

# BRIDGE DECK HYDRODEMOLITION WITH RAPID-SETTING CONCRETE OVERLAYS

- \* *Experiences with Hydro in Missouri*
- \* *Types of Rapid-Setting Overlays*
- \* *Contractor Applied Overlays*
- \* *Overlays Applied by State Forces*



10-25-2008

# Experiences with Hydrodemolition in Missouri

- **Total Surface Treatment**
- **Started out as maintenance demo's (1996)**
- **1<sup>st</sup> Project: Contracted 5 Bridges – St. Louis area (2001)**
- **Latex Modified Overlay**
- **Silica Fume Overlay**
- **Rapid-Setting Overlays**



10-25-2008

**N0620 07-12-04**  
**Hydrodemolition**



A photograph showing two different pavement surfaces side-by-side. The left side is a smooth, grey milled surface. The right side is a rough, textured surface made of small, light-colored aggregate stones embedded in a grey matrix, known as a hydro'd surface. The text 'Milled Surface' is overlaid on the left side, and 'Hydro'd Surface' is overlaid on the right side. A date '10-25-2008' is in the bottom right corner.

**Milled Surface**

**Hydro'd Surface**

10-25-2008



# TYPES OF RAPID-SETTING OVERLAYS

- **Rapid-Setting Latex Concrete (RSLC)**
- **Low P Concrete**



# TYPES OF RAPID-SETTING OVERLAYS

## Rapid-Setting Latex Concrete

- Where and When to Use:
- **High traffic areas**
- **Weekend lane closures**
- **Accelerated Construction**
- **4000 psi in 4 hours**
- **First project let in 2004**

# TYPES OF RAPID-SETTING OVERLAYS

- **LOW P CONCRETE**
- **Introduced in Missouri in 2008**
- **Calcium Sulfoaluminate Cement**
- **Low Permeability, Low Shrinkage**
- **Blended cement with corrosion inhibitors**
- **Superplasticizers**

# TYPES OF RAPID-SETTING OVERLAYS

## Comparisons of Low P and RSLC

- **Cracking**
- **High Early Strength**
- **Low P costs less**

# CONTRACTOR APPLIED OVERLAYS

- RSLC Installations in Missouri
- First installation: IS 270 over Ladue Road – 2004
- Approximately 15 bridge overlays to date
- Higher profile areas include:
  - \* IS 270 /Ladue Road (St. Louis) - 2004
  - \* IS 70 EB / 5<sup>th</sup> Street (St. Charles) - 2004
  - \* Poplar Street Approach (Eastbound) - 2005
  - \* Poplar Street Approach (Westbound) – 2006
- **ALL LOCATIONS PERFORMING VERY WELL**

# POPLAR STREET COMPLEX

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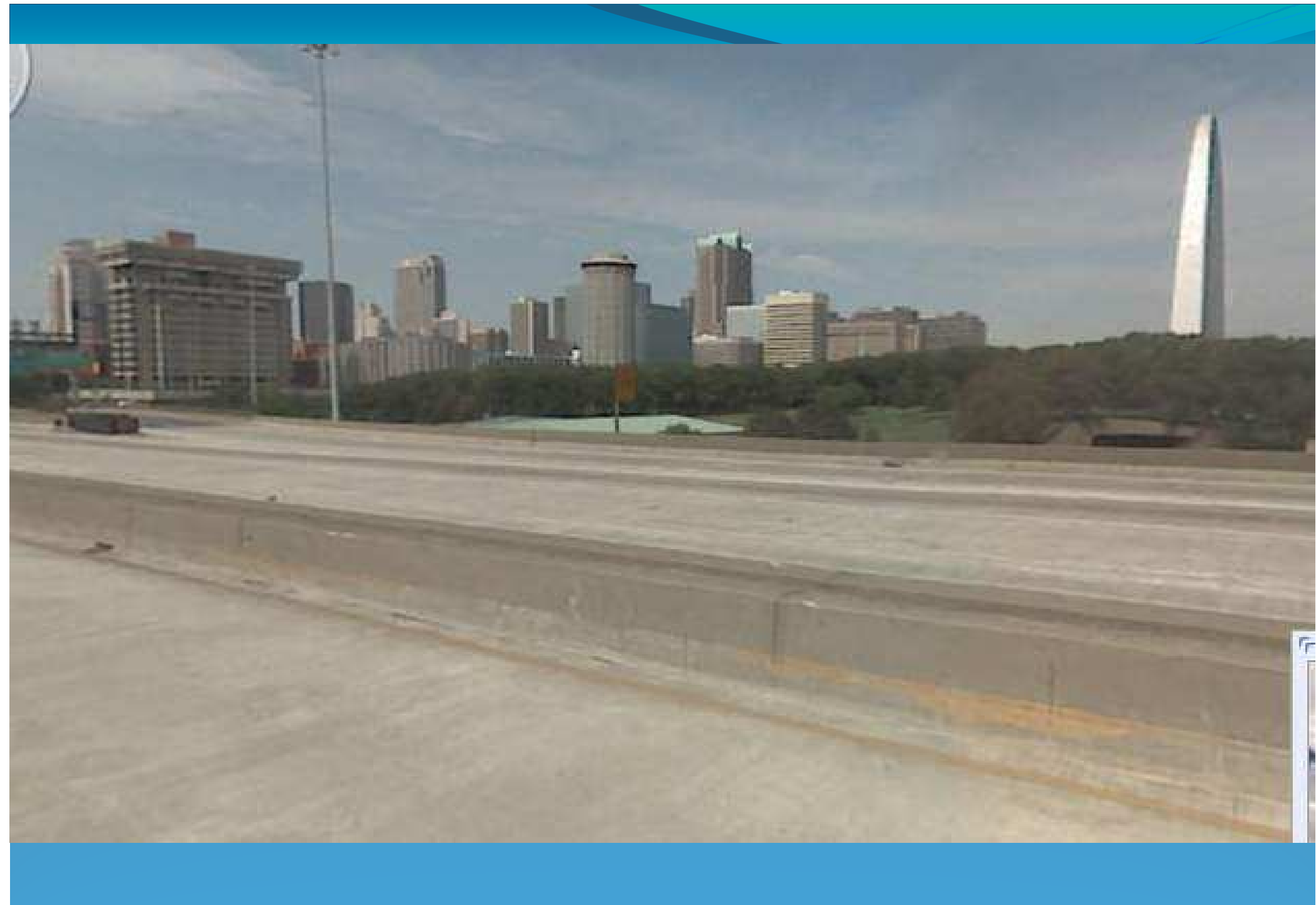


## Downtown St. Louis





**A1501 09-12-05**  
**East end E/O A1502 ramp.**





A1501 09-12-05  
Hydrodemolition/rapid set latex (8/05).





**A1501 W St. Louis City IS 64 8-31-10  
Wearing surface in series 21.**

A1501 W St. Louis City IS 64 8-31-10  
Random transverse cracking in overlay (series 21).



# CONTRACTOR APPLIED OVERLAYS

## Low P Installations

- \* Approximately 15 bridges in St. Louis Area
- \* All less than 2 years old
- \* Highest Profile location IS 44 (Eureka, MO)

## Hydro w/ Low P

A1796  
Hydrodemolition of deck  
West end of deck  
East to West view  
7-30-09

IS 44 WB over Meramec River  
Eureka, MO







# OVERLAYS APPLIED BY STATE FORCES

- **Mini-Bridge Deck Rehabs**
- **Bridge Work A-la-carte**
- **State Provided Labor**
- **Equipment Rental**
- **Request for Quotation for Services**



## OVERLAYS APPLIED BY STATE FORCES

- Approximately 15 done internally since 1996
- Most on lesser volume routes
- Various overlay types installed
- Bridges that miss program

# OVERLAYS APPLIED BY STATE FORCES

## (State Provided Labor)

- **Traffic Control**
- **Milling - Trucks / Sweeper**
- **Hydrodemolition - Containment**
- **Deck Preparation / Finishing**
- **Concrete Curing**
- **Paving Depth Transitions**

# OVERLAYS APPLIED BY STATE FORCES

## (Equipment Rental)

**Options include:**

- **Milling (with or without operator)**
- **Hydrodemolition Equipment with Operators (water optional)**
- **Finish Machine with Operator**
- **Mobil Mixer Rental with Operator**

# OVERLAYS APPLIED BY STATE FORCES (Request for Quotation for Service)

- Overlay Placement by Contractor (Varies)
- Approach tie-ins

# OVERLAYS APPLIED BY STATE FORCES

## First Project in Missouri

- St. Mary's Road / IS 44 – Franklin Co (196)
- Experimental Overlay – Still in service today
- Moderate deterioration



St. Mary's Road Bridge / IS 44  
10/5/2010

Overlay placed in 1996





L0888  
Hydro'd deck prep prior to  
silica fume overlay  
6-8-2007





L0888  
Silica Fume overlay pour  
6-8-2007



L0888  
Silica Fume Overlay  
6-8-2006



L0888  
Burlap and plastic curing  
for Silica Fume Overlay  
Overlay Poured by Bridge Crew  
6-8-2007

# OVERLAYS APPLIED BY STATE FORCES (Advantages)

- **Control Cost**
- **Sense of Ownership in Job**
- **Rapid Construction**
- **In-line with Department Values**

## **OVERLAYS APPLIED BY STATE FORCES (Rapid-Set Low P Concrete)**

- **First Installation in October 2008**
- **Demo with Maintenance Forces**
- **Hydroblasted and resurfaced Bridge deck**
- **Entire Process took less than 24 hours to re-open bridge**

**Low P Concrete Pour  
First in Missouri**



10-25-2008

**A1512**      **11-03-08**  
**Deck surface.**  
**Low P Concrete Overlay**



11-03-2008



08/05/2010 06:20

Route 3, Macon County





08/05/2010 06:20

Route 3, Macon County

## Route 3, Macon County



08/05/2010 06:20



Route 3, Macon County

# CONCLUSIONS

- \* **Very good success with hydrodemolition and Rapid-Setting Overlays**
- \* **Both RSLC and Low P Concrete have worked well**
- \* **State Applied Overlays supplement Contract work and help fill gaps**