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LETS TALK ABOUT MARYLAND'S BRIDGES

Delivering a program with the Customers, Partners and Employees Perspectives in mind

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TODAYS TOPICS

- Maryland
- Maryland's Bridges
- The Approach
- Successes and Innovations

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ABOUT MARYLAND

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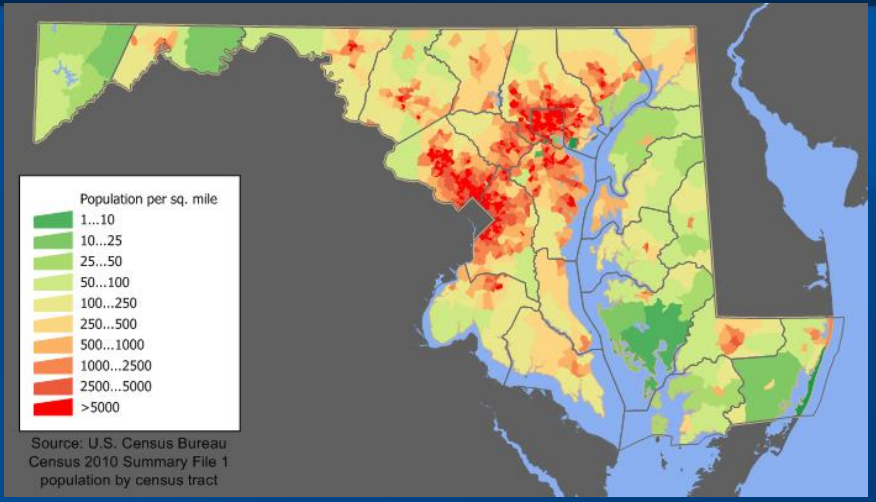
MARYLAND HIGHWAY TRANSPORTATION FACTS

- Baltimore-Washington region offers a well connected multimodal transportation system; but growing demand makes it ***one of the most congested areas in the nation***

- **56.4 Billion VMT** in 2014, 72% which was on state roadways.

- Estimated cost of congestion on freeways and expressways was $1.7 Billion.



Ranked 19th in Population (6 million)

Ranked 5th in Population Density

By 2040, Maryland will have 1.1 million more people, and 0.4 million more jobs

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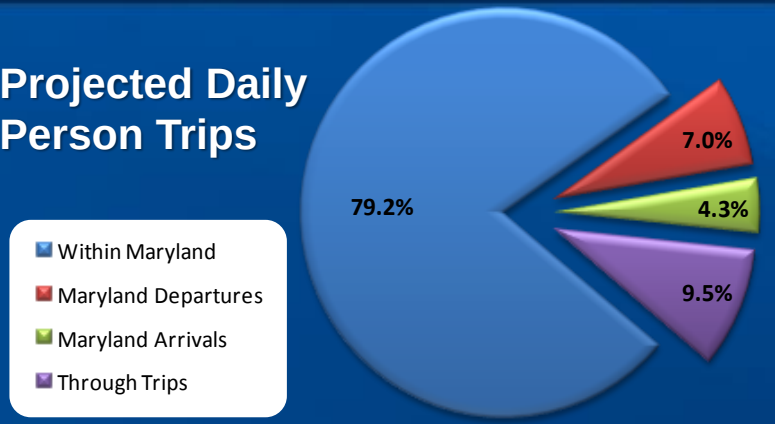
TRAVEL DEMAND PROJECTIONS ON MARYLAND HIGHWAY SYSTEM

Performance Measure	Year 2030 Growth
Auto Trips	12%
Truck Trips	**61%**
Vehicle Miles of Travel	34%
Vehicle Hours of Delay	67%
Congested Lane Miles	**64%**
Through Travel (E-E)	**52%**

Projected Daily Person Trips



Region	VMT (in millions) Existing	2030	Percent Growth
Baltimore Region	64	83	31%
Washington Region	48	66	37%
Eastern Shore	10	14	49%
Western Maryland	16	21	27%
Total	138	184	34%

Source: Maryland Statewide Transportation Model

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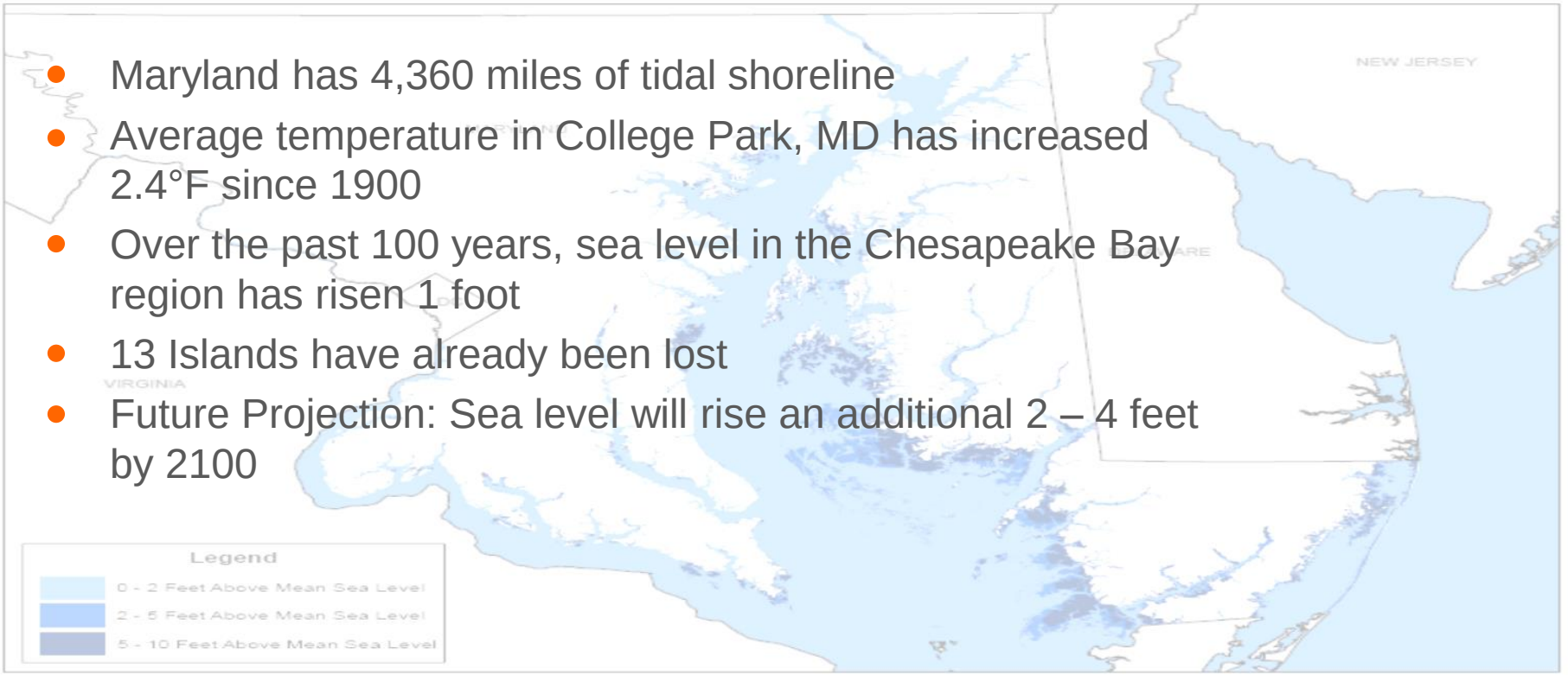
CHANGES IN MD

- Maryland has 4,360 miles of tidal shoreline
- Average temperature in College Park, MD has increased 2.4°F since 1900
- Over the past 100 years, sea level in the Chesapeake Bay region has risen 1 foot
- 13 Islands have already been lost
- Future Projection: Sea level will rise an additional 2 – 4 feet by 2100



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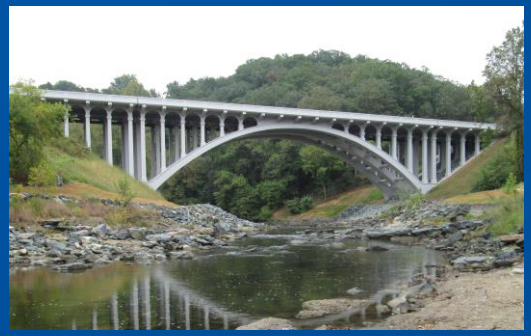
MARYLAND BRIDGE FACTS



- 2565 SHA Bridges
- 357 Non-SHA State Bridges (MdTA, MAA, MTA)
- 2343 Local Government Bridges
- 19 Movable Bridges
- 166 Historically Eligible Bridges
- “Signature” bridges include Woodrow Wilson Bridge and Chesapeake Bay Bridge

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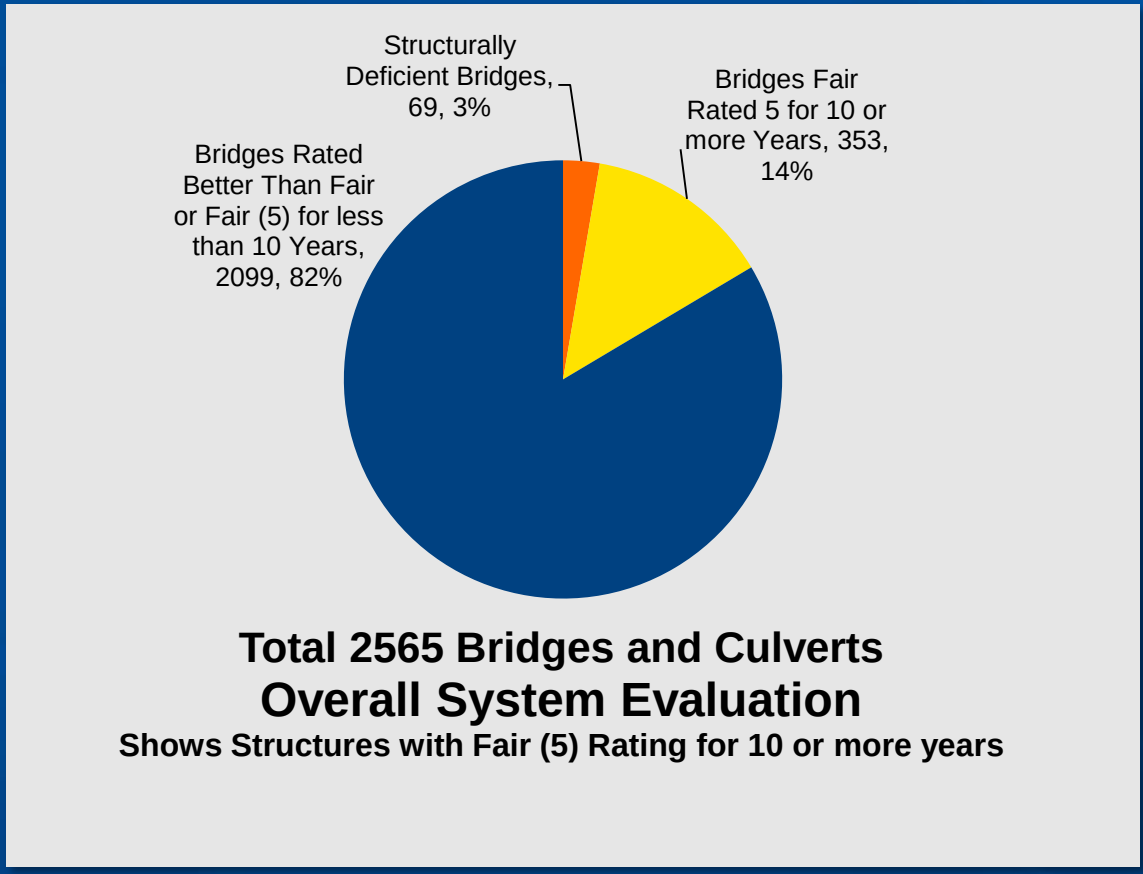
CURRENT SHA BRIDGE CONDITION

As of April 1, 2016 FHWA submission, there are:

- **69 structurally deficient (SD) bridges on the SHA system. (Less than 3%)**
- **21 weight posted bridges. 99% percent of SHA bridges can carry all legal loads.**
- **353 "Fair Rated Bridges". Bridges with at least one of the major elements rated a 5 for 10 or more years. (Potential to become SD in next 5 years is greater.)**



Total 2565 Bridges and Culverts

Overall System Evaluation

Shows Structures with Fair (5) Rating for 10 or more years

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TWO-PRONGED APPROACH

Minor Rehabilitation & Preservation

- Paint Program
- Deck Overlay Program
- Invert Paving
- Concrete Repairs

Major Projects

- Major Rehabilitation Program
- Bridge Replacement Program
- Voided Slab Replacement Program
- Small Structure Replacement Program

GOALS

- Eliminate structurally deficient element with Minor Rehabilitation, Major Rehabilitation, or a Total Replacement of the structure.
- Keep the element from becoming SD by performing preservation activities.

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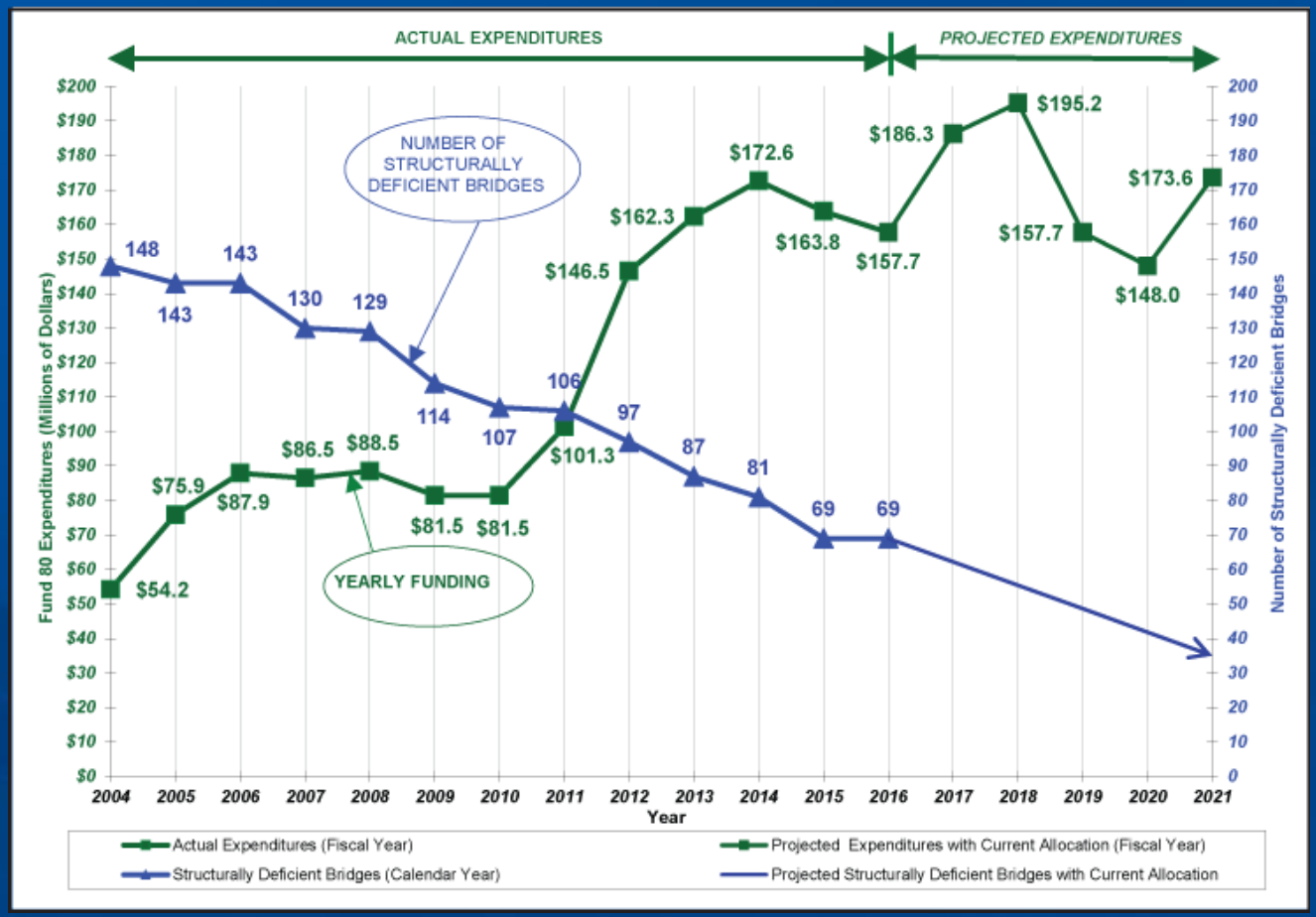
MARYLAND'S INVESTMENT IN BRIDGES



Increased investment in bridges in the last 10 years has seen the number of structurally deficient bridges decrease from 148 in 2004 to the current number of 69 in 2016.

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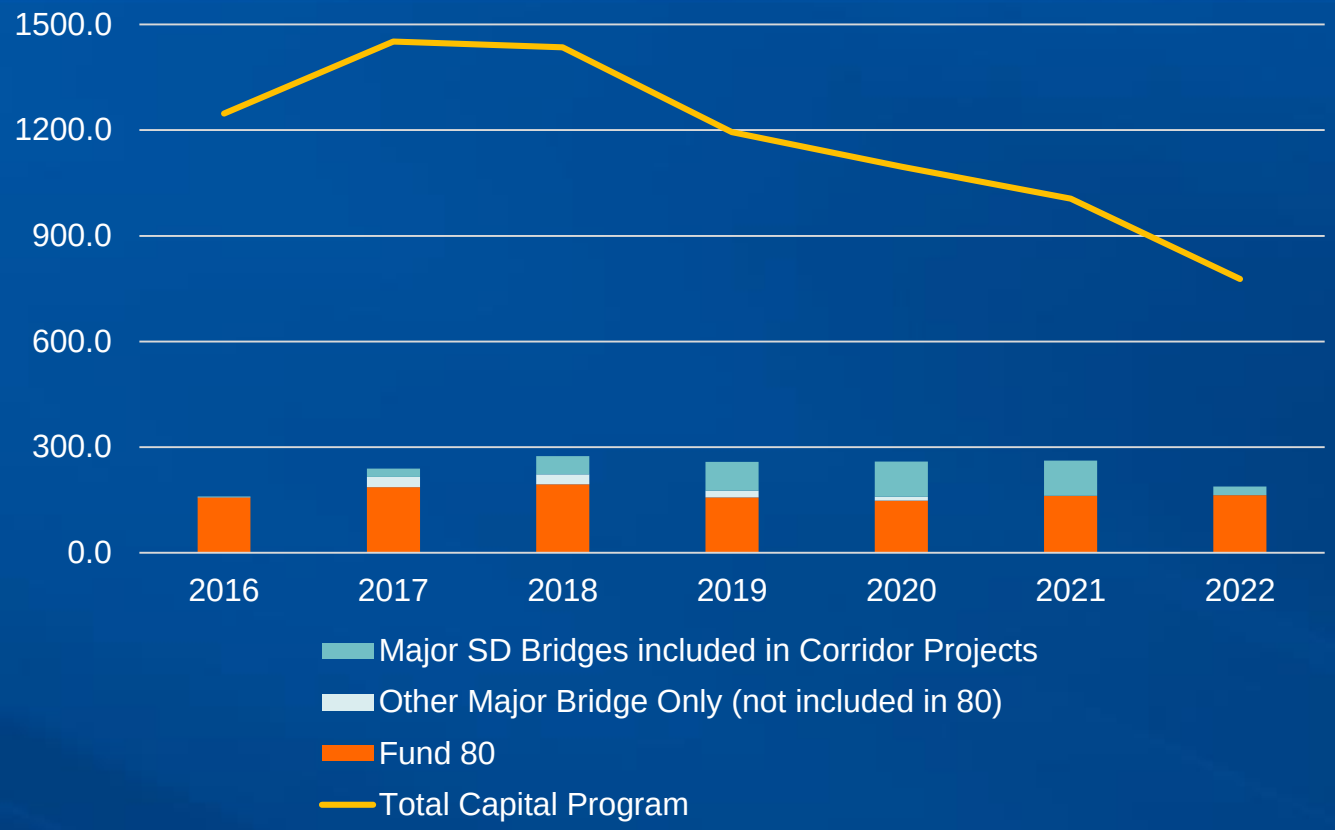
MARYLAND'S INVESTMENT IN BRIDGES



I – 695; bridges over Benson Avenue, Leeds Avenue, US 1, Amtrak; I-81; over Potomac River; and MD 331 over Dover Bridge, (these are major bridge projects that are not included in Fund 80)

I – 695; bridge over Old Harford Road; MD 32, Linden Church Road to I-70; MD 85, District 7 Office entrance to North of Spectrum Drive at I-270 (Phase 1);and I-95, Baltimore Washington Parkway to US 1, (these are major corridor projects that include bridges some are structurally deficient)

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MARYLAND'S INVESTMENT IN BRIDGES

- Investing in Bridges with employee approach and retention
- Using innovations and proven techniques
- All under ONE roof makes for efficient progress (Budget, delivery and people)

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BRIDGE & SMALL STRUCTURE ACTIVITIES OF 2015

- 216 Minor Rehabilitation bridge projects completed
- 37 Small Structure Rehabilitation projects completed
- 39 Bridges painted
- 3 Small Structures Replaced
- 16 Emergency responses to accidents or operational incidents at drawbridges

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USE OF INNOVATIVE TECHNOLOGIES

Acoustic Sensors

Data collection system

Acoustic Sensors

- Acoustic emission system was installed on the Woodrow Wilson Bridge in 2015 to detect breaks in the post tensioned strands in V shaped piers.
- Grout surrounding the post tension strands may have high chloride concentrations.
- Monitor for 10 years to determine if post tension strands are affected.

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USE OF INNOVATIVE TECHNOLOGIES

REMOTE MONITORING – TILT GAGES

- **Monitoring fracture critical bridges with tall rocker expansion bearings using remote gages and data sent via cell signal.**
- **The program was started after a crack was discovered in a bottom flange resulting from a rocker bearing being "frozen" which prevented it form proper thermal expansion and contraction.**

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USE OF INNOVATIVE TECHNOLOGIES

HIGH DEFINITION VIDEO AND INFRARED IMAGING

- Monitoring changes in condition of #136 span bridge with 10 prestress slabs per span.
- High Definition Video (HDV) and Inferred (IR) imaging taken of the underside of a prestressed slabs is compared with future HDV and IR images.
- Software determines changes in crack lengths
- Accurate reflection of changes of condition.

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INNOVATIVE TECHNOLOGIES

- Indicate performance of bridge under loadings.
- A resource that provides accurate information on the condition of a bridge.
- No interruption to traffic to collect data once installed.
- Relatively inexpensive and non-destructive.
  Tool to aid in ensuring the safety of a bridge

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SUMMARY

- Data driven 2 pronged collaborative approach
- Steady continual prioritization of bridges
- Use of innovative practices and proven methods
- A great team!