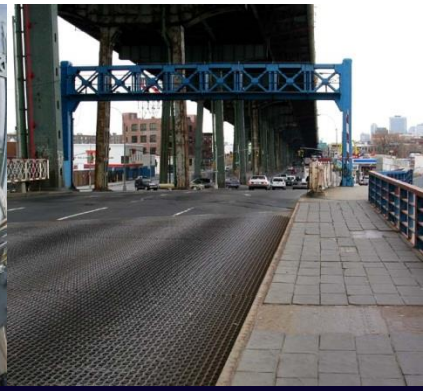
AGILEASSETS

The Leading Global Provider of
Infrastructure Asset Management Software Solutions

Bridge Management Systems

Bridge Analyst™



Why Use BMS?

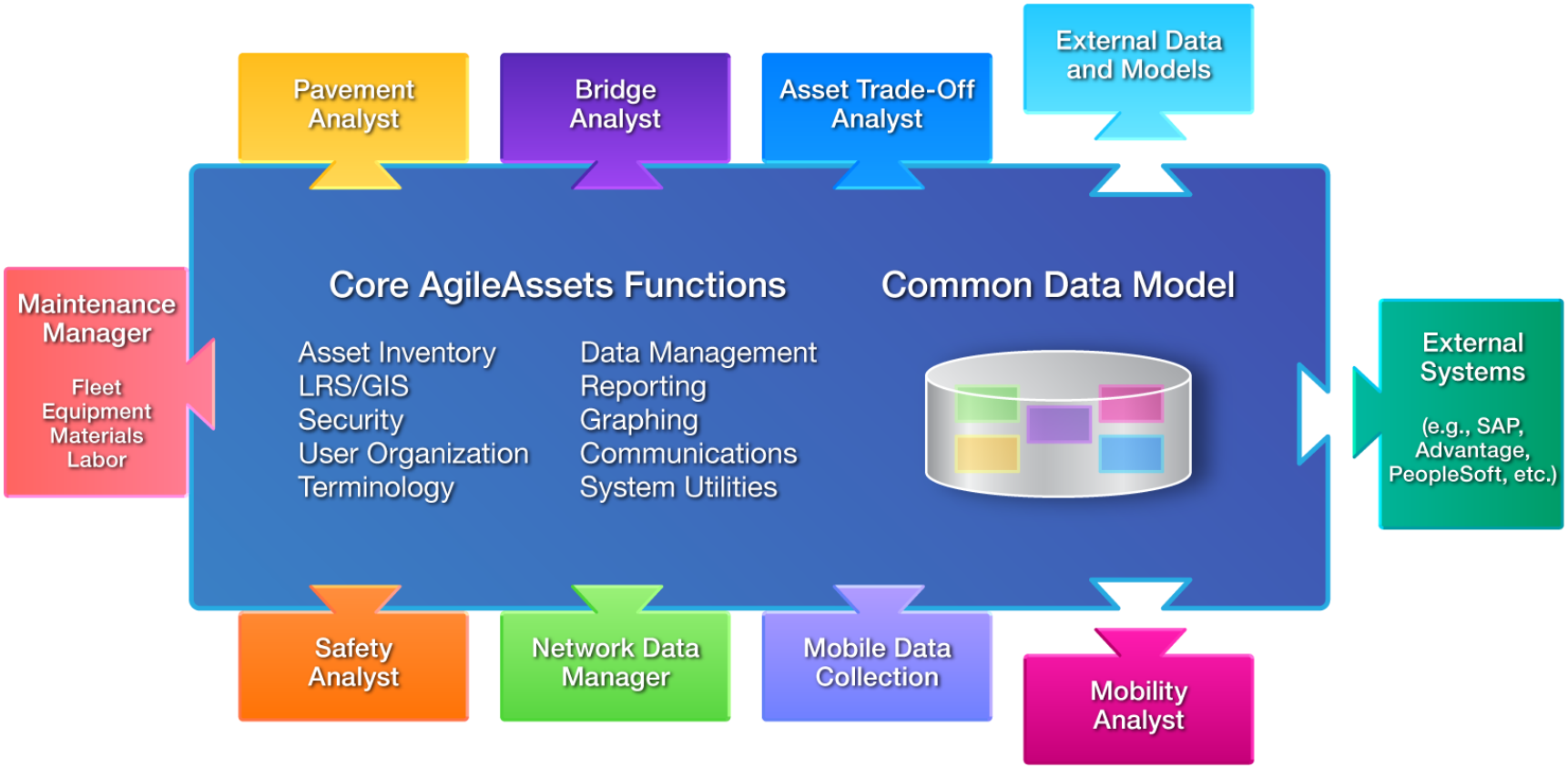
- Are you achieving the best or optimum performance (LOS) across the network at the current level of funding?
- Are you performing the right mix of activities, projects, strategies to achieve the best long term performance for your bridges?
- Do you have the capability to perform short and long term scenario analysis ?
- Can you readily determine the level of investment needed across all assets to achieve agency performance targets? Can you conduct trade-off analysis?
- Can you readily meet MAP 21 reporting requirements?

Bridge Analyst Overview

- Agency-specific deterioration models and decision trees
- Comprehensive Analyses:
  - Level-of-Service Maintenance Analysis (Network Level) - Markov Chains (Probabilistic approach)
  - Single-Objective Multi-Constraints Optimization Analysis (Project-Level – Network Analysis)
  - Short-Term Maintenance Needs Project Ranking Analysis (Project Level – Network Analysis)
- Integration between Bridge, Maintenance et al.

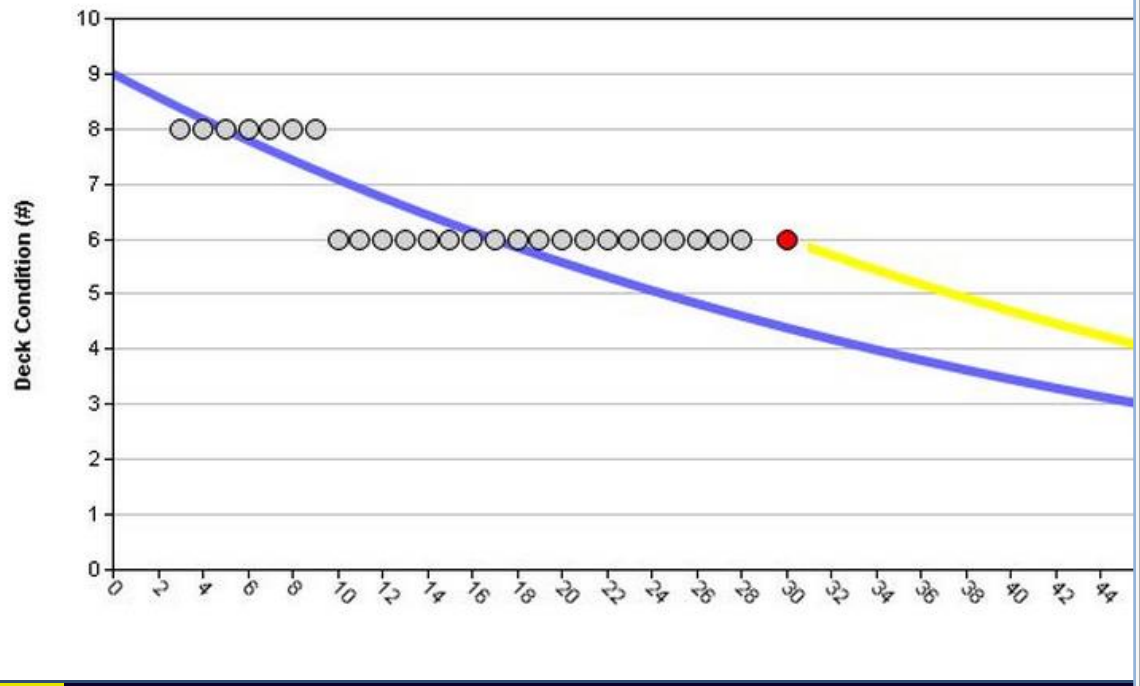
Product Integration

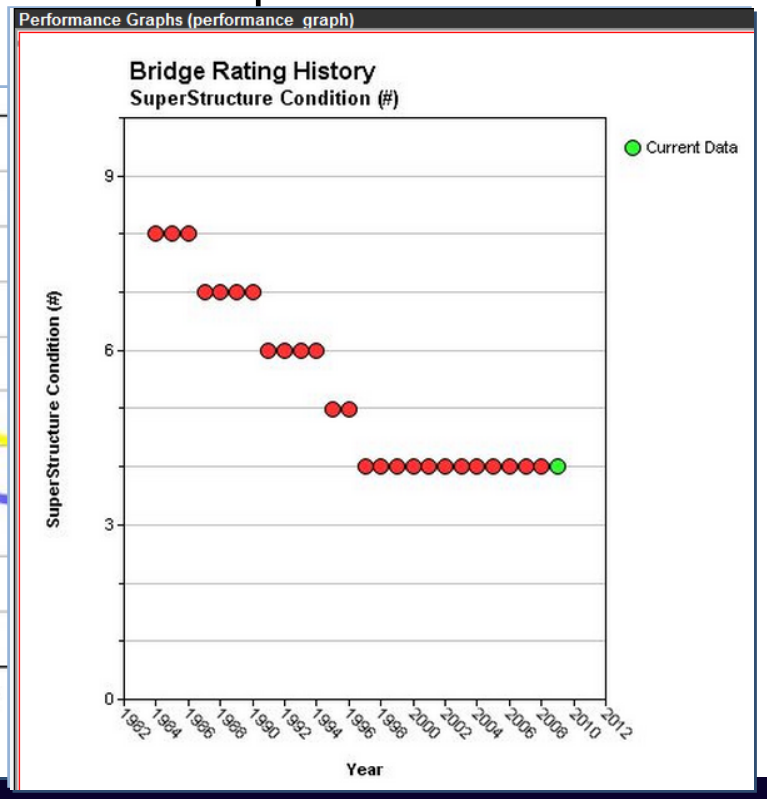
Modular Framework



Bridge Manager Features

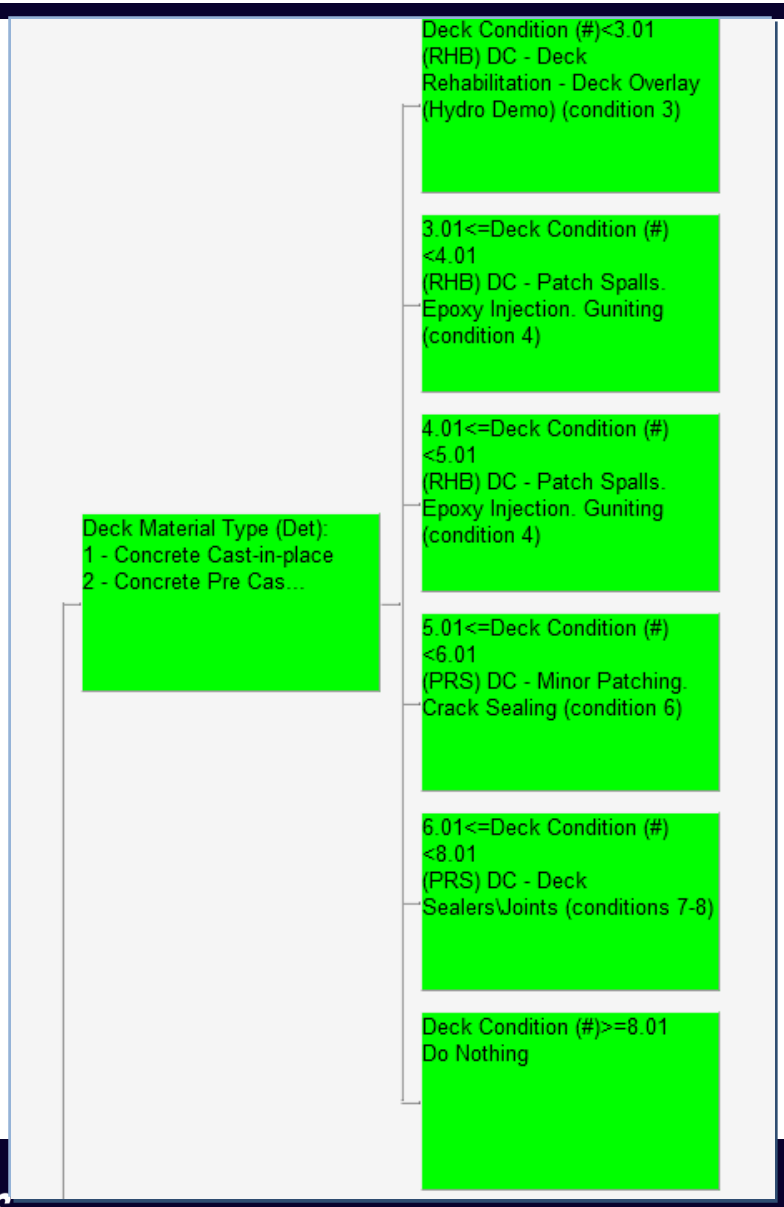
- **Element Level Deterioration Modeling**
  - Deck, Superstructure, Substructure Deterioration Modeling
  - Library of Deterioration Models
  - Assign Deterioration Models by User-Defined performance categories





Bridge Manager Features

- **Element Level Decision Trees & Treatment Assignment**
  - Deck, Superstructure, Substructure, Expansion Joints, Railings, Girders, etc.
  - Allow preservation activities as a consideration
  - Recommend replacement of structure if cost of a project exceeds **X% of Replacement Cost**



Bridge Manager Features

Life Cycle Scenario Analysis & Economic Analysis

- Determine Least Cost to Maintain Network at certain condition
- Analyze Impact of Deferred Maintenance
- Evaluate Influence of a work plan on a Structure / Element's Life Cycle
- Optimize Network Condition given Budget Constraints

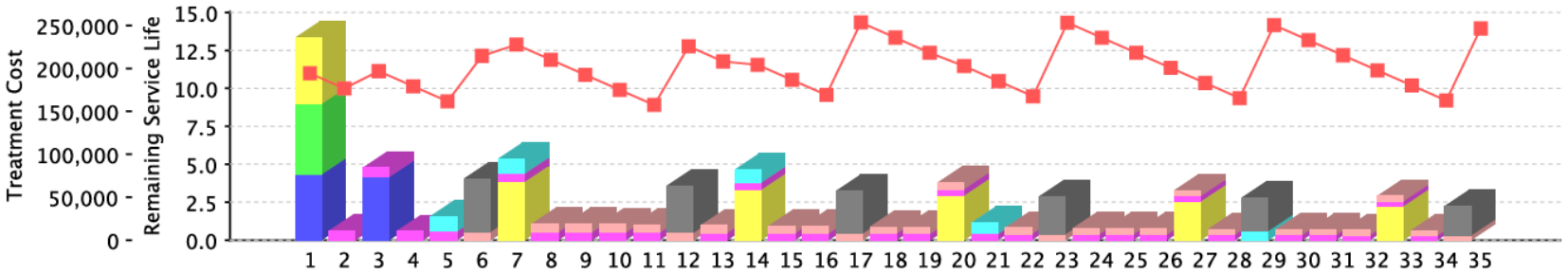
Bridge Manager Features

Life Cycle Scenario Analysis & Economic Analysis

STRUCTURE LIFE CYCLE ANALYSIS REPORT

STRUCTURE#:140021

SCENARIO NAME :Maximize Network Condition given Budget (LC: 35 Years) 2011 TO 2046



ECONOMIC ANALYSIS RESULTS

Net Present Worth of Costs by Work & Element

SCENARIO ID : 760

	Preserve	Rehab.	Total
Deck	$ 285,426	$ 161,809	$ 447,235
SubSt.	$ 0	$ 366,000	$ 366,000
SuperSt.	$ 237,215	$ 392,086	$ 629,301
Total	$ 522,641	$ 919,895	$ 1,442,536

Cost Analysis

SCENARIO NAME : Maximize Network Condition given Budget (LC: 35 Years)

Number of Years in Analysis :	35
Average Interest Rate :	3 %
Average Inflation Rate :	1 %
Net Present Worth of all Costs (NPW) :	$ 1,442,536
Equivalent Uniform Annual Cost (EUAC) :	$ 67,135
Annual User Cost Savings (EUAUC) :	See NM

Benefit Analysis - Structure Condition

Element	Latest Inspection	During Life Cycle			
		MIN	AVG	MAX	END
Deck	4.00	4.67	6.36	7.00	6.04
SuperSt.	4.00	5.05	5.52	5.99	5.91
SubSt.	5.00	5.03	5.55	6.00	5.70
RSL	8.00	8.90	11.47	14.35	13.95

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Bridge Manager Features

- **Compare Economic Analysis Results**
  - Associated with Alternative Element / Structure / Network Life Cycle Scenarios

COMPARISON OF ECONOMIC ANALYSIS RESULTS

Net Present Worth of Costs by Work & Element

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RSL	8.00	8.90	11.47	14.35	13.95

Net Present Worth of Costs by Work & Element

SCENARIO ID : 783

	Preserve	Rehab.	Total
Deck	$ 61,647	$ 233,205	$ 294,851
SubSt.	$ 0	$ 355,222	$ 355,222
SuperSt.	$ 11,091	$ 389,541	$ 400,632
Total	$ 72,738	$ 977,967	$ 1,050,705

Cost Analysis

SCENARIO NAME : Least Cost to Maintain 140021 at CS-5 (LC: 35 Years)

Number of Years in Analysis :	35
Average Interest Rate :	3 %
Average Inflation Rate :	1 %
Net Present Worth of all Costs (NPW) :	$ 1,050,705
Equivalent Uniform Annual Cost (EUAC) :	$ 48,899
Annual User Cost Savings (EUAUC) :	See NM

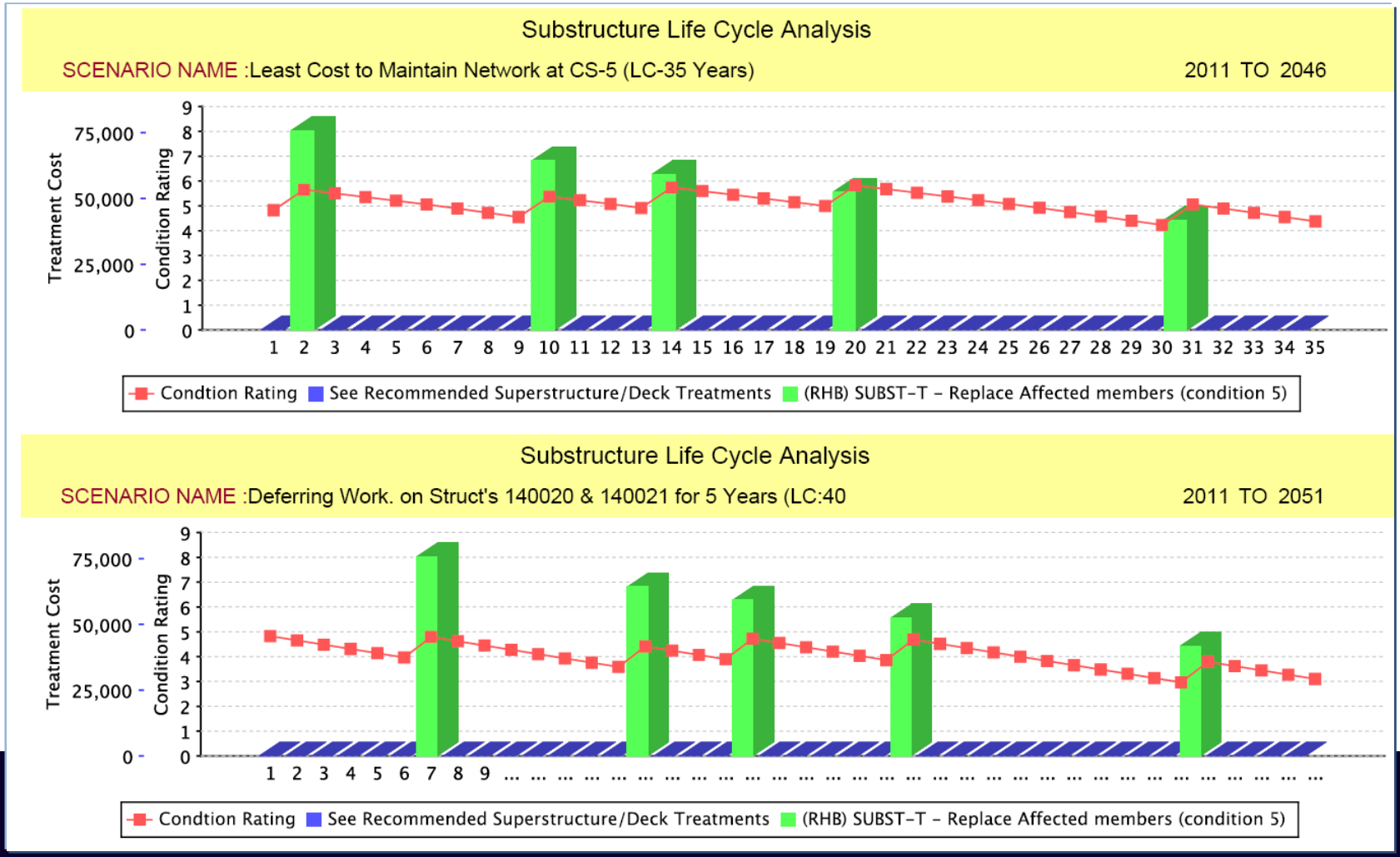
Benefit Analysis - Structure Condition

Element	Latest Inspection	During Life Cycle			
		MIN	AVG	MAX	END
Deck	4.00	4.50	5.99	6.91	6.06
SuperSt.	4.00	4.53	5.33	5.77	5.30
SubSt.	5.00	4.51	5.24	5.92	5.40
RSL	8.00	6.57	10.40	13.12	10.34

Bridge Manager Features

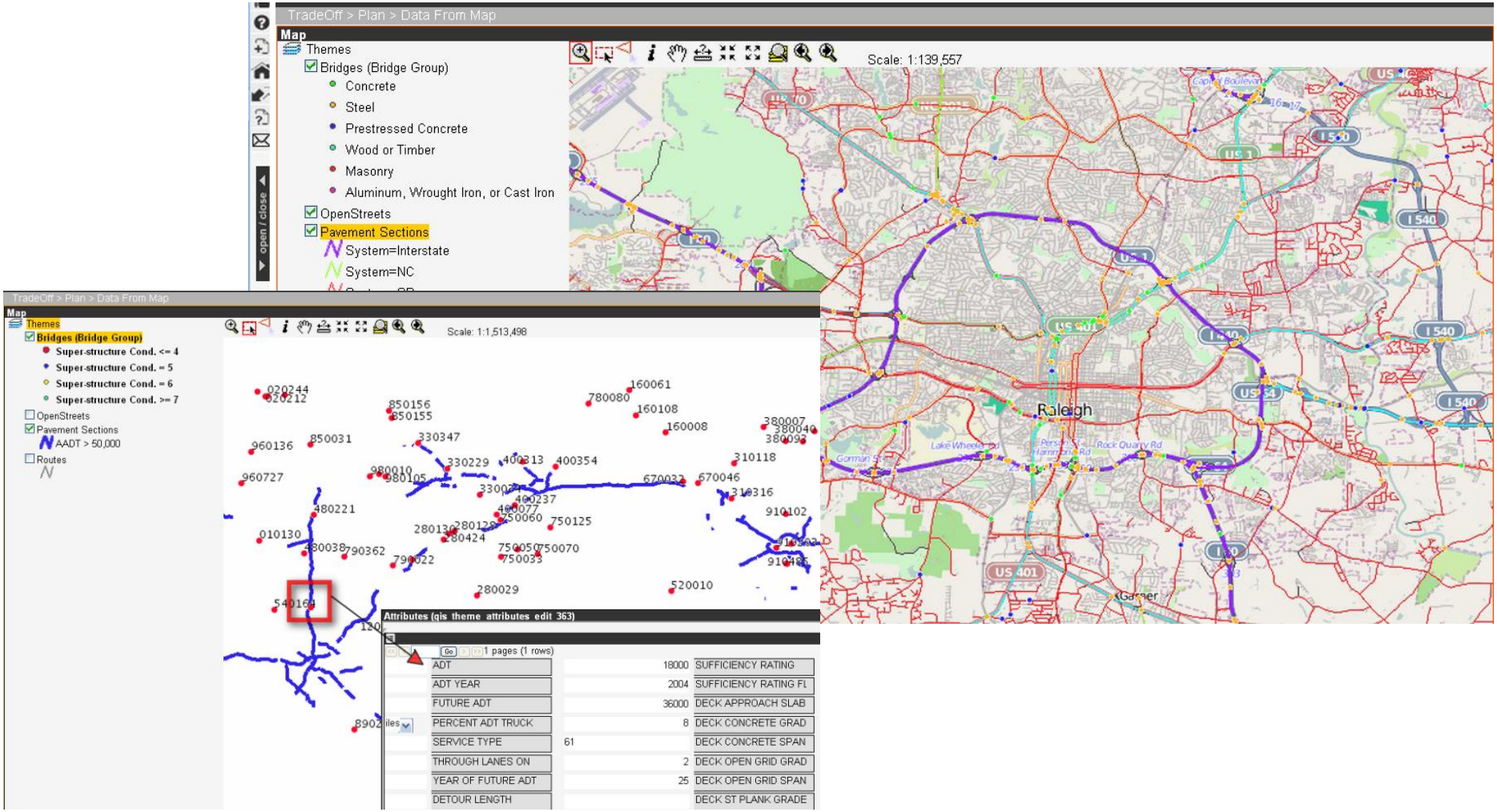
Analyze Impact of Deferred Maintenance

At Network, Structure, Element level



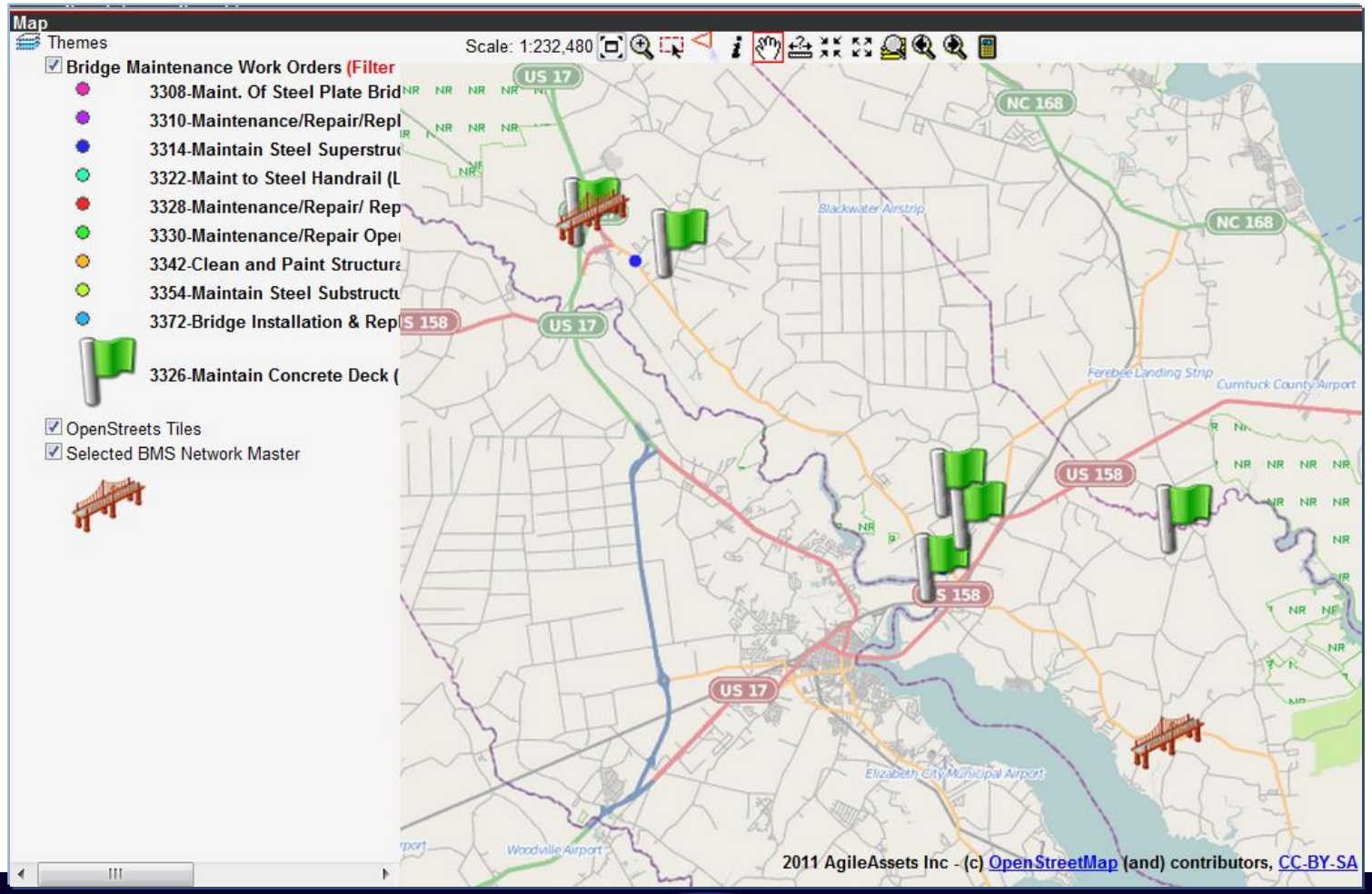
Bridge Manager Features

❖ Integrated GIS Framework



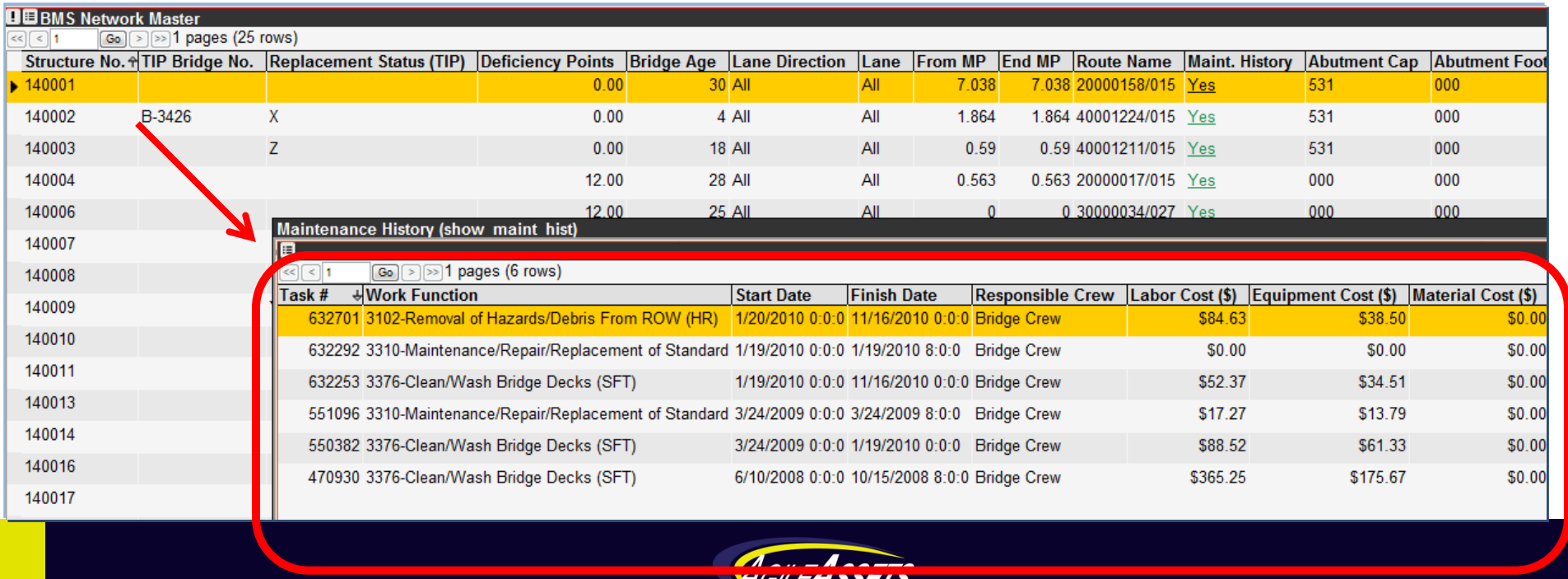
Bridge Manager Features

- **Integrated with Maintenance**
  - Track Maintenance history of each structure on the map



Bridge Manager Features

- **Integrated Maintenance Module**
  - Share Bridge Work Plans with Maintenance Team
  - Allowing Maintenance Team to Issue Work Orders from Bridge Work Plans
  - Drill down Maintenance Costs associated with a structure down to the resource level



BMS Network Master

1 pages (25 rows)

Structure No.	TIP Bridge No.	Replacement Status (TIP)	Deficiency Points	Bridge Age	Lane Direction	Lane	From MP	End MP	Route Name	Maint. History	Abutment Cap	Abutment Foot
140001			0.00	30	All	All	7.038	7.038	20000158/015	Yes	531	000
140002	B-3426	X	0.00	4	All	All	1.864	1.864	40001224/015	Yes	531	000
140003		Z	0.00	18	All	All	0.59	0.59	40001211/015	Yes	531	000
140004			12.00	28	All	All	0.563	0.563	20000017/015	Yes	000	000
140006			12.00	25	All	All	0	0	30000034/027	Yes	000	000
140007												
140008												
140009												
140010												
140011												
140013												
140014												
140016												
140017												

Maintenance History (show_maint_hist)

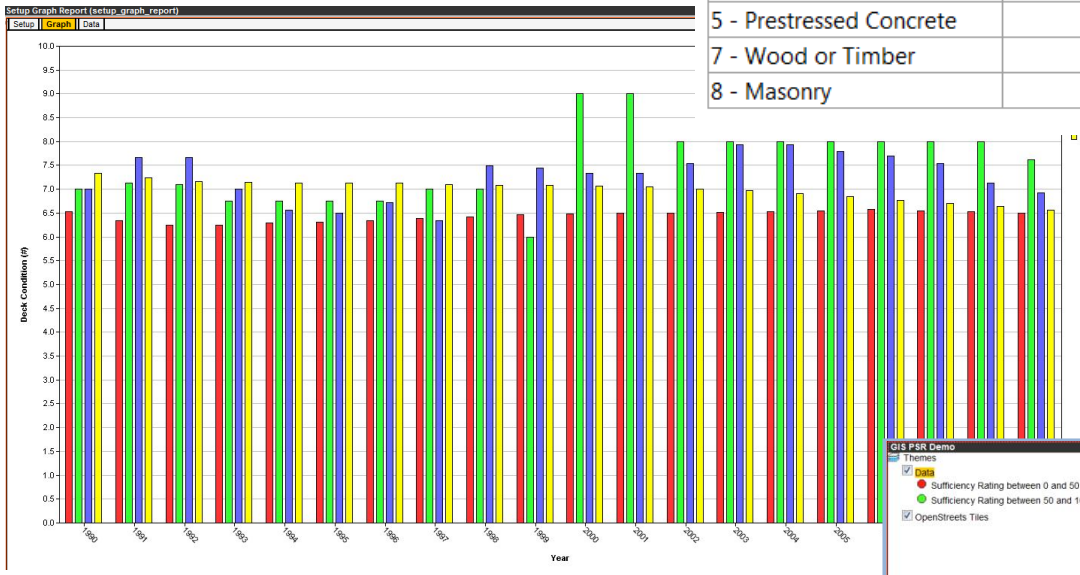
1 pages (6 rows)

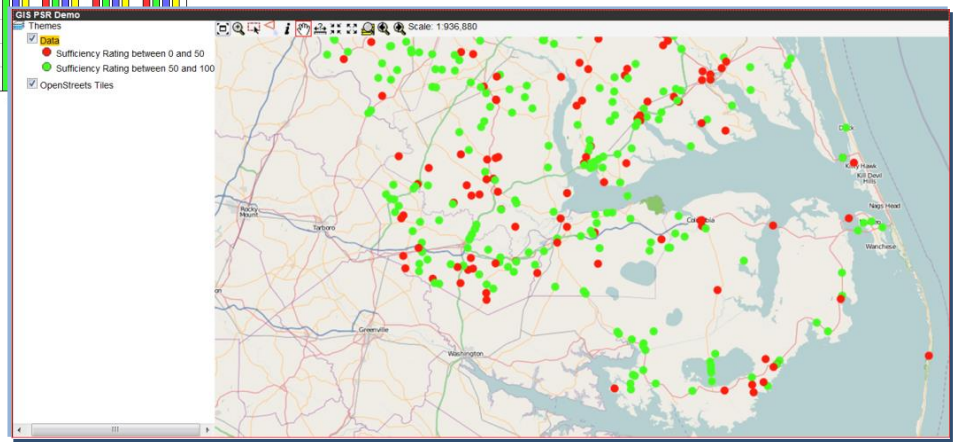
Task #	Work Function	Start Date	Finish Date	Responsible Crew	Labor Cost ($)	Equipment Cost ($)	Material Cost ($)
632701	3102-Removal of Hazards/Debris From ROW (HR)	1/20/2010 0:0:0	11/16/2010 0:0:0	Bridge Crew	$84.63	$38.50	$0.00
632292	3310-Maintenance/Repair/Replacement of Standard	1/19/2010 0:0:0	1/19/2010 8:0:0	Bridge Crew	$0.00	$0.00	$0.00
632253	3376-Clean/Wash Bridge Decks (SFT)	1/19/2010 0:0:0	11/16/2010 0:0:0	Bridge Crew	$52.37	$34.51	$0.00
551096	3310-Maintenance/Repair/Replacement of Standard	3/24/2009 0:0:0	3/24/2009 8:0:0	Bridge Crew	$17.27	$13.79	$0.00
550382	3376-Clean/Wash Bridge Decks (SFT)	3/24/2009 0:0:0	1/19/2010 0:0:0	Bridge Crew	$88.52	$61.33	$0.00
470930	3376-Clean/Wash Bridge Decks (SFT)	6/10/2008 0:0:0	10/15/2008 8:0:0	Bridge Crew	$365.25	$175.67	$0.00

Bridge Manager Features

❖ Reports

Substructure Material (Det)	Deck Condition (#)	Substructure Condition (#)	SuperStructure Condition (#)
0 - Other	6.8640	6.0327	6.6810
1 - Concrete	6.4822	6.7564	6.9105
3 - Steel	7.0296	6.8480	7.0790
5 - Prestressed Concrete	6.2794	6.4741	6.5620
7 - Wood or Timber	6.0361	5.0704	5.8063
8 - Masonry	6.4600	5.8400	6.3000





Analyze Recommended Strategy

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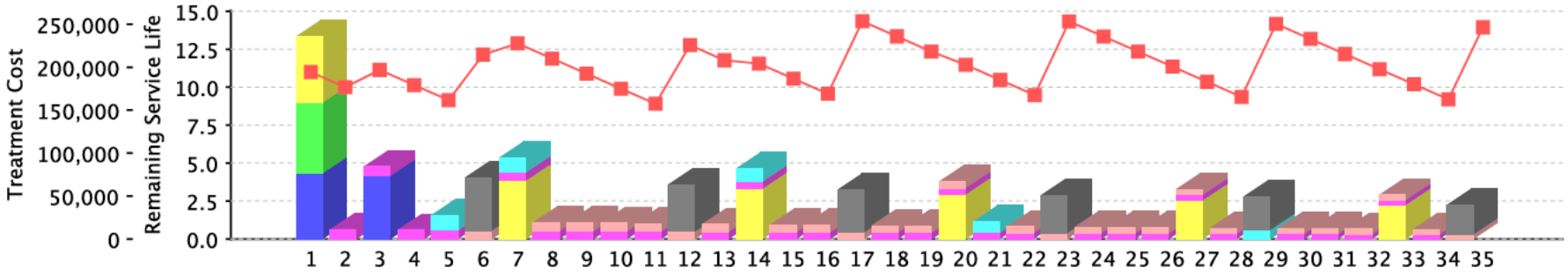

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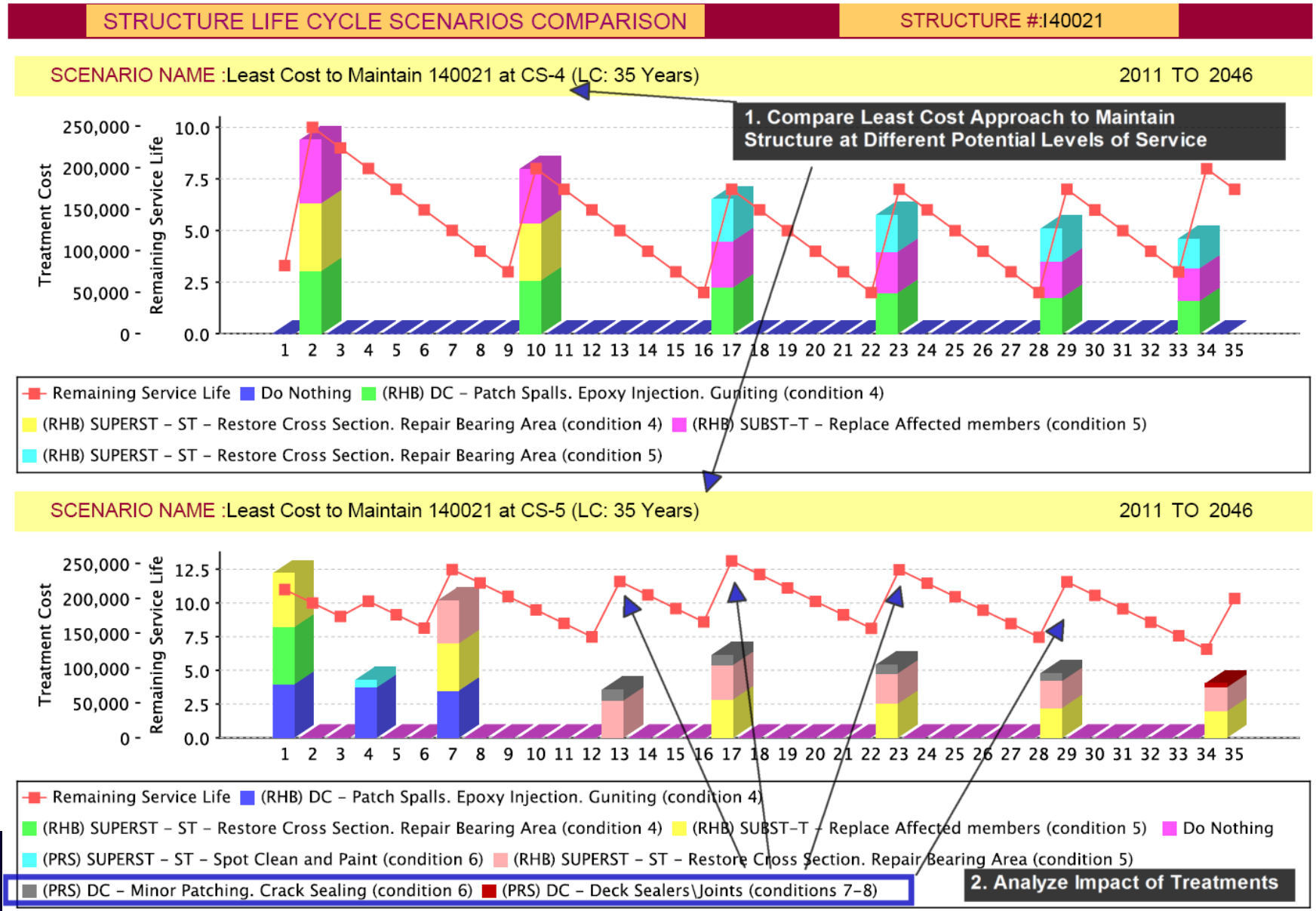
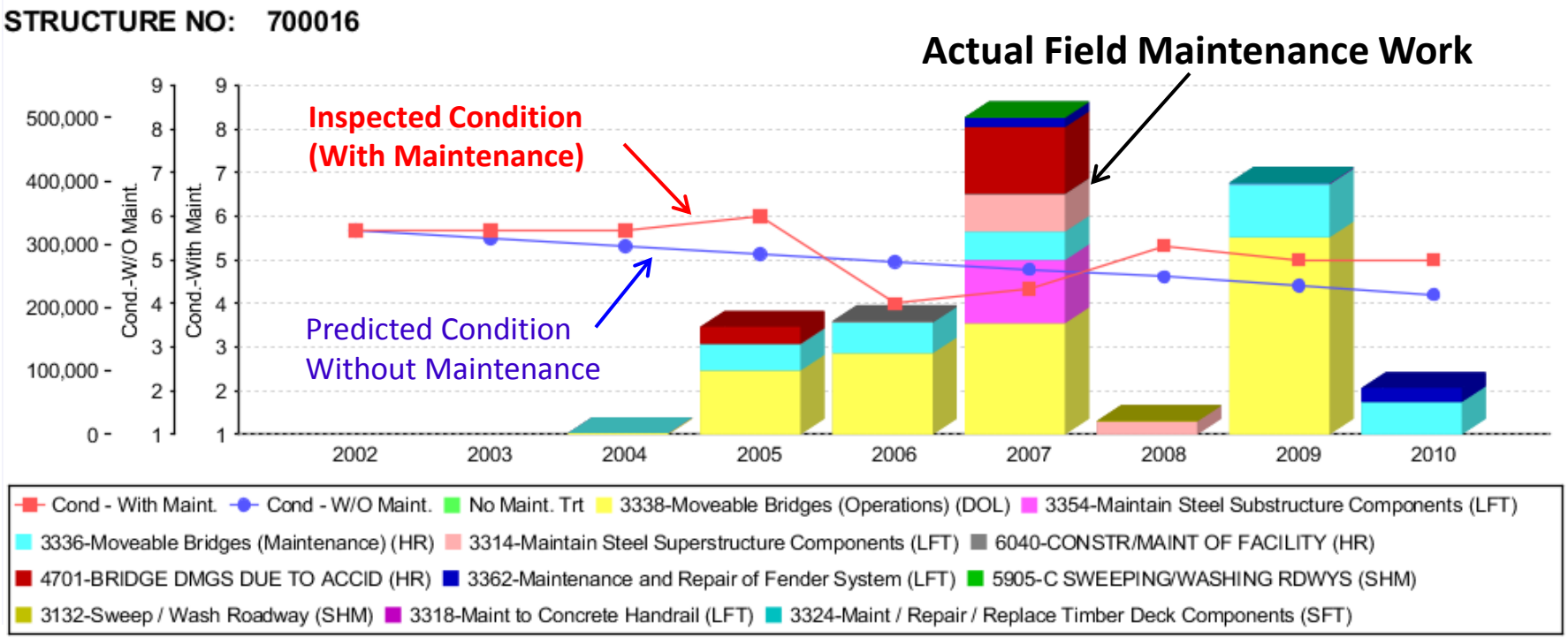
Modeling & Analysis Capabilities



Performance Management

Evaluate Impact of Bridge Maintenance / Preservation Activities on Bridge Element Condition Rating (Project / Bridge Level)



Thank You!

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