INTRODUCTION

• INTRODUCTION

• INVENTORY

• HISTORY

• DEFINING BRIDGE PRESERVATION & PREVENTIVE MAINTENANCE

• PROGRAM

• INNOVATIVE STRATEGIES

• Q & A
CITY OF ROCHESTER’S INVENTORY

- Rochester Owns and Maintains:
  - 32 Vehicle Bridges
  - 9 Pedestrian Bridges
  - 30 Railroad Underpasses
  - 9 Tunnel Structures
- "Topside" Maintenance on 23 NYSDOT Vehicle Bridges and 1 Pedestrian Bridge
- Average Bridge Condition Rating = 5.06
- Average Sufficiency Rating = 69.86%
STONE ARCH BRIDGES
PEDESTRIAN BRIDGES
PEDESTRIAN BRIDGES
SPECIAL STRUCTURES
RAILROAD UNDERPASSES

CITY OF ROCHESTER’S INVENTORY
HISTORY OF ROCHESTER’S BRIDGE PROGRAM

• Program first implemented in 1981

• PM Work is 100% funded by the City of Rochester (Cash Capital)

• Average annual maintenance contracts are valued at $250,000

• Over 54 Engineers with 13 individual firms in the Rochester Community have been involved in this program over the span of 31 years

GOAL: Prolong the life of the City’s bridge infrastructure and reduce the need for large capital improvements
Why it work’s ......

• City Council Support !!

• Performance Based Scorecard Measurements Real time Results

• Extremely Cost Efficient Don’t have to deal with the NYSDOT !!

• Flexible with rapid delivery and solid results
### City of Rochester - Bridges

#### FY 2012 Scorecard Measures

<table>
<thead>
<tr>
<th>FY 2012 Scorecard Measures</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>% Rated 6 &amp; 7 (Excellent)</td>
<td>27.5</td>
</tr>
<tr>
<td>% Rated 5 (Good)</td>
<td>45.5</td>
</tr>
<tr>
<td>% Rated 4 (Fair)</td>
<td>27</td>
</tr>
<tr>
<td>% Rated Less than 4 (Poor)</td>
<td>0</td>
</tr>
</tbody>
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As of Sept 10, 2012
What is Bridge Preservation?

- Actions or strategies that:
  - Prevent, delay or reduce deterioration of bridges or bridge elements
  - Restore the function of existing bridges
  - Keep bridges in good condition
  - Extend their life

Source: FHWA Bridge Preservation Expert Task Group
Bridge Preservation Actions

• Intended to delay the need for costly reconstruction or replacement by taking action on bridges while they are still in good condition, before the onset of serious deterioration.

• Bridge Preservation encompasses Preventive Maintenance and Rehabilitation activities.
What is Preventive Maintenance?

- Planned strategy of cost-effective treatments to an existing bridge that:
  - Preserves the bridge
  - Delays future deterioration
  - Maintains or improves the functional condition of the bridge

- Preventive Maintenance includes Cyclical and Corrective Maintenance Activities

*Source: AASHTO Subcommittee on Maintenance*
BRIDGE PRESERVATION FLOW CHART

Source: FHWA Bridge Preservation Guide
CYCLICAL MAINTENANCE ACTIVITIES

• Activities performed at planned intervals to preserve existing bridge element or component conditions.

• Bridge element or component conditions are not always directly improved as a result of these activities, but deterioration is expected to be delayed.

• Typical Cyclical Maintenance Items include:
  ✓ Bridge Washing
  ✓ Spot and/or Zone Painting of Structural Steel Elements
  ✓ Deck Sealing & Overlays
  ✓ Concrete Sealing
  ✓ Bearing Lubrication
<table>
<thead>
<tr>
<th>CYCLICAL ACTIVITY</th>
<th>COMMONLY USED FREQUENCY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wash/clean decks or entire bridge</td>
<td>1-2 years</td>
</tr>
<tr>
<td>Install overlay on concrete decks:</td>
<td></td>
</tr>
<tr>
<td>• Thin polymer overlay</td>
<td>10-15 years</td>
</tr>
<tr>
<td>• Asphalt overlay with waterproof membrane</td>
<td>10-15 years</td>
</tr>
<tr>
<td>• Rigid overlay</td>
<td>20-25 years</td>
</tr>
<tr>
<td>Seal concrete superstructure &amp; substructures with waterproofing penetrating sealant</td>
<td>3-5 years</td>
</tr>
<tr>
<td>Field clean &amp; overcoat steel members</td>
<td>10-15 years</td>
</tr>
<tr>
<td>Lubricate bearing devices</td>
<td>2-4 years</td>
</tr>
</tbody>
</table>
ASPHALT OVERLAY
• Activities performed on Bridge elements as needed and identified through the bridge inspection process.

• Typically performed on a bridge that is in overall good to fair condition to restore the element to a state of good repair.

• Typical Condition Based Maintenance Items include:
  ✓ Superstructure & Substructure Concrete Repairs
  ✓ Steel Girder Repairs
  ✓ Complete Painting of Structural Steel Elements
  ✓ Joint Replacement
  ✓ Bearing Replacement
  ✓ Curb Repairs & Replacement
  ✓ Scour Protection
  ✓ Railing Repairs & Upgrades
  ✓ Drainage Improvements
RAILING REPLACEMENT

[Images of a bridge and railing before and after replacement]
CURB REPLACEMENT
DECK REPAIRS
WHY IS PREVENTIVE MAINTENANCE IMPORTANT?

- **CURVE W/ CORRECTIVE MAINTENANCE**
- **CURVE W/ OUT CORRECTIVE MAINTENANCE**

Graph showing the decline in average condition rating over age (years) with and without corrective maintenance.
WHY IS PREVENTIVE MAINTENANCE IMPORTANT?

- Application of a preventive maintenance treatment
- Length of time rehabilitation is deferred
**Inventory Management** is a process in which one oversees and tracks their assets.

**Bridge Inventory** is data pertaining to the identification information, classification, type and material, operational condition, geometrics, load rating and posting, and inspections of the bridge.

There are several ways to track this inventory depending on the owner’s needs:
- Simple Excel Spreadsheet
- Microsoft Access Database
- Bridge Management Software Program

Database provides a central location for bridge data:
- Photos
- Inspection Reports
- Flag Reports
- Work Orders
- Contract Documents
• 1990’s / Early 2000’s - City utilized MS Access to track bridge inventory

• 2008 – City purchased a Bridge Management Software Program to track bridge inventory

• City of Rochester utilizes Cartegraph’s BRIDGEview bridge management software program
Advantages of a Bridge Management Software Program:

- Accurately capture and maintain bridge data
- Proactively monitor overall condition of bridges
- Track current and historical bridge information
- Assists with factoring bridge maintenance into yearly budget.
- Reporting features help track bridge data that helps establish preventive maintenance schedules, and accurately determine replacement needs.
• Utilizing the Cartegraph Software Program, generate report listing bridges with:
  ✓ Element specific deficiencies (condition ratings ≤ 4)
  ✓ Safety concerns
  ✓ Cyclical maintenance needs
• Based on this information, maintenance needs are prioritized
• Estimate cost to eliminate deficiencies or perform the cyclical maintenance needs
• Evaluate and compare needs, associated cost, and available funds
• Develop a list of maintenance repairs to be performed over a 5-year period
  ✓ Priority is placed on bridges with safety concerns and bridge elements with condition ratings ≤ 4
• 5-year Maintenance Program is a working document that is updated year-to-year based on current condition and needs of existing bridge inventory.
• Construction Documents (Year One of 5-year Plan)
  ✓ Plans & Details
  ✓ Specifications
  ✓ Proposal Book
  ✓ Engineer’s Estimate

• Bid & Award
  ✓ Advertisement
  ✓ Pre-bid Meeting
  ✓ Bid Opening
  ✓ Bid Analysis
  ✓ Award Recommendation
• Construction Management & Inspection
  ✓ Preconstruction Meeting
  ✓ Construction Inspection
  ✓ Progress Meetings
  ✓ Shop Drawing Review
  ✓ Pay Applications
  ✓ Change Orders
  ✓ Record Plans
• Product Development with Dow POLY-CARB, Inc.

• POLY-CARB, Inc. ("Dow POLY-CARB") is a wholly owned subsidiary of The Dow Chemical Company, one of the world's most pre-eminent science and technology companies. Dow POLY-CARB is committed to developing and delivering quality performance-based, low-risk, cost-effective infrastructure solutions that add safety and are easy-to-implement.

• Working with Dow POLY-CARB to develop new products that will solve an ongoing curb maintenance issue at the Driving Park Bridge.
QUESTION & ANSWER PERIOD
What types of activities does Bridge Preservation encompass?
Preventive Maintenance & Rehabilitation Activities
What are the two types of Preventive Maintenance Activities?
Cyclical and Condition Based Activities
Name three types of Cyclical Preventive Maintenance Activities
- Bridge Washing
- Spot and/or Zone Painting of Structural Steel Elements
- Deck Sealing & Overlays
- Concrete Sealing
- Bearing Lubrication
Name three types of Condition Based Activities
✓ Superstructure & Substructure
  Concrete Repairs
✓ Steel Girder Repairs
✓ Complete Painting of Structural Steel Elements
✓ Joint Replacement
✓ Bearing Replacement
✓ Curb Repairs & Replacement
✓ Scour Protection
✓ Railing Repairs & Upgrades
✓ Drainage Improvements
Why is Preventive Maintenance Important?
Preventive Maintenance is a cost effective way of extending the functional life of an asset without large capital investments.