

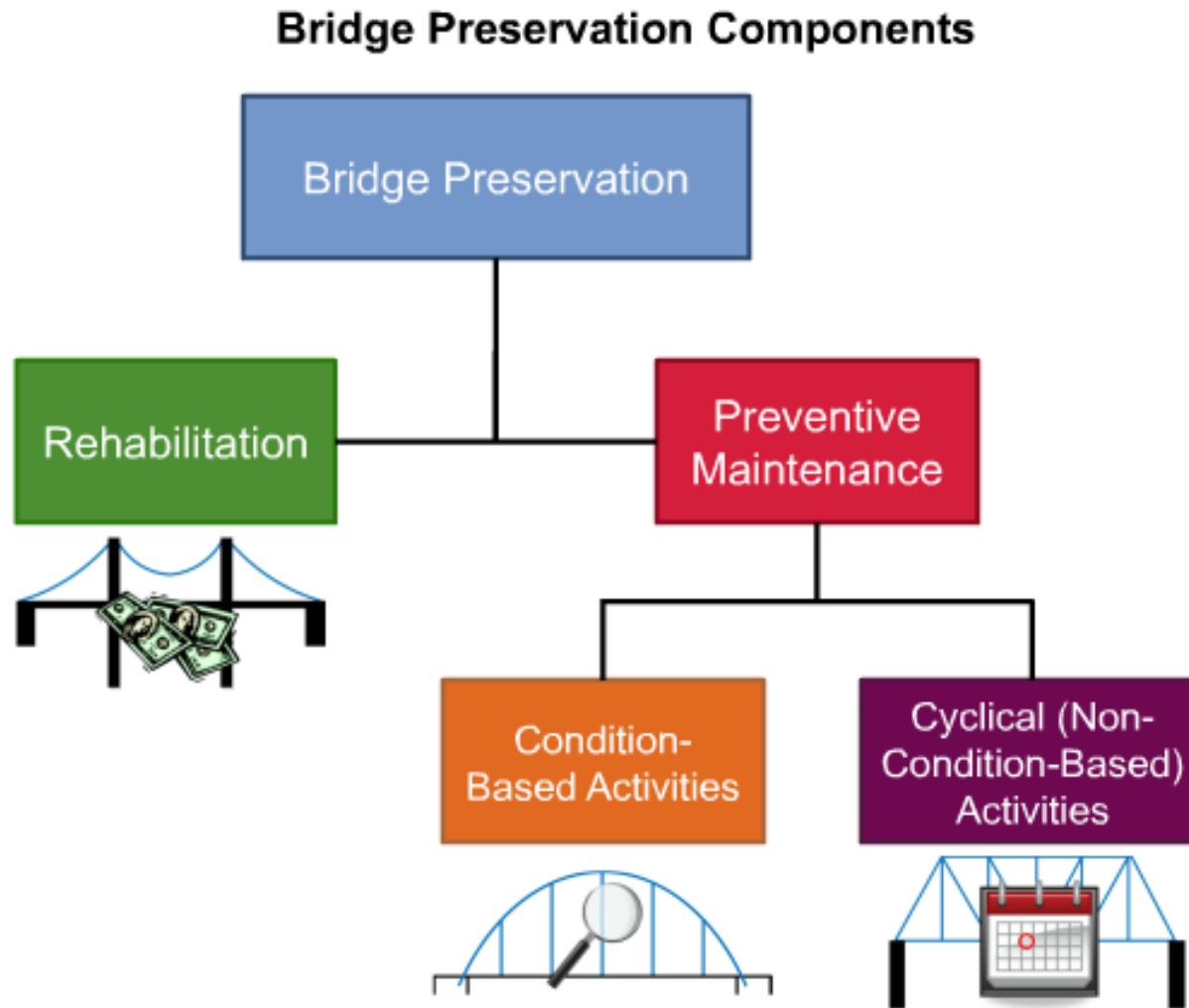


# Preservation Needs and Cost Identification

Jose L. Aldayuz, P.E  
Kansas City, MO 2015

# Presentation Outline

- Bridge Preservation Components
- Preventive Maintenance
- Needs Assessment
- Work Plans
- Creating Projects
- Creating Programs

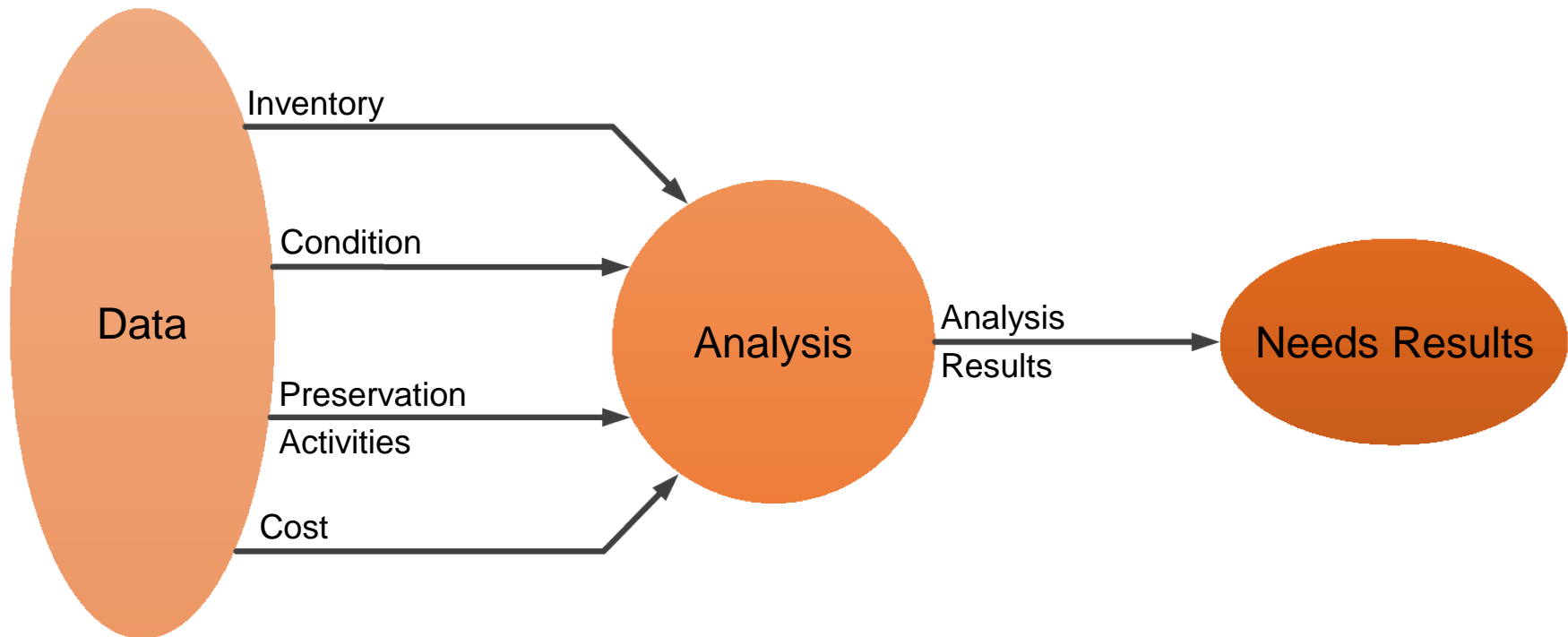


Source: NHI Bridge Preservation Training

## Elements of a Systematic Preventive Maintenance Program



Source: NHI Bridge Preservation Training



Source: NHI Bridge Preservation Training

- Inventory information
  - Average Daily and Truck Traffic, geometry, location, and type
- Condition data
  - NBEs, BMEs, ADEs, and NBI Condition Ratings
- Preservation and rehabilitation activities
- Cost data
  - Preservation costs, rehabilitation costs, and annual budget



## Bridge Element Cost Elicitation Form



## REINFORCED CONCRETE BRIDGE DECK

Element #: 12

Units: ft<sup>2</sup>

Type: NBE

Typical cost reflects  
cost without low  
high outliers

For each action, fill in the practice that is used by WisDOT to protect, repair, rehabilitate, or replace the bridge element referenced on this form or select the typical practice. Enter the WisDOT typical cost per unit for the selected practice.

Action	Practice	Used	Typ. Cost (\$ / Unit)
<u>Protect</u>			
- Performed on a cyclical basis while the deck is in CS2 or better and exhibits no or minimal distress.			
Typical Practice:	Wash & remove debris from bridge deck annually.	<input type="checkbox"/>	NA
	Perform sealing and waterproofing procedures every 3-5 years.	<input type="checkbox"/>	NA
WisDOT Practice:	Sweep and remove debris from bridge deck bi-annually	<input checked="" type="checkbox"/>	0.60
	Perform sealing and waterproofing procedures every 10 years.	<input checked="" type="checkbox"/>	3.70
<u>Repair</u>			
- Performed on a condition based need. The deck is typically in CS2 or CS3 and exhibits moderate distress.			
Typical Practice:	Perform small deck surface repairs for spalls and delaminations.	<input checked="" type="checkbox"/>	12.84
	Perform crack sealing procedures if crack widths are 0.007" or larger.	<input type="checkbox"/>	NA
WisDOT Practice:		<input type="checkbox"/>	
		<input type="checkbox"/>	



## Bridge Element Cost Elicitation Form



### REINFORCED CONCRETE BRIDGE DECK

Element #: 12

Units: ft<sup>2</sup>

Type: NBE

#### Additional Information:

##### Protect

Bridge cleaning generally consists of collecting and properly disposing of trash and debris.

Bridge washing involves pressure washing off salts, dust, sand, and any remaining undesired material from exposed concrete bridge deck surfaces, leading to the removal of the chloride from the bridge.

Environmental requirements and considerations play a big role in bridge deck cleaning and washing.

Equipment typically includes hand tools, power brooms, air compressors, and vacuum / water trucks.

Traffic control may need to be maintained for bridge cleaning and washing activities.

Pressure washing and vacuum equipment is recommended to have equipment pressure of at least 30-40 ksi per minute, minimum flow rate of 16 gallons per minute, and a water tank of 4000 gallon capacity.

Deck sealing/waterproofing is done by applying a sealant or similar substance to the concrete deck to reduce its surface porosity and stabilize the outer layer, aiding in resisting water and chloride

Deck preparation has a large impact on the effectiveness of this action. Sand, shot, or air blasting is typically used to eliminate moisture and oil residues on the deck.

Any moisture on the deck must be allowed to properly dry prior to sealant application. Drying time of the deck depends on air temperature and degree of rain fall, typically ranging from 1 to 3 days.

Sealants should also be applied to curbs and barriers in the splash zone.

An abrasive material may also need to be applied to the deck to create the necessary anti-skid traffic surface.

##### Repair

Deck surface repairs are considered a temporary repair since all of the chloride contaminated concrete



- Threshold triggers for condition-based actions
  - Total needs for condition-based preventive maintenance activities
- Threshold triggers for cyclical preventive maintenance
  - Total needs for cyclical preventive maintenance activities
- Life cycle cost analysis for rehabilitation versus replacement
  - Total needs for rehabilitation projects

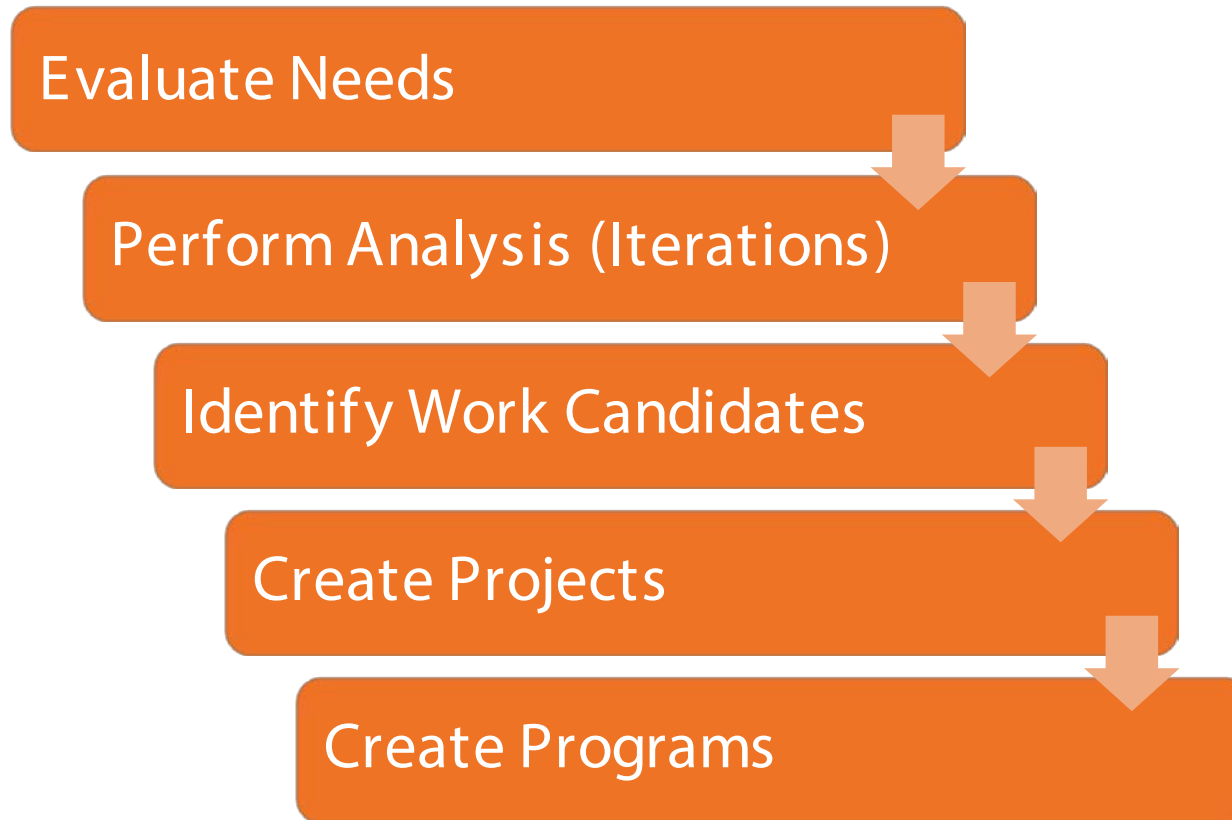
## Needs Results Component

- Total needs = Cyclical + Condition-based + Rehabilitation

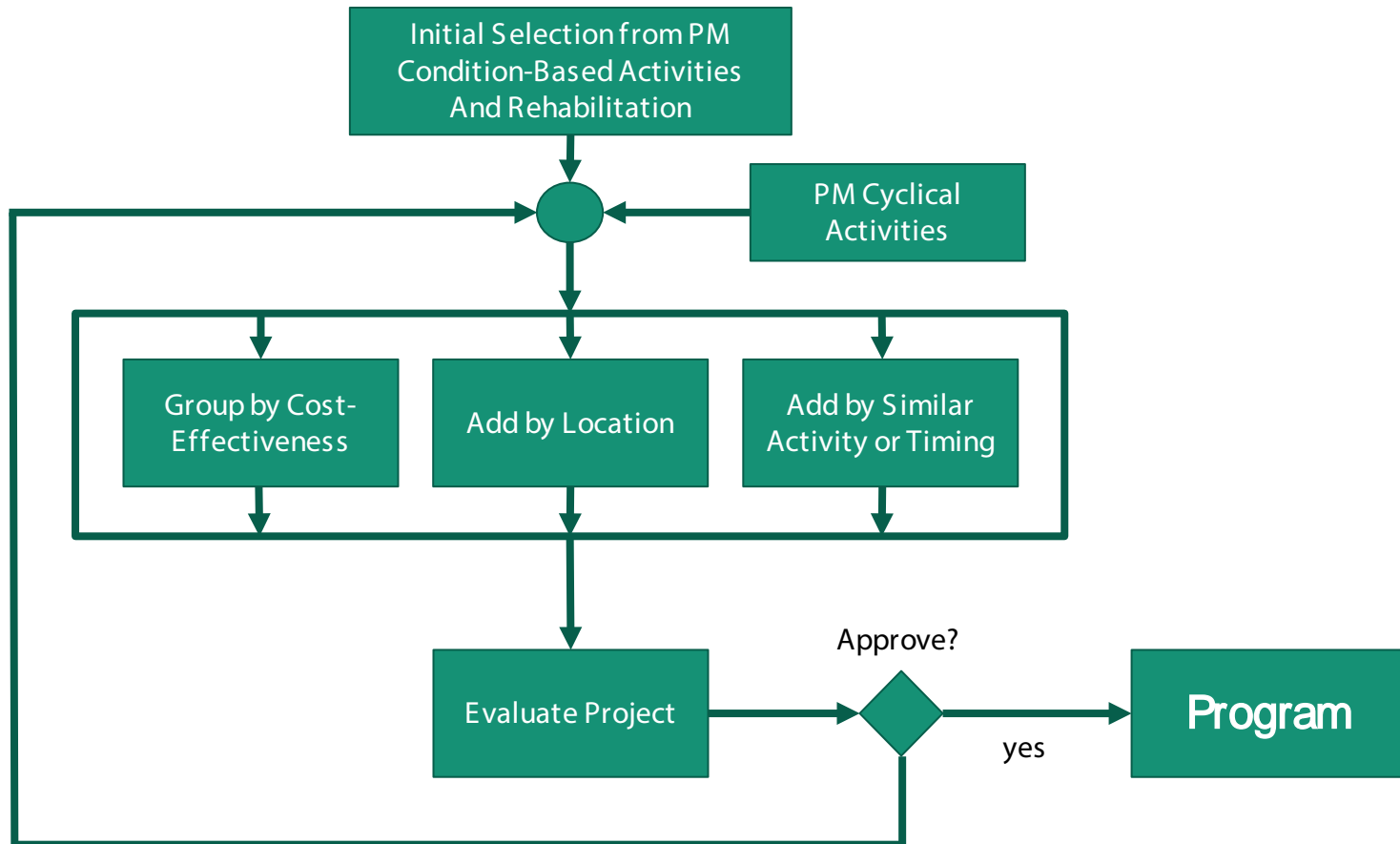
$$\text{\$2,400,000} = \text{\$500,000} + \text{\$900,000} + \text{\$1,000,000}$$

- Total needs of bridge preservation program are based on:
  - Inventory
  - Condition
  - Cost

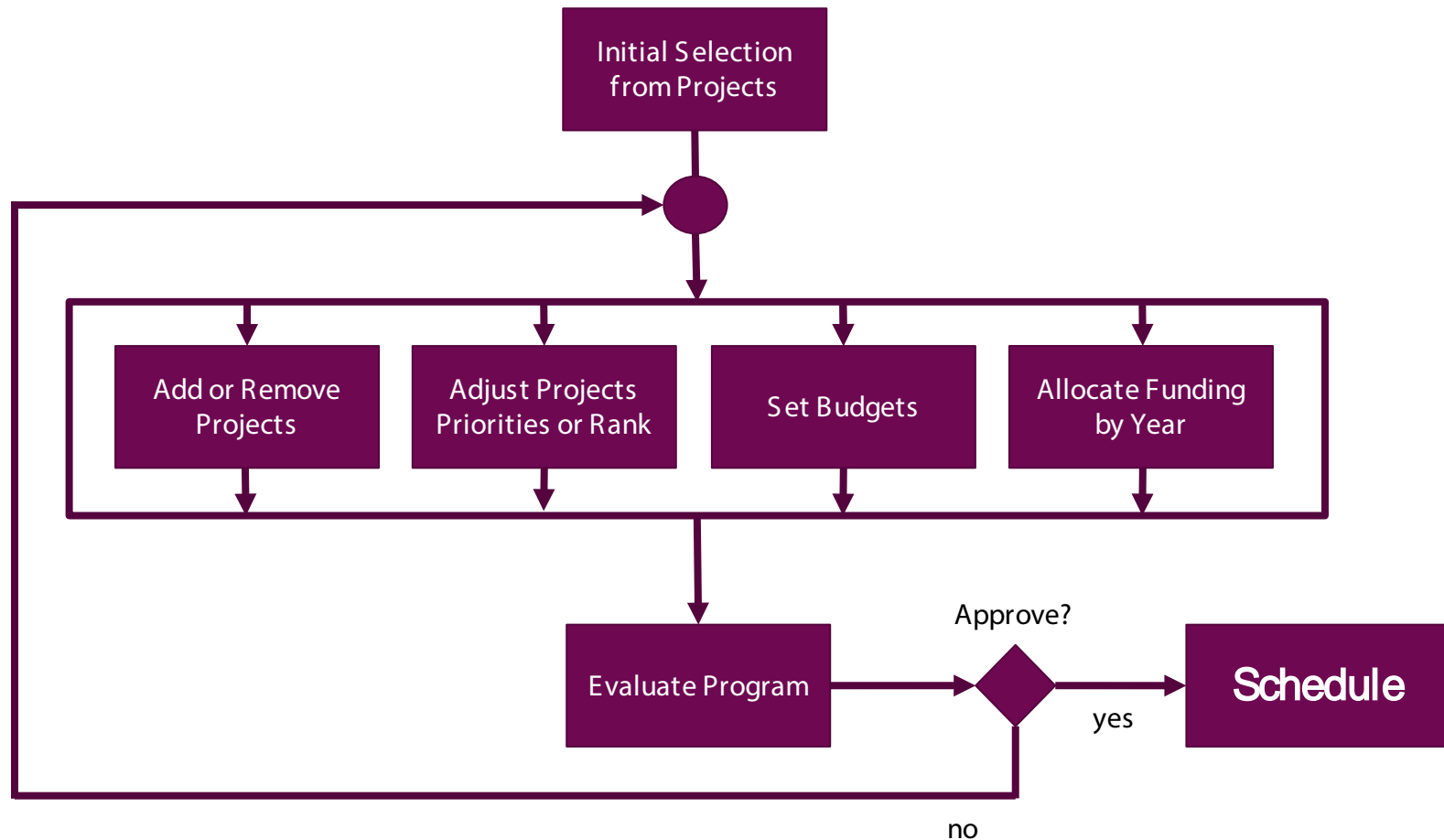
- Goals, objectives, and performance measures established
- Needs identified and prioritized
- Best strategy defined and priced
- Budget approved
- Budget matched with needs
- Work planned
- Preventive maintenance given high priority



Source: NHI Bridge Preservation Training



Source: NHI Bridge Preservation Training



Source: NHI Bridge Preservation Training

## ■ Questions?

**Jose Aldayuz, M.S, P.E.** | Transportation Department Manager | Michael Baker International  
3601 Eisenhower Avenue | Alexandria, VA 22304 | [O] 703-317-6522 | [M] 571-326-9250  
[jaldayuz@mbakerintl.com](mailto:jaldayuz@mbakerintl.com) | [www.mbakerintl.com](http://www.mbakerintl.com)