin April 5, 2017
Construction Photos

- Section 1 milled ready for paving. April 9, 2017
Construction Photos

• First day of paving. April 11, 2017
Construction Photos

• First day of paving. April 11, 2017
Construction Photos

• First day of paving. April 11, 2017
Construction Photos

• First day of paving. April 11, 2017
Construction Photos

• First day of paving. April 11, 2017
Construction Photos

• Second day of paving. April 13, 2017. 910 CY
Construction Photos

- Integral curb on portions.
Construction Photos

- Curb and gutter replacement prior to overlay
Construction Photos

- Finished project
Construction Photos

• Finished project
Construction Photos

• Finished project
Construction Photos

- Finished project
Construction Photos

- Finished project
Construction Photos

- Finished project
Final Comments

• 4 bids. 3 grouped from 1.8 to 1.95 Million
• Final construction cost $1,794,000
• Final yield: 8% Mainline, 12% Shoulder
• Contractor earn all but one incentive days
• Last pour May 18, 2017 (6 weeks)
• Open to traffic May 26, 2017 (7 weeks)
• Engineering work is more akin to reconstruction than overlay
Questions?