20 Years of Hydrodemolition of Bridge Decks in Missouri

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Outline

- Why Use Hydrodemolition?
- Start of Total Surface Hydrodemolition in Missouri
- Missouri Installations
- Major Projects
- Specifications in Missouri
- Very Early Strength Latex Modified Concrete
- Summary
Hydrodemolition Robot
Why Use Hydrodemolition?

• Concrete Removal
• Surface Preparation
• Process uses:
  * Direct Impact
  * Pressurization of Cracks
  * Rapid Erosion
I am from Missouri, you have to show me!
Start of Total Surface Hydrodemolition in Missouri
Start of Total Surface Hydrodemolition in Missouri

- Bridge Lo868, St. Mary’s Way over IS 44, Franklin County (Maintenance Project) – 1996
- Bridge Lo896, Route 100 over IS 44, Franklin County (Maintenance Project) – 1997
- Various Maintenance Projects in St. Louis Area – 1997, 1999
- Bridge A0174, IS 44 over Pickerel Creek, Greene County (first programmed job) – 1998
- MoDOT Research Report on Hydrodemolition and Repair of Bridge Decks (December 2002, Wenzlick)
Hydrodemolition and Repair of Bridge Decks

December, 2002
MISSOURI INSTALLATIONS

Including Latex Modified Concrete Overlays
Missouri Hydrodemolition Deck Work (154 bridges)

- NW District – 3
- NE District – 9
- KC District – 15
- Central District – 16
- SL District – 95
- SW District – 14
- SE District – 2
T.S. Hydrodemolition Work (SY) per District

- NW District – 3855 SY
- NE District – 6354 SY
- KC District – 20,283 SY
- CD District – 19,784 SY
- SL District – 232,597 SY
- SW District – 69,223 SY
- SE District – 1266 SY
- TOTAL – Over 350,000 SY (Since 1996)
You are thinking about hiring me to be your latex salesman.
Overlays

- Over 300,000 SY Latex / Very Early Strength Latex
- Probably well over 30,000 cubic yards of LMC/VESLMC
- Other Dense Overlays – Low Slump, Low P, Microsilica Concrete
Deterioration Curve for Latex Modified Overlays

Condition

Years in Service

Deterioration Curve for Latex Modified Overlays

Linear (Deterioration Curve for Latex Modified Overlays)
Notable T.S. Hydro/LMC Installations

- St. Mary’s Road over I-44, Franklin County (first total surface install 1996)
- First Programmed Job I-44 over Pickerel Creek, Greene County (1998)
- MO 141 – 5 bridges in Jefferson/St. Louis Counties (2001)
- US 65 – bridge in Grundy County (2002)
- Route A – 3 bridges in Jefferson County (2007)
- I-70 in Kansas City (2011) – 6100 SY + on 15 bridges
- US 50 / Lamine River (2013)– 4390 SY
St. Mary’s Way
Franklin County MO (1996 Install)
St. Mary’s Way
Franklin County MO
A0174  Greene Co  1-30-17
44E @ Pickerel Cr
13% deck patches Sp 1 looking west

(1998 Install)
Jefferson County
MO 141 (2001 Install)
Jefferson County
MO 141
St. Louis County
MO 141
A2571  Rte. 65  Grundy
South End Deck Looking North
3-6-18  (2002 Install)
Jefferson County
Route A (2007 Install)
Jefferson County
Route A
Jackson County,
I-70 / US 40 (2011 Install)
Jackson County, I-70 @ Sterling
Major Projects (with LMC/VESLMC)

- Major Jobs include:
  - Poplar Street Bridge Approach (E & W) – 51,000 SY + (2005, 2006, 2011)
  - 3rd Street Viaduct (5) Downtown St. Louis – 56,000 SY + (2016-2017)
  - Truman Lake Bridges (4) in Benton County – 40,000 SY + (2009)
  - MO 185 / Bourbeuse River, Franklin County – 9700 SY + (2004)
A3689  Benton  Rte MO 83  (Truman Lake)
(2009 Install)
Evolution of Specifications

• Bar Exposure (waiving of clearance requirements)
• Payment for Monolithic Repair
• Zoned Repairs for Continuous Concrete Structures + Hydro Prep
• Deck Testing for Chlorides
• Removal of Pre-existing (debonded) Patches
GPR Scan vs. Actual Removals
Very Early Strength Latex Modified Concrete

- Poplar Street Approach Complex (St. Louis City)
- I-270 over Ladue Road (St. Louis County)
- I-70 EB over 5th Street (St. Charles County)
- I-55 NB (partial) over BNSF RR (Jefferson County)
- I-44/55 Interchange (St. Louis City)
- Approximately 40,000 SY of VESLMC
- 20 bridges +/-
A1501 EB (East end)

- High Production Hydro Equipment
- VESLMC
- Installed 2005
- NBI 4 Rated Deck
Poplar Street Approach Complex
Poplar Street Approach (EB Ramp Entrance)
I-64 WB
St. Louis City
Poplar Street Approach (west end)
(2011 Install)
US 50 (Lindbergh Blvd)
St. Louis County
2015

Very few, Isolated fine cracks
SUMMARY

• Fast Track Hydro Preferred Treatment
• Valuable Process in MODOT Deck Rehabilitation and Preservation Process
• Installations are Standing Test of Time
• Specifications continue to evolve
• VES-LMC is Viable for Strategic Traffic Locations
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** Every agency should have this process in their tool box!!!
And you want to be my latex salesman!

Questions?