



## MAINTENANCE & ROADWAY OPERATIONS WORKSHOP



Maryland Transportation Authority

## Building an Effective Electronic Structures Data Management System

by William Pines, P.E.

May 2016



## Who is MDTA?



Transportation



### Signature Bridges











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### Workhorse Bridges







#### **Movable Bridges**







## Tunnels



Bores

#### Vent Buildings / Pump Rooms





#### **Electro-Mechanical Systems**





#### Sign Structures & Gantries

#### **High Mast Light Poles**





Martiner Harbor



Toll Plazas





#### Retaining Walls



#### Roadway & Traffic Safety Features



#### Small Bridges/Drainage (< 20 ft)



#### Noise Walls





## How do we manage it all?







Integrated Enterprise (Agency-wide) Asset Management

VS.

Individual Asset Management







#### What Will the Toll Dollars Do?

- Total CTP (FY16-FY21) Budget \$1.9B
- Entirely funded by toll revenues





Authority



## What do we mean by structures performance?







## What are our Performance Goals?

• Maintain a State of Good Repair

## • "Proactive" Goal:

 Maximize the number of bridges with NBI 58, 59, 60 Ratings of Satisfactory "6" or better



Replace I-895 Canton Viaduct

## "Reactionary" Goals:

• Minimize the number of structurally deficient bridges,



Address Priority 1 defects within 1 year,



#### Why do we need to proactively manage structures assets?









# How does MDTA manage structures assets? <u>Agency Evolution</u>:



*Prior to 2004*:

- Paper Reporting
- Lots of spreadsheets



#### <u>Present</u>:

- All electronic, web-based
- Performance Measurement & Reporting



#### GIS Based System for Structures, Inventory & Appraisal Data

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> Home Juniata 915 L/2 Coln A, J Metal Army Deput	Emigsville Columbus	Willow Haights	Carney	(N/A) Old Bin:	
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Gainesboro Middleway Brunswick	Damascus Batt a	Worton Ma	usod Ave	(5b) Inspection route (route type) (Help)	4 - County Route
(a) Kabletown	Ellicott City	EMELIA WO	COS CONDEN RAIG	(5c) Inspection route (service type) (Help)	1 • Mainline
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#### Inspections

- National Bridge Inspection Standards
- MDTA Facilities Inspections Manual
- Perform Inspections Annually:
  - Biennial Year
    - Hands-on technique
    - Non-Destructive Testing
  - Interim Year
    - Risk-based









#### Inspection Data automatically creates preformatted reports

ASIR - In	spections	_			_	_	_	_	462 asset(s)	
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								ARYLAND TRANSPORTAT	TON AUTHORITY	
					Search	Dynamic - :	Maryland Di Transportation Authority [-8	95 B NB OVER MD 170	Date: 10/23/2013	
	Picture Name	Inspection type	Status	Initial team	Team leader	From		MARYLAND TRANSPOR BHT-Baltimore H	TATION AUTHORITY	
	AAY056011	Bridge - Biennial	Final	Terretach Engineering Consultants, T	nc. Dennis Dempsey	10/5/2015		2016 Biennial Insp	pection Report	
	AAY056021	Bridge - Biennial	Final	Transtech Engineering Consultants, J	nc. Dennis Demosev	10/12/2015		FOF STRUCTURE No	2 . AAY056011	
				······				I-895 B NB OVER	MD 170	
	AAY060001	Bridge - Biennial	Final	Transtech Engineering Consultants, I	nc. Dennis Dempsey	10/5/2015			Xist	1
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							Firm Performing the inspection Inspection Team Leader	Dennis Dempsey	ASIR E-Signature	44181
							QC Engineer:	Umesh Murthy	ASIR E-Signature	20227
-								Name	Signature	PE Number
							Reports denoted with an "ASIR Team Leader and QC Engineer	E-Signature" in the signature colu denoted in the name column.	umn have been reviewed and appr	roved by the Inspection
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							REAL MARTIN			page 1 of
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## Inspections

#### **NBI** Ratings



#### MAP-21 Element Level



#### **Element Level Inspection Data**

Element	Flowert Description	Unit of	Total	Condition	Condition	Condition	Condition
Number	Element Description	Measure	Quantity	State 1	State 2	State 3	State 4
109	Prestressed Concrete Beam	ft	369	300	50	19	
310	Elastomeric Bearing	each	12	10	2		
226	Prestressed Concrete Pile	each	2	2			
233	Prestressed Concrete Pier Cap	ft	40	30	8	2	



#### Units & Quantities of Elements (No Generalities)



#### **Individual Defects Recorded**

	M-V125001 - Bridge - Biennial - Final Show details										
😡 Info 📝 Inspection 🕅 Repairs 🎧 Photos 🗈 Inspection documents 📝 Audits 🛧 Routings 🗅 Summaries 🕌 Reviews ① Warnings 🗄 Element level data											
+ New Clinic Show details Delete Dynamic - Repairs - Maintenance Report  Print Group by Don't group  V Repair History Task order Add all to task order for all Add selection to task order Clinic Create task order for selection											
	MDTA Id	Туре	Routing	Repair status	Last priority evol	ution	Date	Components	Comments		
	Current inspection (E	Bridge	- Biennial - M-V1	25001 9/14/2015	)						
	2016-M-V125001-00001	Repair	Repair/LOC created	OPEN	3 - M	edium	12/7/2015	Span 02 > Deck 58 > Curbs & Sidewalks 02	Seal the $1/8$ " wide $\times$ 4'-0" long crack in the east		
	2014-M-V125001-00001 Repair Repair/LOC created OPEN 3 - Medium 3 - Medium 11/30/2015 Begin > Approach 58 > Slab & Pavement 10 Seal 1/8" wide crack near inlet in west sidewalk.										
	2011-M-V125001-00013	Repair	Repair/LOC created	OPEN	M - Maintenance	M - Maintenance	11/23/2015	Begin > Abutment 60 > Joint 15	Remove debris from South Joint.		
	2011-M-V125001-00012	Repair	Repair/LOC created	OPEN	M - Maintenance	M - Maintenance	11/23/2015	End > Abutment 60 > Joint 23	Remove debris from North Joint.		

#### **Element Condition States Recorded**

<b>M-V</b>	125001 - Bridge - Biennial - Final Show details								
😡 Info	🔽 Inspection 🦞 Repairs 🖾 Photos 📄 Inspection documents 💟 Audits	Routings	🗅 Summarie	es 🕌 Reviews 🧃	) Warnings 🗮 Elemer	nt level da	ata		
Display mo	de 💿 *Percentage 🔘 Quantity								
Number	Name	Unit	Quantity	*QuantityCalculate	*PercentageCalcula	CS 1	CS 2	CS 3	CS 4
<b>,1</b> 300	Span 01 > Strip Seal (LF)	LF • linear foot	47	47	100	21.28	78.72		
1 8307	Span 01 > Strip Seal (LF) > Neoprene or Fiberglass Joint Trough (LF)	LF • linear foot	47	47	100	100			,
3 311	Span 01 > Movable (roller, sliding, etc.) (EA)	EA • Each	5	5	100	60	40		
3 515	Span 01 > Movable (roller, sliding, etc.) (EA) > Steel Protective Coating (SF)	SF • Square foot	20	20	100	60	40		
1 313	Span 01 > Fixed (EA)	EA • Each	5	5	100	100			
1 515	Span 01 > Fixed (EA) > Steel Protective Coating (SF)	SF • Square foot	71	71	100	100			
331	Span 01 > Reinforced Concrete Bridge Rail (LF)	LF • linear foot	237	237	100	100			
3 8342	Span 01 > Fencing (LF)	LF • linear foot	237	237	100	100			
3 12	Span 02 > Reinforced Concrete Deck (SF)	SF • Square foot	5236	5236	100	100			
3 321	Span 02 > Reinforced Concrete Deck (SF) > Reinforced Concrete Approach Slab	SF • Square foot	847	847	100	100			
<b>.</b> 3 8062	Span 02 > Reinforced Concrete Deck (SF) > Reinforced Concrete Approach Slab	LF • linear foot	224	224	100	100			
107	Span 02 > Steel Girder/Beam (LF)	LF • linear foot	557	557	100	100			

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## **Defect Repair Assignment, Tracking and Queries**

🕘 ASIR - Re	pairs									123 asset(s) filter	red Clear Filters	Quick Search Sa	ved filters	<ul> <li>Manage fil</li> </ul>
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	MDTA Id *	Asset name	Type	Routing	Repair status	Last priority evolution	Date	Components	Comments		neinen et Dies 2 :	rish aniarity, aiyan ta Girdan C	Task order	adaa KU 2052
	2014-6-X/1/001-00009	B-X/1/001	Penelo	Repair/LOC created	OPEN	2 Web Driving	1/10/2014	George	Consider a programm	red replacement of the focker be	annys at Pier 2 t	with phoney given to dirder 6.	Linked to task o	
	2014-CEX979011-00002	CEX979011	Kepair	Repair/LOC created	OPEN	2 - High Priority	1/7/2014	Scuppers	Repair the damaged s	scupper grate and clean out the	clogged drain.		Linked to task o	rder KH27831
	2014-CEX979011-00006	CEX979011	Repair	Repair/LOC created	OPEN	1 - First Priority	1/8/2014	Bearings	Shim and reset bearing	ng 7 at Pier 1 in Span 1.			Linked to task o	rder 999 R1 -
													<u> </u>	
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	Number 99	9 R1 - CEX9790	011									Progres	s	
	Status 🔘	) TC										Priorit	ry 🔵 1	
	Assignment date 11	/19/2014										Assigned t	Koudjo An	nouzou
	Due date <	M/d/yyyy>										Contra	t MA 2803	
	Duration										1	MDTA Project manage	Abey Tam	rat
	Real cost										47351.92	Estimated co	st	
	Comments TO	999R1 is for a	dditiona	al bearing repair	s on CEX93	79011.								

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#### Performance Reports → Supplemental Info → Bridge Tour

Reports × http://asirmdtarequestedFile= × +										
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Transportation Authority Wearing Surface Ratings										
Asset Name	Date To	Master Element	Rating							
		В	6							
BCY080001	05/08/2014	С	6							
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#### Bridge Tour $\rightarrow$ 25 Yr. Long Range Needs $\rightarrow$ 6 Yr. Capital Program

#### **CTP** Sample AI. в с D м Ν 0 P Priorit 2016-CTP PIN PM Facility 2016 2017 2018 2019 2020 2021 2022 Description 2022 Substructure and Superstructure Repairs to GEC 2325 KH 2,000 8,000 6,336 16,336 1 Various Bridges on JFK (Construction) 41 2325 KH 3,178 3,176 3,691 10,045 GEC Repair and/or Seal Decks – Facility wide 1 42 Three (3) Bridge Deck Overlays on I-95 (over GEC 2325 KH 2,000 3,000 5,000 MD-824, MD-45 and MD-279) 2 44 One (1) I-95 Mainline Deck Replacement 2325 GEC KH 5,000 5,000 10,000 2 45 (over Little Northeast Creek)







#### **Effective Structures Management Systems drives:**







## QUESTIONS?

William N. Pines, PE Deputy Director of Engineering Maryland Transportation Authority Office of Engineering and Construction 300 Authority Drive Baltimore, Maryland 21222 410-537-7873 (Direct) 410-456-8045 (Cell) wpines@mdta.state.md.us http://www.mdta.maryland.gov