



Polymer Overlays in Kansas

Midwest Bridge Preservation
Partnership Conference

Kansas City, Missouri

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OUTLINE

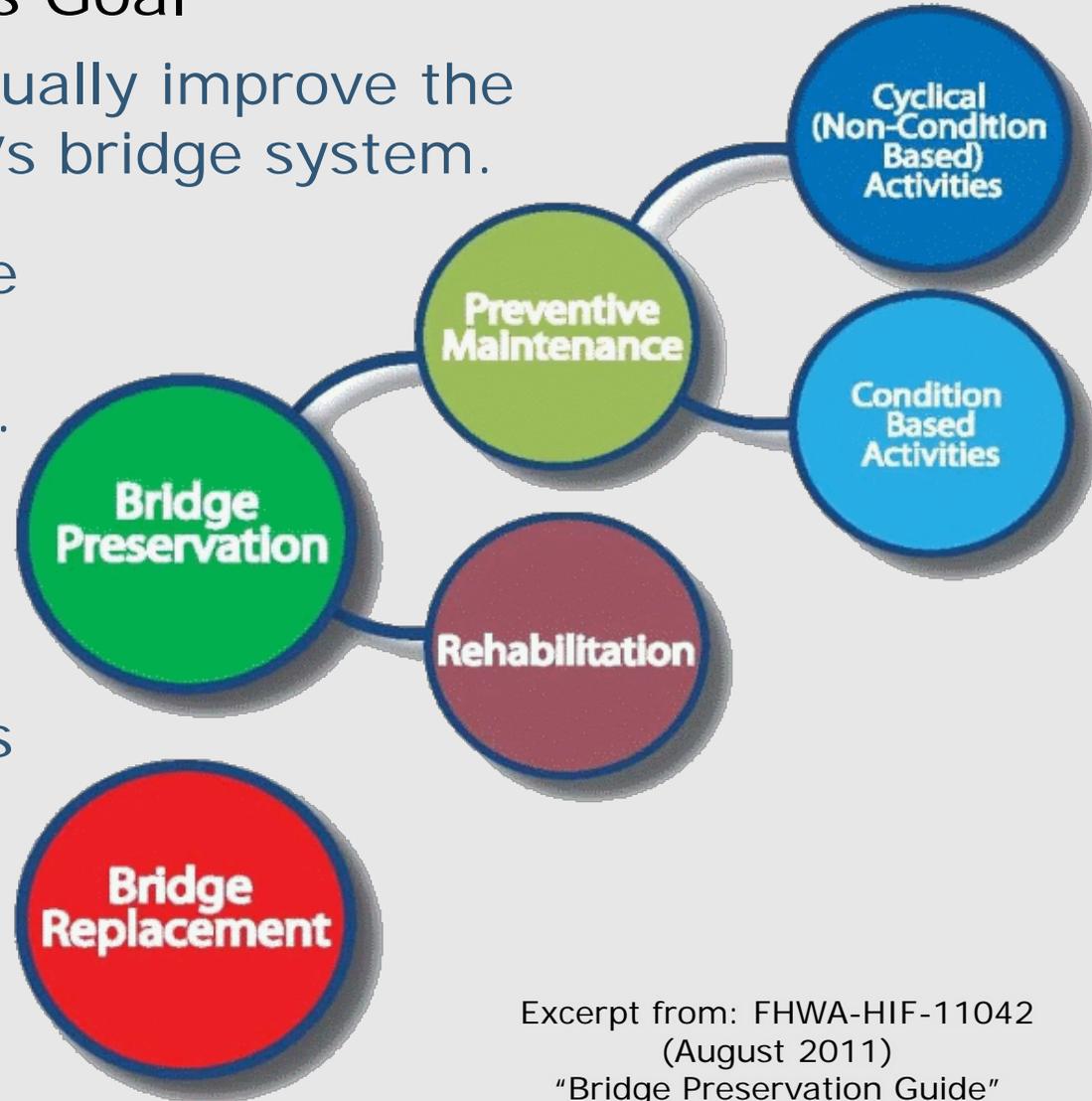
- Preservation Goals
- Preservation/Bridge Maintenance Funding
- Polymer Overlays Placed in Kansas
 - Statistics
 - Trends
- Polymer Overlay Specifications
 - Multi-Layer
 - Single Layer Repair
- Polymer Overlay Problems
 - Cracking, Peeling, Delaminations
- Surface Preparation and Protection
- Application of Overlay
- Questions



Flow Chart of Bridge Preservation

- **Bridge Management's Goal**

- To monitor and continually improve the condition of the State's bridge system.
- To continually improve the condition of the State's bridge system.
- To achieve this goal, it is necessary to perform maintenance activities and to replace those bridges that can no longer be economically maintained.



Excerpt from: FHWA-HIF-11042
(August 2011)
"Bridge Preservation Guide"

Polymer Overlays = Bridge Preservation



1. Prep



2. Epoxy



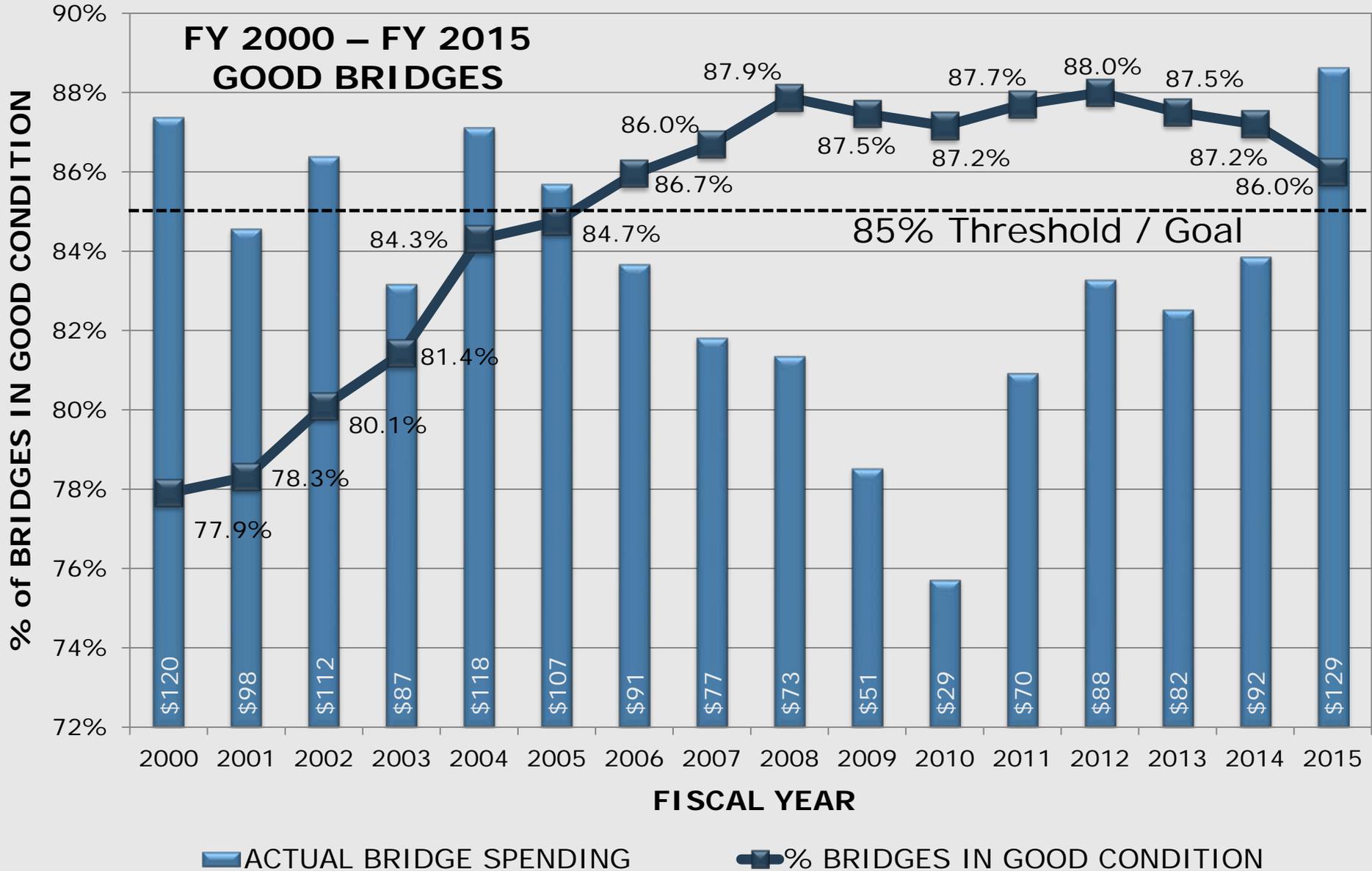
3. Aggregate



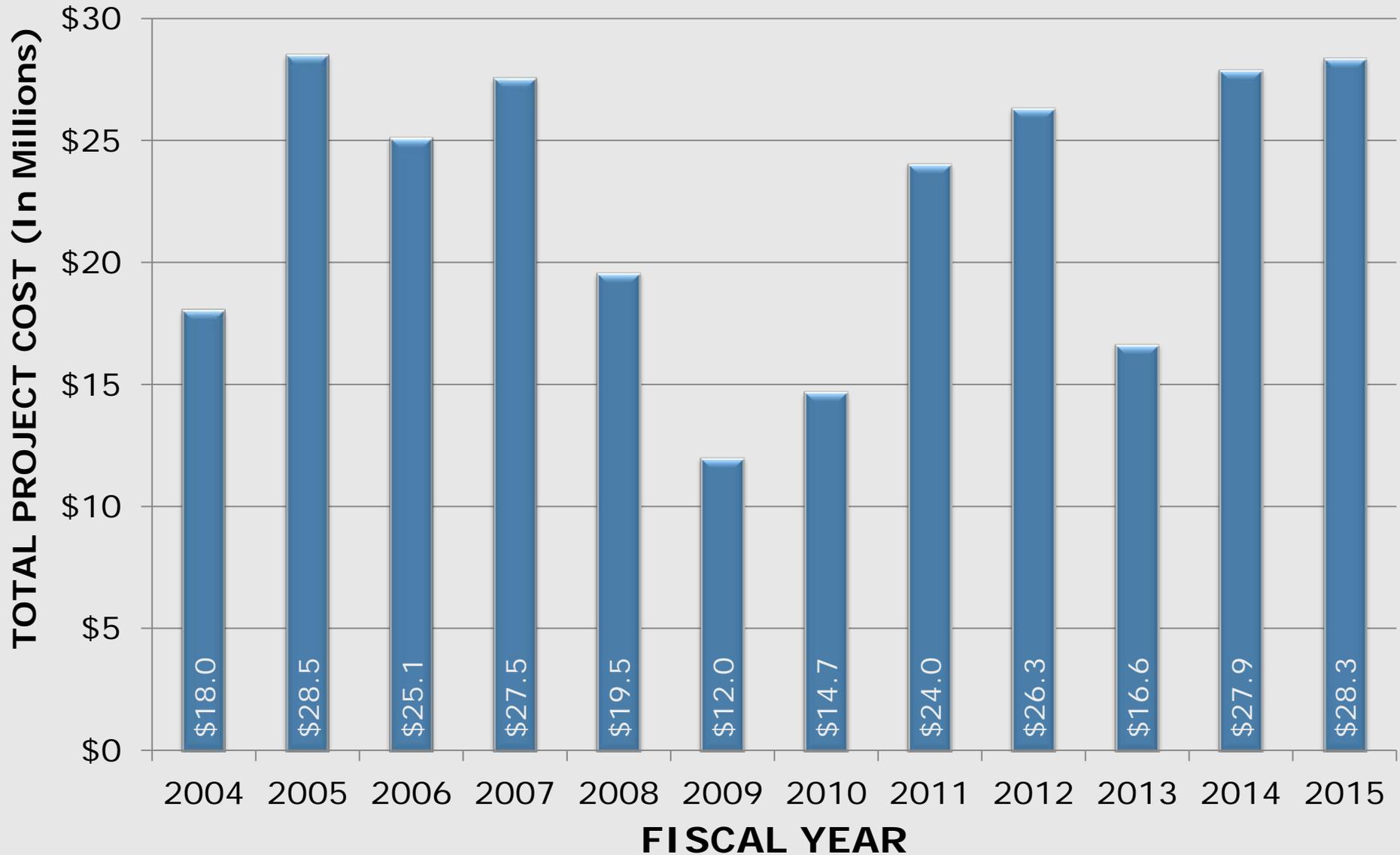
4. Product

Bridge Condition Related To Spending

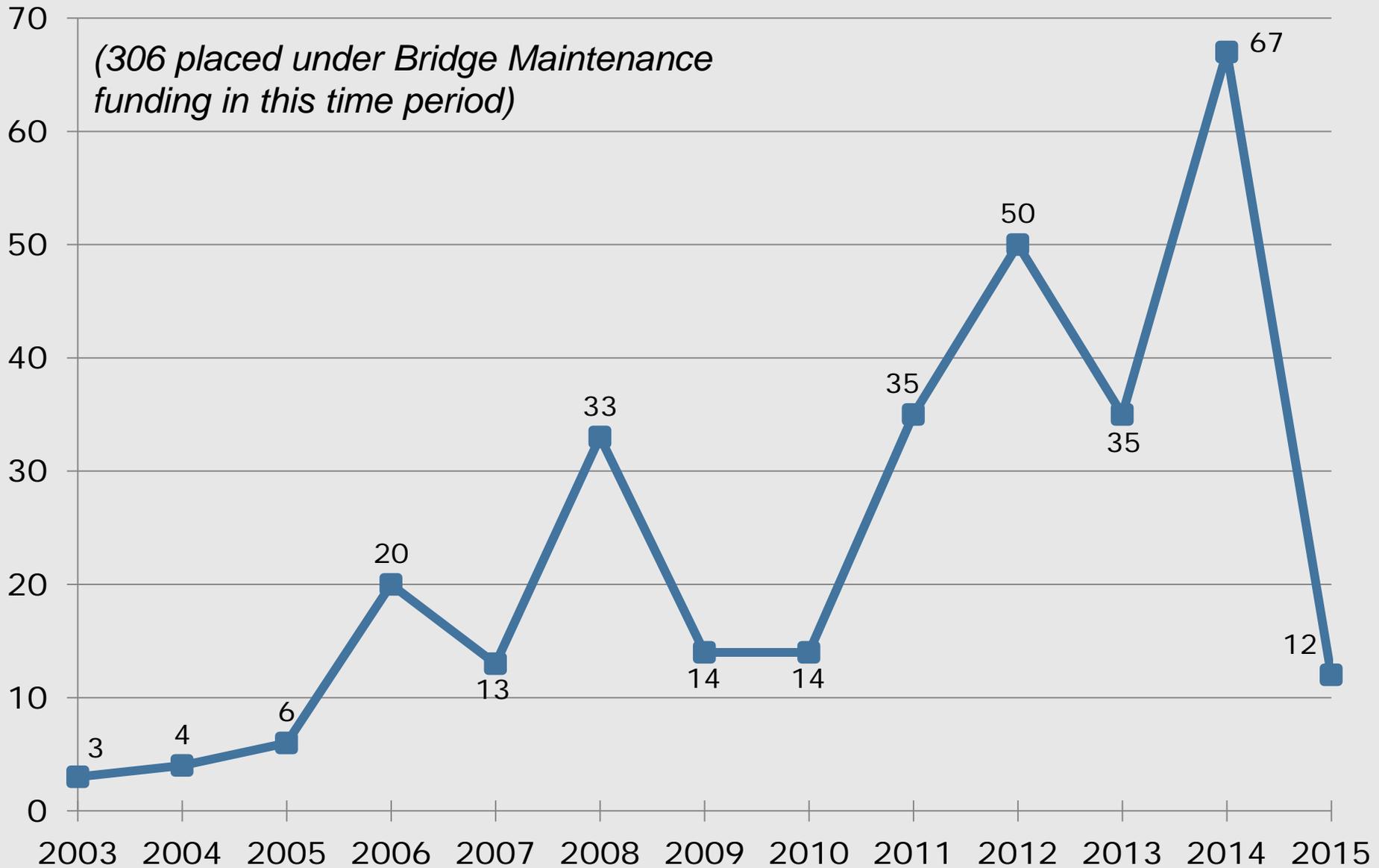
**FY 2000 – FY 2015
GOOD BRIDGES**



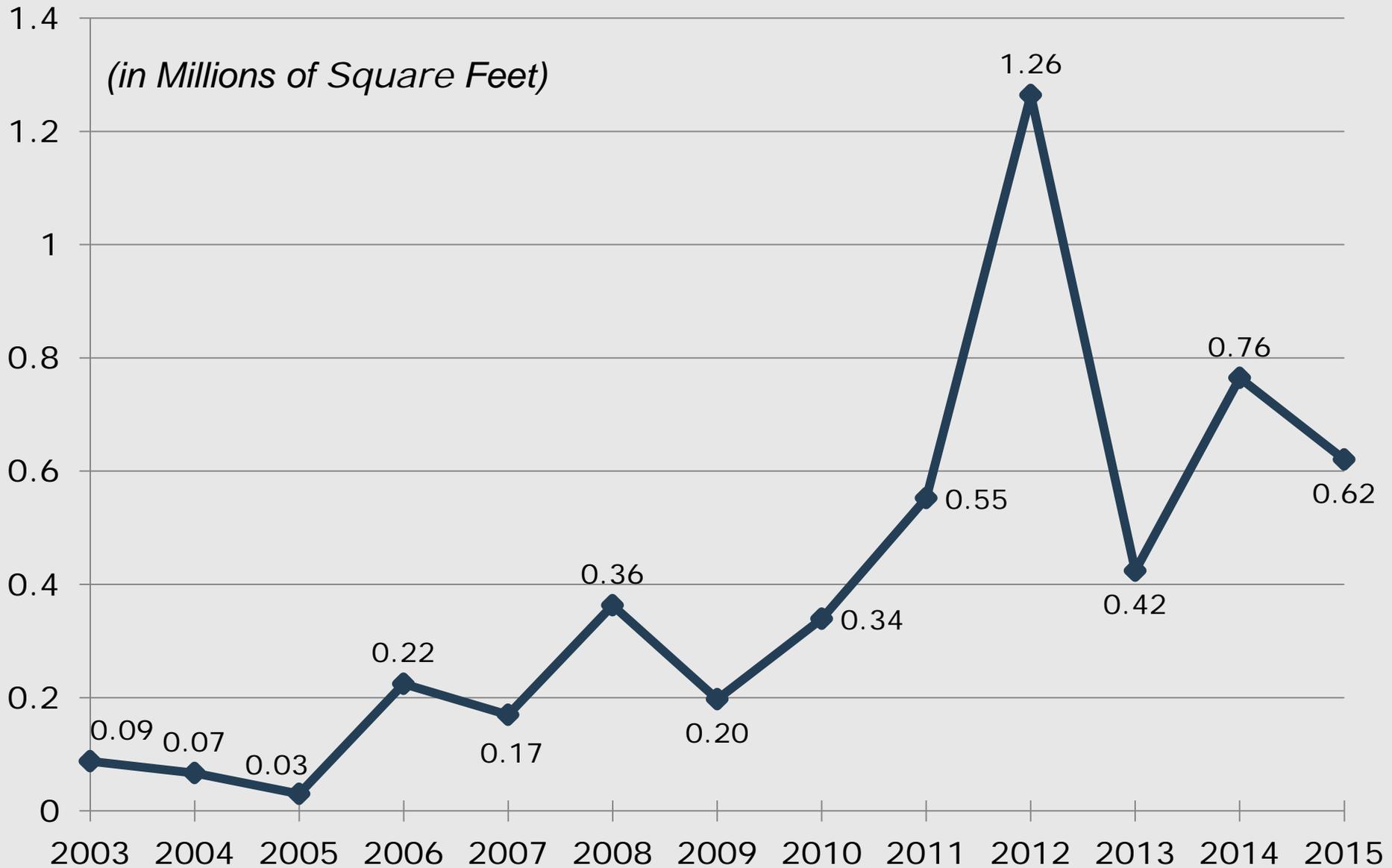
Bridge Maintenance Funding



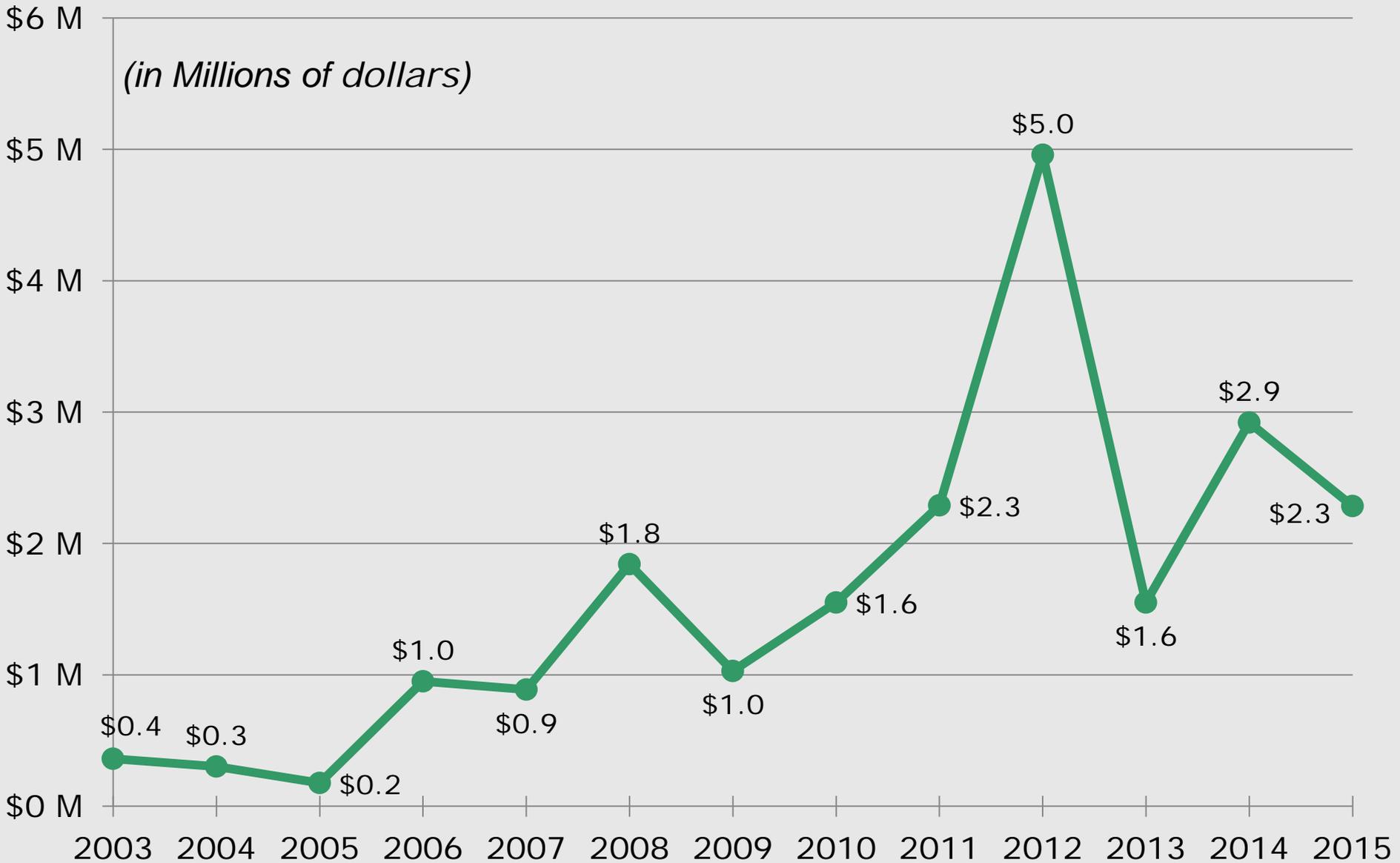
Number of Polymer Overlays Placed



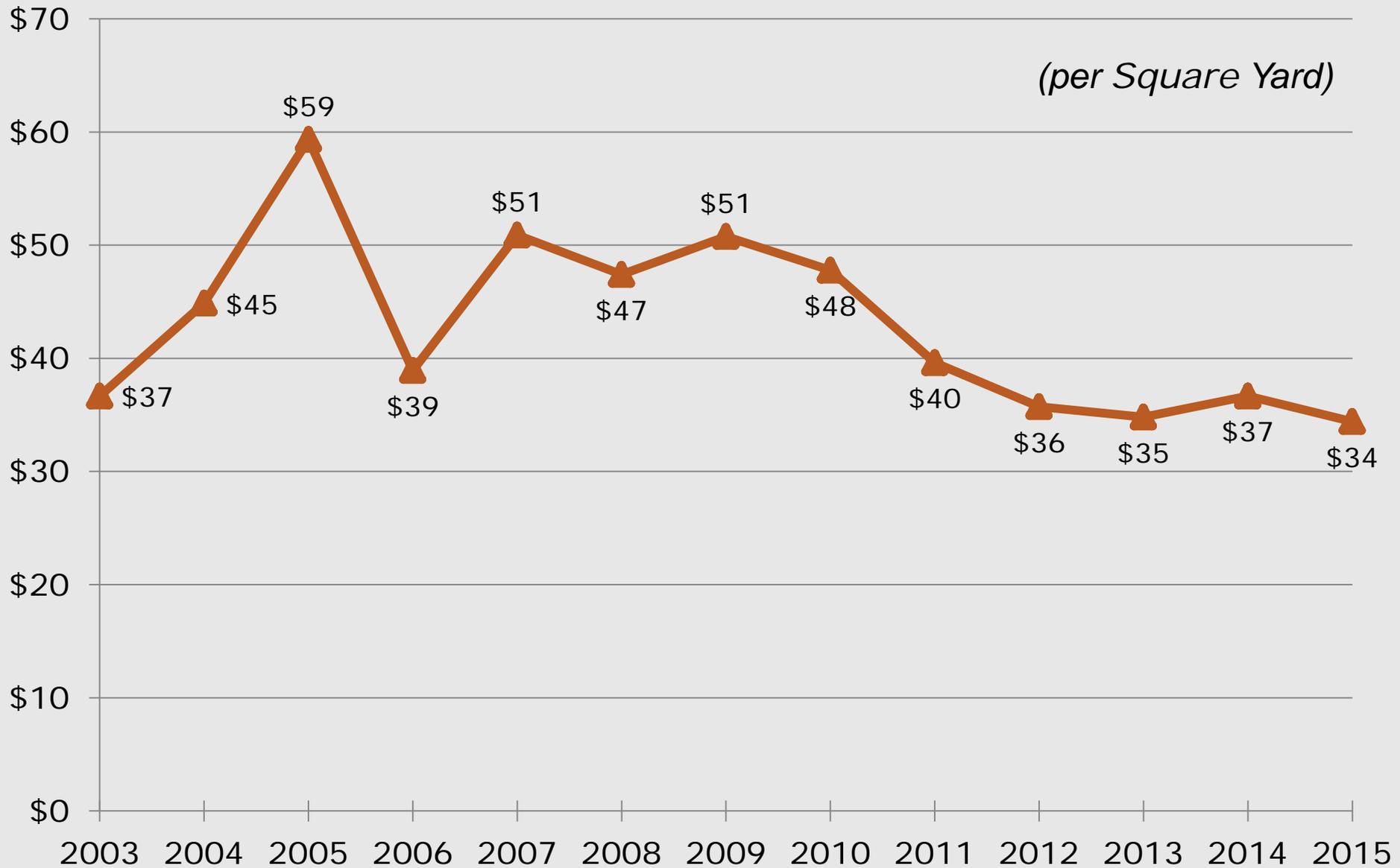
Square Feet of Polymer Overlays Placed



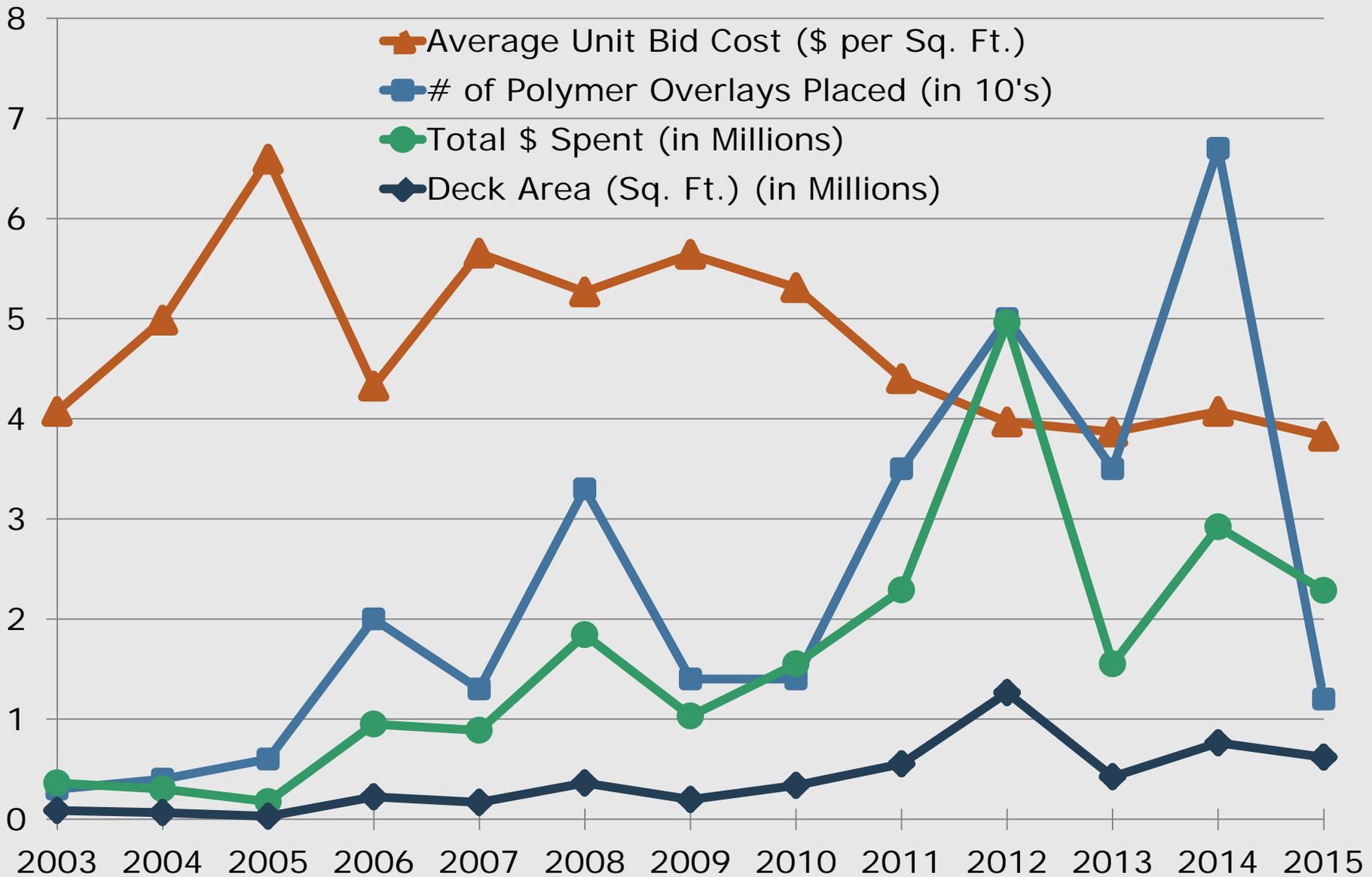
Money Spent on Polymer Overlays



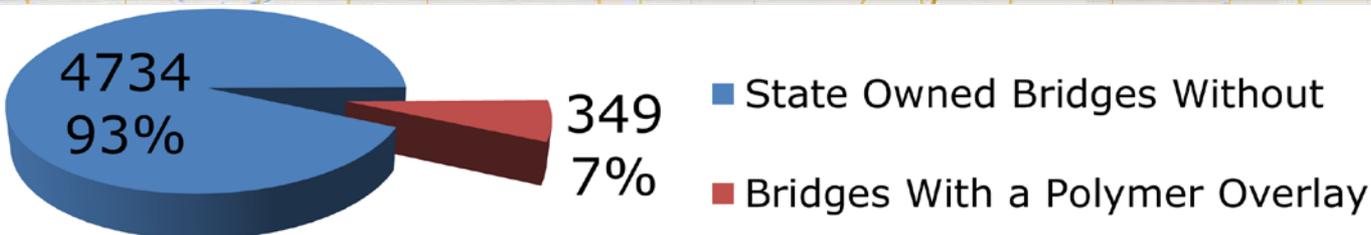
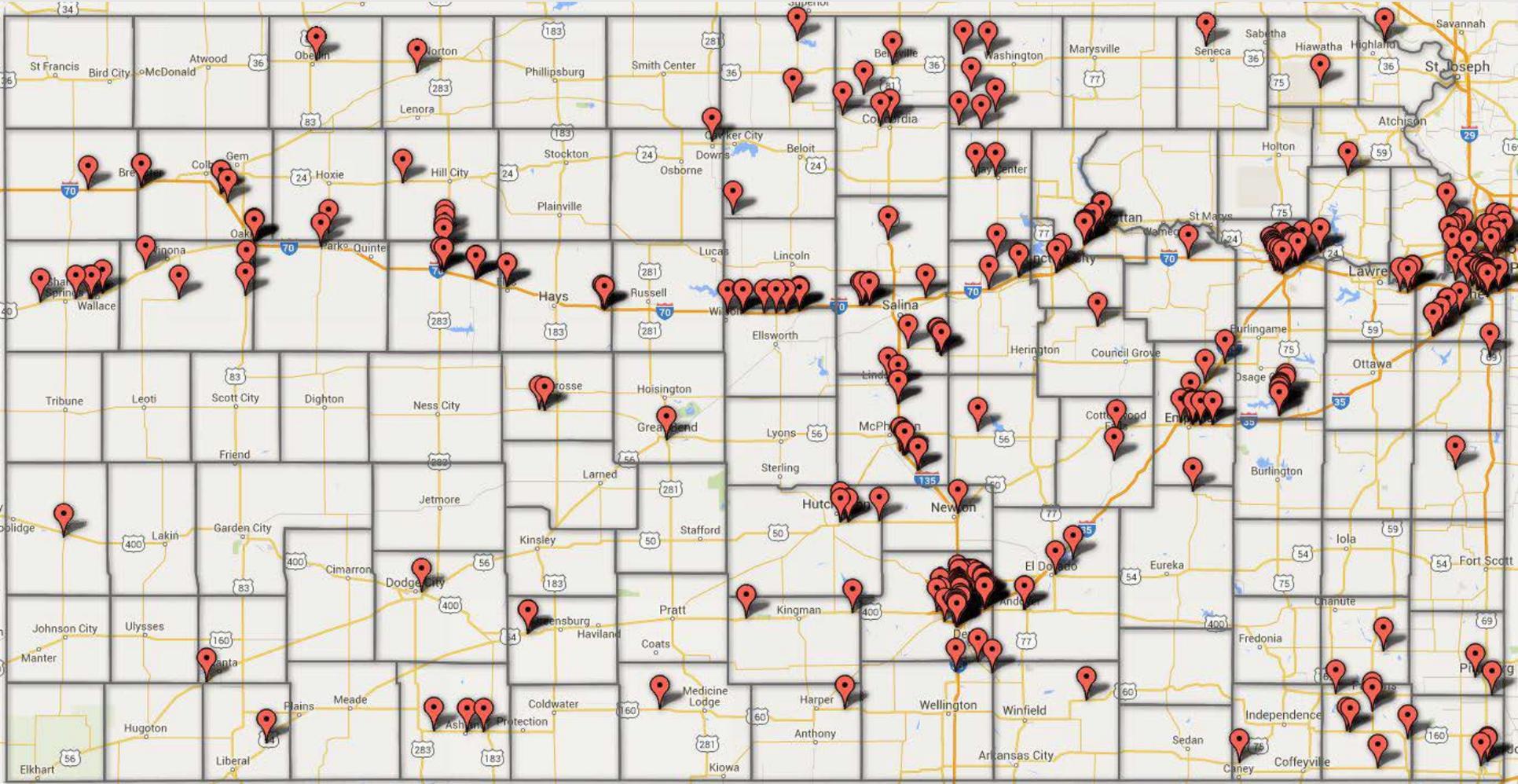
Average Unit Bid Cost



Summary of Statistics



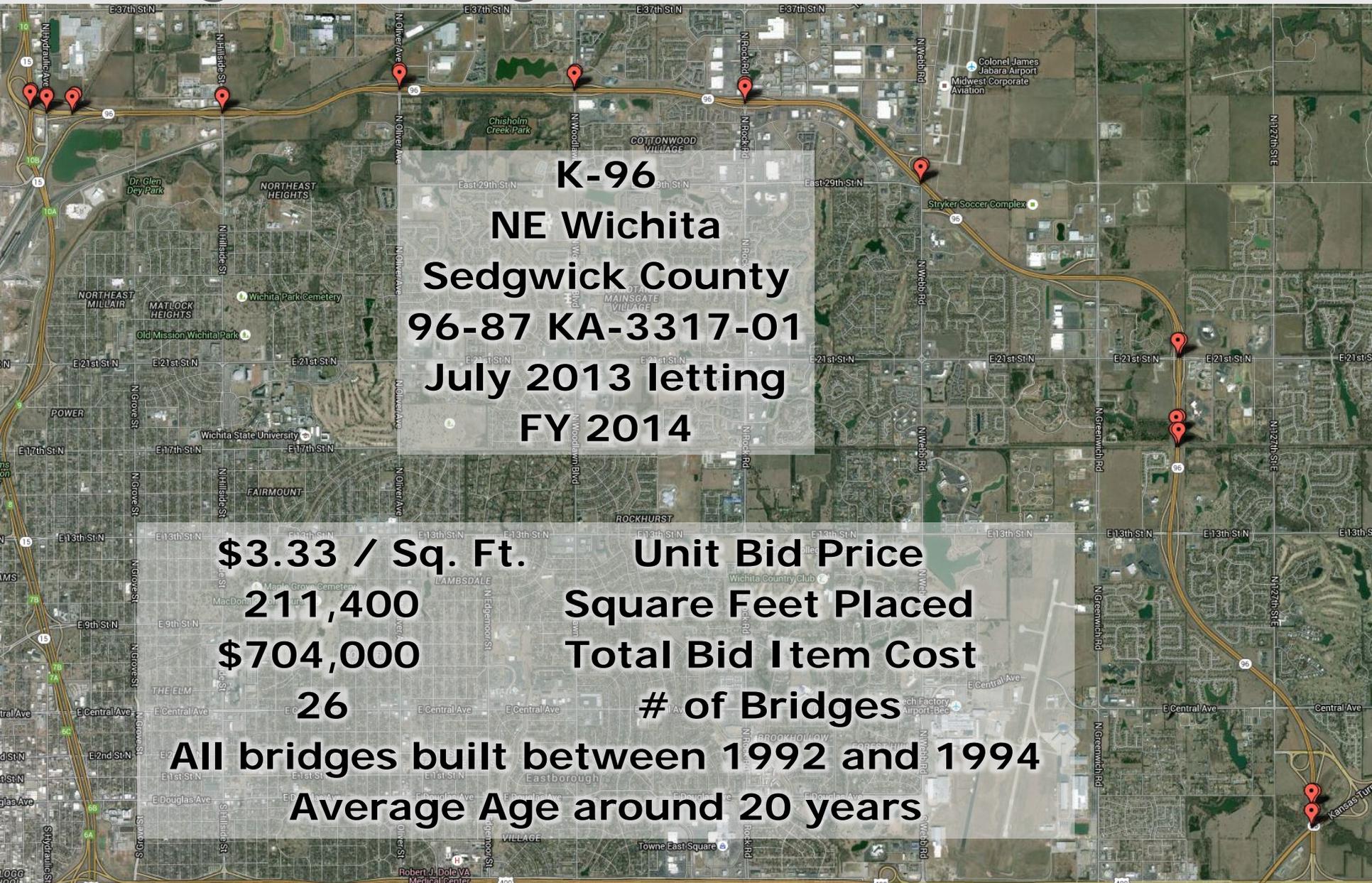
State Owned Bridges with Polymer Overlays



■ State Owned Bridges Without

■ Bridges With a Polymer Overlay

Taking Advantage of Low Bid Prices



K-96
NE Wichita
Sedgwick County
96-87 KA-3317-01
July 2013 letting
FY 2014

\$3.33 / Sq. Ft.

211,400

\$704,000

26

All bridges built between 1992 and 1994

Average Age around 20 years

Unit Bid Price

Square Feet Placed

Total Bid Item Cost

of Bridges

Polymer Overlay Specifications

The following specifications are available on the KDOT webpage at the following link:

- <http://www.ksdot.org/bureaus/burConsMain/specprov/2015specprov.asp>
- 729 – Multi-Layer Polymer Concrete Overlay
- 740 – Polymer Concrete Overlay Repair

Those specs also employ the following material specs:

- 1730 – Polymer Resins for Polymer Concrete Overlay Systems
- 1102 – Aggregates for Concrete Not Placed on Grade

The 2015 edition of the Specifications became effective with the July letting.

- Note: These specs do not include a warranty.
- *Response to the Maryland inquiry from July.*

729 – Multi-Layer Polymer Concrete Overlay

SECTION 729

MULTI-LAYER POLYMER CONCRETE OVERLAY

729.1 DESCRIPTION

Prepare the surface of the reinforced concrete bridge deck and construct a multi-layer polymer concrete overlay (overlay) as shown on the Contract Documents.

Provide an overall combination of labor and equipment with the capability of proportioning and mixing the polymer resin components and placing the primer and aggregate, in accordance with this specification and the manufacturer/supplier's recommendations.

BID ITEM

Multi-Layer Polymer Concrete Overlay

UNITS

Square Yard

j. Weather Limitations.

(1) Epoxy. Do not place the overlay if the air temperature is expected to drop below 55°F within 8 hours of placement.

(2) Polyester. Do not place any component of the overlay if the air or substrate temperature is at or expected to drop below 40°F during installation.

(3) General. Do not place the overlay when the deck temperature will exceed 90°F.

Do not place the overlay if gel time is less than 10 minutes.

The overlay may be placed outside the specified temperature ranges with the approval of the Engineer and the material manufacturer/supplier. Discuss changes to temperature limitations at the preconstruction conference.

740 – Polymer Concrete Overlay Repair

SECTION 740

POLYMER CONCRETE OVERLAY REPAIR

740.1 DESCRIPTION

Repair the existing polymer concrete overlay surface.

Provide an overall combination of labor and equipment with the capability of preparing the surface, proportioning and mixing the polymer components, and placing the polymer material and aggregate in accordance with this specification and the manufacturer/supplier's recommendations.

When specified, construct a single coat polymer concrete overlay according to this specification.

BID ITEMS

Polymer Concrete Overlay Repair
Single-Layer Polymer Concrete Overlay

UNITS

Square Yard
Square Yard

c. Preparation For Polymer Concrete Overlay Repair.

(1) When specified, repair unsound bridge deck concrete according to **SECTION 731** and cure repairs prior to performing the polymer concrete overlay repair.

(6) Removal area should extend a minimum of 6 inches beyond the edges of the unsound, damaged or delaminated polymer concrete overlay or 6 inches beyond patching of the concrete bridge deck.

(7) Shot blast/sand blast or bush hammer portland cement concrete patch surfaces to produce an acceptable surface for placement of the polymer concrete overlay patch. Produce a surface relief equal to the International Concrete Repair Institute (ICRI) Surface Preparation Level 6 to 7 or ASTM E 965 Pavement Macrotexture Depth of 0.04 to 0.08 inch.

Polymer Concrete Overlay Repair

- The polymer overlay repair spec and bid item has been officially used on the following 2 projects:

Project No. **70-89 KA-3169-01**

Shawnee County

Bridge No. **027**

I-70 over SE 3rd St.

Location: 39.05503,-95.66813, at milepost 361.75

Bridge No. **028**

I-70 over SE 4th St.

Location: 39.183434,-94.794382, at milepost 361.86

Project No. **177-9 KA-3155-01**

Chase County

Bridge No. **050**

K-177/Walnut St. over the Cottonwood River

Location: 38.37456,-96.53897, north end of Cottonwood Falls

- The bids for those projects came in at the following prices:
 - **\$18.50** and **\$29.50** per Square Yard
- Compared to the average bid price for a Multi-Layer Overlay:
 - Between **\$32** - **\$36** per Square Yard over the last few years

Problems – Cracking / Delaminations



Problems – Cracking / Delaminations



Problems – Peeling / Delaminations



Problems – Peeling / Delaminations



Surface Preparation



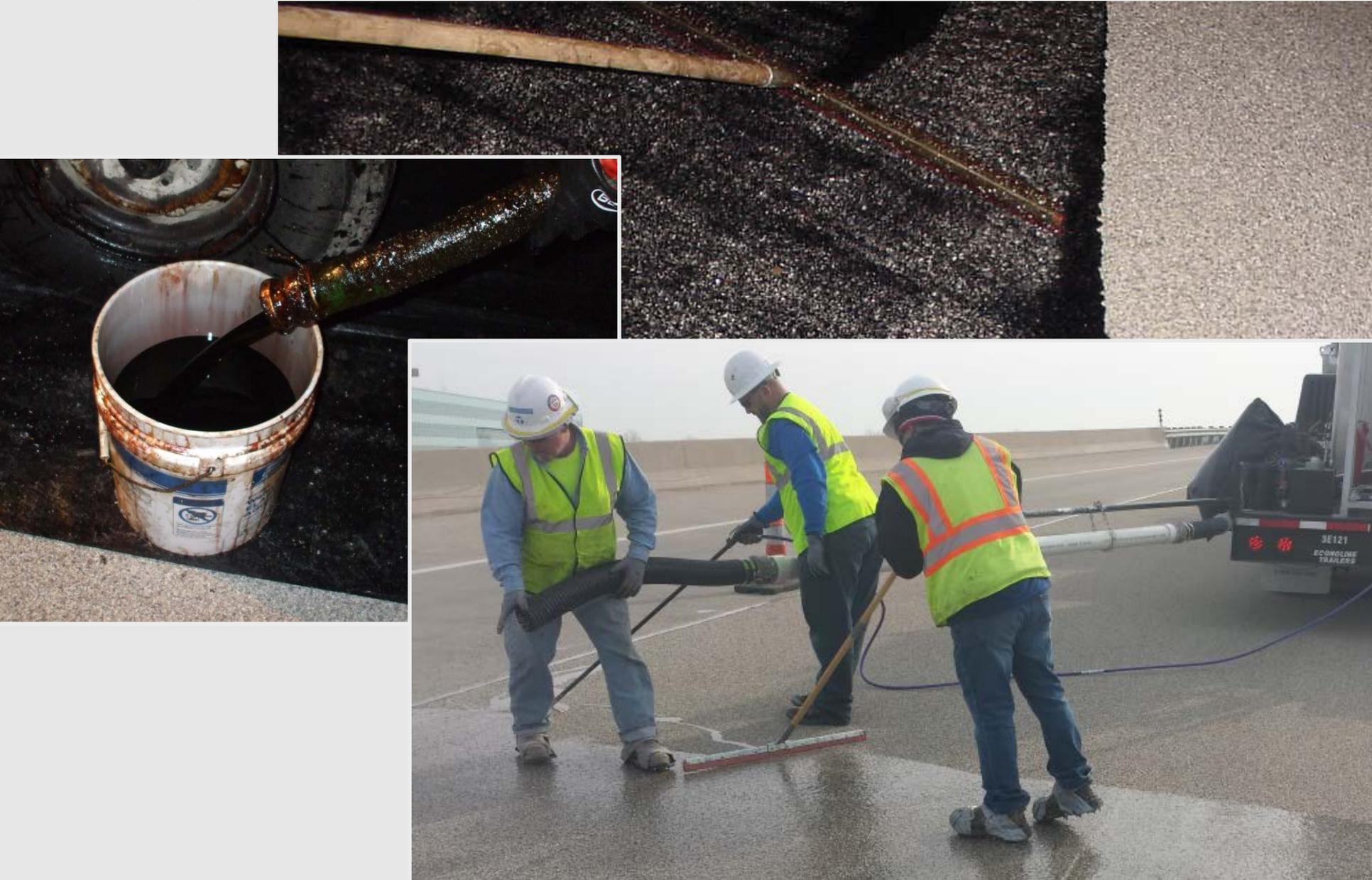
Surface Protection



Surface Protection – Fancy Footwear



Epoxy Application



Aggregate Application





QUESTIONS?



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