February, 2010
Volume 3, Issue 1

New York State Department of Transportation

Bridge Maintenance News

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RBME Meeting Cooperstown, March 23-25

Structures Maintenance Conference Mohawk Valley Community College, June 23-24.

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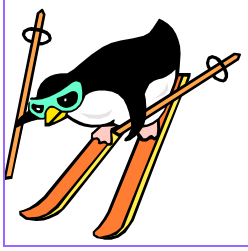
NHI Web-based Courses
www.nhi.fhwa.dot.gov/home.aspx



Bridge Flags Show Focus Needed at Girder Ends

The Pareto principle (also known as the 80-20 rule) states that, for many events, roughly 80% of the effects come from 20% of the causes. We were interested in what issues were generating 80% of the bridge flags.

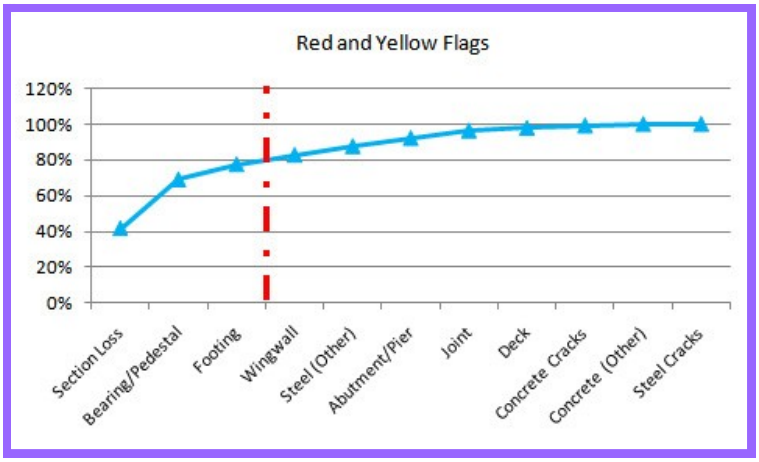
We reviewed all (state and local) red and yellow flag data for the period of May 2004 to December 2009. Categorizing flags to create the charts shown was time consuming. A word search was conducted in the comments section of the file to determine the element or cause of the flag. Each comment was then read to determine an appropriate subcategory. Through that process the categories listed in the table above were derived. This was a lengthy but worthwhile process.

FLAGS (MAY 2004 - DECEMBER 2009)

	Category	Red	%	Yellow	%	Total	%
Superstructure	*Section Loss*	1006	46%	2755	40%	3761	42%
	Steel Cracks	10	0%	0	0%	10	0%
	Steel (Other)	65	3%	378	6%	443	5%
	Concrete Cracks	0	0%	123	2%	123	1%
	Concrete (Other)	13	1%	52	1%	65	1%
Substructure	Bearing/Pedestal	627	29%	1833	27%	2460	27%
	Abutment/Pier	93	4%	316	5%	409	5%
	Wingwall	70	3%	407	6%	477	5%
	Footing	147	7%	607	9%	754	8%
Deck	Deck	56	3%	77	1%	133	1%
	Joint	103	5%	275	4%	378	4%
	Totals	2190		6823		9013	

The results were then charted using the Pareto concept for both yellow and red flags. It is not surprising to find that 80% of the flags issued are associated with three conditions; section loss on steel beams and problems with bearings and pedestals. It is unusual to find section loss occurring at locations other than at girder ends or in complex connections on truss bridges. It can be assumed that 80% of the flags are associated with conditions encountered at the end of steel girders.

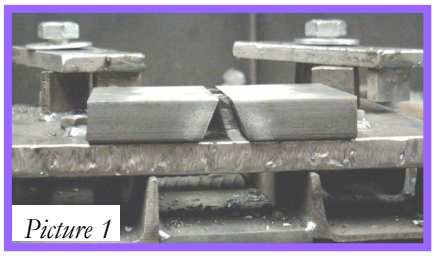
As the charts show, the main problem (42%) has been in section loss on steel bridges. This is possibly the consequence of a variety of past issues associated with the bridge painting program.



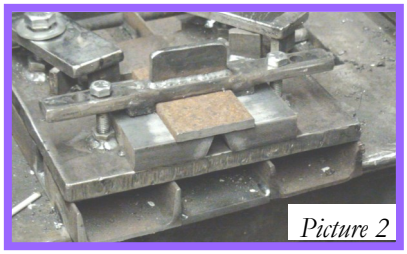
One factor contributing to this finding is that access to a address these flags is difficult. It is often easier to rent or borrow equipment for under bridge access then to secure the equipment for maintenance purposes. Otherwise crews must erect scaffolding, often on slopes or on barges, to perform scheduled and minor maintenance actions. This impediment can result in necessary work being overlooked until a flag is issued. Access for even simple actions, such as bridge washing, can be problematic. Crews try diligently to flush areas around the girder ends, but do so while standing on the ground with limited results. Convenient access to elements just below the superstructure is vital for bridge maintenance. The information gleaned from this project has helped secure approval to use scarce equipment funds for three tow-behind under bridge inspection units for bridge maintenance

Getting into the Groove

The Oneonta Bridge Crew has crafted a welding jig that can be called the 'Cadillac' of jigs. Anyone that has taken the 3G certification test would appreciate this jig.

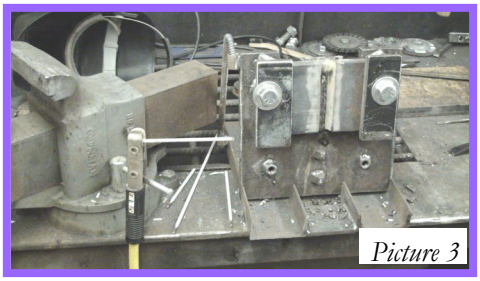

Picture 1

Providing a 1" thick vertical groove weld with no deficiencies for 3" is not easy. Preparation is critical. This jig helps the welder set and secure the test plate with precision.

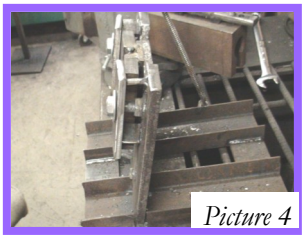

Picture 2

Picture 2 shows the backer plate being placed. Bolting this part of the jig locks the plates in and provides clear access to tack weld the plates together.

The plates are then repositioned in the upper section of the jig (picture 3). Instead of heavy duty clamps to restrain the heat shrinkage, the jig uses ¾" bolts holding ½" thick steel plates.


Picture 3

When welding vertical, there is an allowance of 5° from direct vertical. Welders take advantage of this as it helps control the molten metal. The jig has this covered too (picture 4). A piece of threaded rod is used to lock the jig into the 5° from vertical. The base is made of 'C' channel welded together. A narrow slot is cut for the placement of the jig.


Picture 4

I have seen many varieties of jigs that have been made over the years, this is definitely the "Cadillac" model. There obviously was much thought put into this jig and the maker should be proud. The ability of putting the test plates together with precision measurements are easily recognized on the finished product.

Please contact the Oneonta Bridge Crew for more information.

Submitted by Brian Keicher

University of Buffalo Announces Webinar Series on Bridges

The Civil Engineering Department at SUNY Buffalo has developed a new Master's level course entitled: "Bridge & Highway Infrastructure Management and Public Policy". This course is designed to explain the issues, approaches, and practices used in the management of transportation infrastructure systems, with a focus on **highway bridges.** Topics include the roles of bridge engineers in managing transportation infrastructure, public policy, specifications and standards of practice, capital project development and financing mechanisms, research funding processes, environmental issues, project delivery procurement methods, and asset management. The course is conducted through a series of free webinars presented by distinguished bridge engineers from around the country. Sessions are held on Monday evenings throughout the current semester For additional information go to http://mceer.buffalo.edu/education/Bridge_Speaker_Series/Bridge_Infrastructure_Course.pdf

Solar Barricade/Barrier Lights

Bridge and lane closures have been in the news a lot lately. The use of concrete "jersey" barrier, Type III barricades, and traffic drums (barrels) is common with these types of closures. Also common is the barrier/barricade lighting which goes with these devices. These barrier lights typically run on batteries. With long-term closures, maintenance of the lighting requires time and dozens of batteries.

Not so with solar powered barrier/barricade lights. These lights operate similarly to battery operated lights (flashing or steady burn), but with no batteries. The solar powered light can save you money in battery cost, as well as in the cost associated with your crew checking and replacing dead batteries. Also, it is an environmentally friendly solution as well. Region 7 (Watertown) Bridge Maintenance has several shoulder closures set up using lighted jersey barrier and barrels. R7 will begin using solar powered lighting in the near future. Check a future issue of the Bridge Maintenance News for more feedback.

Bridge Maintenance History Lesson

When the question came up, "How is bridge maintenance different from what it was 10, 20 or 30+ years ago?", I knew just who to ask.

Wendell (Stu) Strum, started with NYSDOT in 1957 and has been in Region 9 Bridge Maintenance for 35 years. I consider him bridge maintenance royalty.

Wendell Strum

Stu reminisced about when he first started in Bridge Maintenance. Back then tools were scarce and he was lucky to get his hands on a hammer or a wheelbarrow. Repairs were smaller and were not as technical as they are today. Also, when bridge maintenance first became a dedicated entity, the skill level was not yet developed and has since evolved quite considerably.

Out of curiosity, I asked Stu about his most memorable repair. It was the result of the flood in 2006. With the rising water, logs had damaged an interstate narrow suspension bridge between Pennsylvania and New York. Structures came up with a design and it took his crews 5 days to complete the repair.

Dave Patrick, a BRS2 in Butternut, has been in bridge maintenance for 30 years, 22 of which as a BRS2. Dave mentioned the bridge crew size has changed since he began in 1979. Dave said, "his crew used to have 17 people. Now crew sizes are between 10 and 14." Dave's most memorable project is a repair on Route 34 in Weedsport. "It was a large old structure with 2 beams", he said. "One of the beams had a 90% crack that his crew repaired over three weeks during the winter".

Dave Patrick

Steve Vance from Region 8's Townline Crew has been in the bridge maintenance business since 1989 and as a BRS2 since 1994. He also noted the change in bridge crew size from when he first started. Steve went on to further state that everything was concrete then and now he is using more elastomeric products. He also noted the ability to perform more repairs during the colder months. For example; heated asphalt plug joints.

Steve Vance

~ *Sue Maloney*

April Ponders Paint

My younger sister gave me a great Christmas present this year: she borrowed and smashed up my car. On the journey to the paint shop, I crossed the Twin Bridges. This lead to a curiosity of why the paint on my car is lasting longer than on the bridge.

I was interested knowing why, so I called a couple paint professionals. Dee McNeil of Sherwin Williams and Larry Stephans of Ameron gave some great insight.

The first is application. Both men noted that cars are most often painted in a controlled environment with controlled temperature and complete accessibility. The application is done robotically, which leaves no room for human error. Bridge painting involves heights and containment with limited lighting and air movement. Stephans mentioned the quality control aspects, and how a car is a smaller unit with the application being more efficient.

Another difference is surface preparation. Automobiles have multiple coatings applied, involving multiple surface preparation steps. The first step, typically in an electro-deposition of the primer that fills in all imperfections. This is not performed in a bridge piece. Cars have a prime, base and polyurethane top coat applied, then multiple clear coats. Also, cost of paint is a huge factor. Dee McNeil estimated that the paint used for a car costs about $320/gallon, while paint for a bridge is around $40/gallon. Obviously, more costs—better technology.

The maintenance of any edifice will have direct correlation to the longevity. A car's paint system is maintained continually through washing or waxing – which does not happen nearly as much on a bridge. A car is kept away from weather conditions by being placed in a garage, while a bridge is always exposed.

One more thing – if you've ever wondered why the colors on bridges infrequently change, there is a reason. Most states have approved coating systems that have been used for years. In New York, the specifications most likely do not support applying bright colors on bridges because it would call for an extra clear coat. Perhaps in the future we'll see some brights, but for now it's mostly sage green.

~ *April Hotaling*

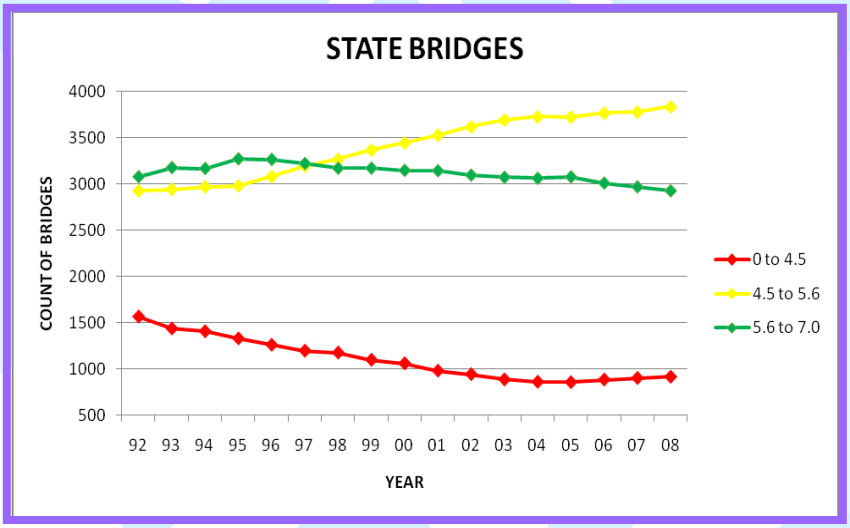
Introducing Fair Bridges

There has been considerable discussions lately on developing a performance measure that would provide a comparative analysis of bridge conditions among State DOTs.

Bridge maintenance engineers would like the performance measure to capture their efforts in preserving bridge conditions.

One idea, already in practice in several states, is to introduce "fair" and "good" categories in addition to the commonly tracked "poor" or "deficient" grouping. Efforts to keep non-deficient bridges from becoming deficient could then be tracked. The movement of bridges between categories allows managers to validate or tweak their investment strategies.

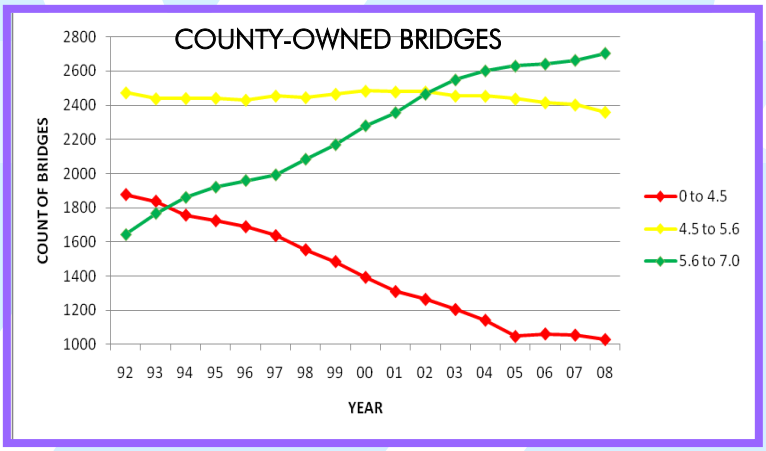
We wondered what such a chart might look like for NY bridges. We chose "fair" to be bridges with condition ratings greater than 4.5 and less than or equal to 5.6 using the NYSDOT weighted condition rating formula.



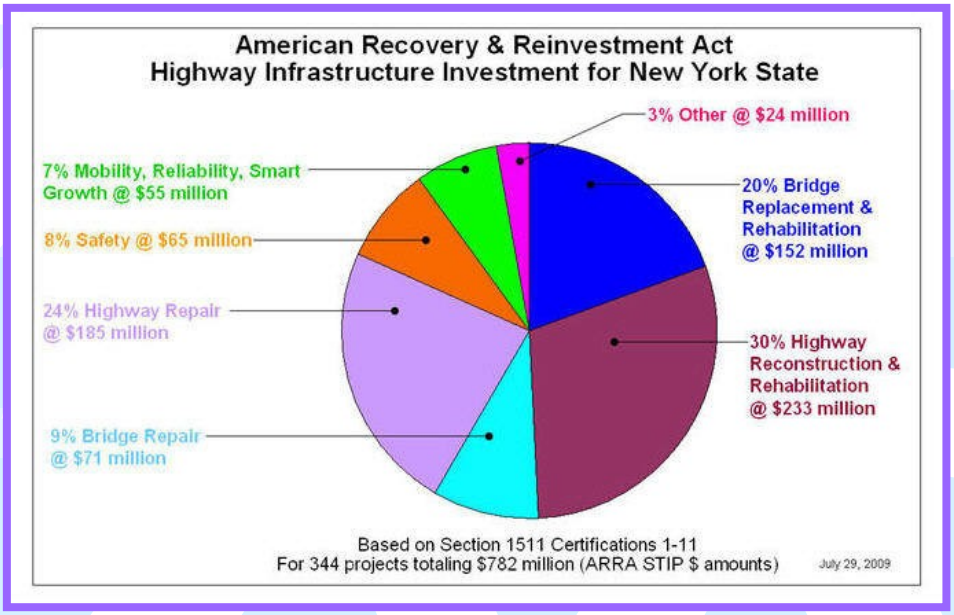
The trend line indicates a recent increase in number of "poor" bridges after years of significant gain. Also seen is an increase in the "fair" group and reduction in the number of "good" bridges.

Charts of state-owned bridges by Region have been posted at **P:\Temporary Data Exchange\Bin Count**

Charting the trend of the county-owned bridges shows a much different record. The counties have been able to significantly reduce the number of "poor" bridges, seemingly moving them all into the "good" grouping. At the same time the number of "fair" bridges only dropped slightly.



What NYSDOT Did With the Money



B.U.M.S. Meet

B.U.M.S.(Bridge Users and MAMIS Survivors) was created through the bridge COP to review materials inventory management. Harry Young, ARBME R8, chairs the group which is comprised of ARBMEs and RBMEs from around the state. They recently met in Albany to discuss the stockpile module in MAMIS and the Fleet Anywhere application that is being piloted through Fleet Administration. The minutes of that meeting can be found at **P:\Temporary Data Exchange\Bin Count**

Words from the Chief Engineer

From the Chief Engineer, Bob Dennison, on developing future construction programs:

- We must create program directions that are clearly fix it first and don't progress the quality of life jobs. We do not have resources to do both now.
- Our measure of performance needs to be adjusted.
- We can't spend engineering time on jobs that have no chance of moving forward as that sends a message that contradicts the fact that our resources are constrained.
- To cut bus services and build a new bike path does not make sense. To turn off street lights while building new ones is a little crazy and hard to explain.
- Our program should be revised to be consistent with two principles.
  - Fix it first
  - Provide as many jobs as possible.
- We also have a responsibility to safety - bridges should not fall - traffic signals should work- crashes should be addressed.
- And, not polluting the earth (storm water should be managed and the air should be made cleaner).
- Things like highway capacity improvements, new rest areas and nice urban renovation jobs (my favorite kind of job) simply are not affordable at this time.

Let's be honest and adjust the directions accordingly.

Crown Point Bridge Update

On December 28, 2009, Idaho-based blasting company, Advanced Explosives Demolition Inc, demolished the Crown Point Bridge. A ferry, providing free, year-round, 24-hour, seven-day-a-week service connecting Addison, Vermont to Crown Point, New York is open for operation.

BIN 3357300 is located in the Town of Livingston Manor in Rockland Co. It was built in 1860 and carries traffic over the Willowemoc Creek.

Bridges Per Crew Member

Currently filled Bridge Maintenance positions were counted and matched to the state-owned bridge inventory in each Region. R11 is not included as the Region does not have bridge crews. R10's fill count is reduced by the number of bridge crew titles (6) dedicated to operating lift bridges .

NYSDOT currently employs a bridge crew repair staff of 518 titles ranging from Field Supervisor II to Bridge Repair Assistant Trainee. It could be viewed that, on average, each crew member needs to maintain 14 bridges. The average square footage of bridge deck per person (123,193 sq. ft) provides some feel for the size of the structures.

Region	Count Of Bridge Crews	Count Of Bridges	Sum Of Deck Area (sq ft)	Bridges per Person	Sq Ft Deck per Person
1	69	832	9,246,750	12	134,011
2	40	508	3,346,461	13	83,662
3	51	611	6,423,306	12	125,947
4	47	798	6,769,974	17	144,042
5	75	857	8,270,168	11	110,269
6	41	538	3,982,962	13	97,145
7	39	396	2,557,023	10	65,565
8	54	1,152	9,152,240	21	169,486
9	74	944	7,787,473	13	105,236
10	28	546	6,277,755	20	224,206
SW	**518**	**7,182**	**63,814,112**	**14**	**123,193**

Friction Testing TPOs

The General Engineering Group in the Materials Bureau has been friction testing thin polymer overlays (TPOs) and healer/sealer applications on dozens of NYSDOT bridges since 2005. To-date properly installed overlays have retained high friction values. Some installations have been in-place since 2001. Poor surface preparation (brush blasting instead of shot blasting) and inappropriate material (admitted by the manufacturer) resulted in a few low values at two sites.

Testing is done according to ASTM E 274 Standard Test Method for Skid Resistance of Paved Surfaces Using a Full-Scale Tire. The test tire used meets the requirements of: ASTM E 501 Standard Specification for Standard Rib Tire for Pavement Skid-Resistance Tests.

Manufacturers supply the wearing course aggregate with their thin polymer overlay system. Typically these aggregates are quartz or basalt with a harness rating of 7 or greater on the Mohs scale of hardness. Aggregates of this quality meet and exceed the NYSDOT specification for wearing surface aggregates. NYSDOT is unique in specifying a percentage of aggregate not dissolved in an acidic solution.

The overlay systems friction tested are epoxy, methyl methacrylate, high molecular weight methyl methacrylate, and poly-urea based systems. These polymers have proven durable and are able to retain the aggregates over time.

Rt 30 over the Minekill

In 2002 R9 Bridge Crews applied Fiber Reinforced Polymers to strengthen the concrete spandrel arch. In 2009 the bridge was replaced. The new structure was designed by Region 9 Highway and Main Office Structure. The contractors were Ketco (prime) and Tioga (subcontractor). The total cost of the project was $7.3 million.

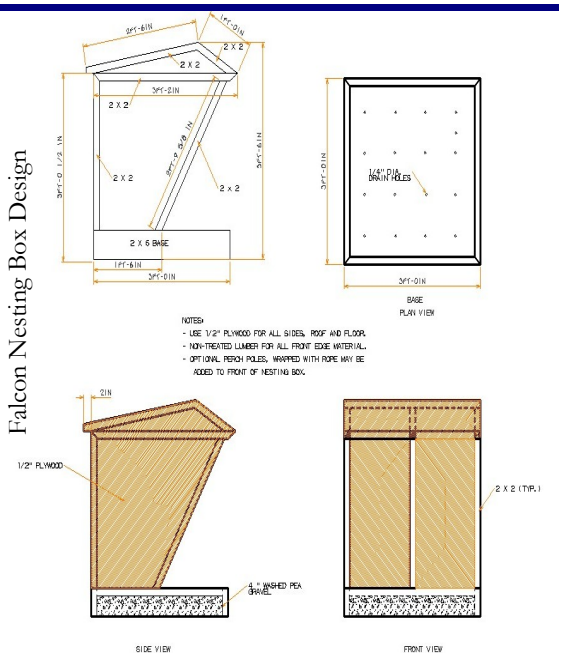
Falcon Nesting Boxes

Region 1 bridge crews spend part of their season as falconers. They don't hunt with falcons though, they hunt *for* falcons. They do that by building nest boxes and placing them at appropriate locations on bridges. Falcons like high perches with open spaces, with water and a food source. They help bridge maintenance by controlling the pigeon population.

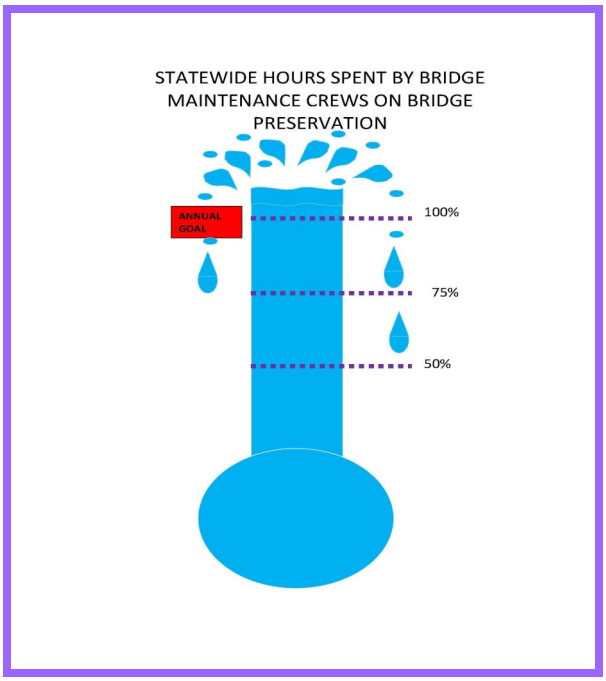
Working with Environmental Coordinators in NYSDOT and with The Department of Environmental Conservation, crews built, installed, and banded the chicks on the Collar City and Dunn Memorial bridges. A camera was installed on the Dunn Memorial. The hatching and growth of the chicks has been seen by thousands of interested bird watchers.

Additional information can be founds at: http://www.dec.ny.gov/animals/7429.html

Terry Carmel & Jim Church installing a falcon nest box



BM Meets PM Goal



The sum of the hours reported doing preventative maintenance activities is divided by the total number of reported hours for the BM organization in the summer season (excluding S&I and operating lift bridge tasks). The annual goal is 25%. This past season the crews spent 32% of their hours performing preventive maintenance work. Kudos for R4 for using 49% of their hours on preventive maintenance activities. If you want to see your regional performance, these numbers can be found at.**P:\Temporary Data Exchange\Bin Count**

Internet Offerings

Back copies of The Bridge Maintenance Newsletters are posted at:
Intradot: http://axim22.nysdot.private:7779/portal/page?_pageid=39,507052,39_507134:39_2336070&_dad=portal&_schema=PORTAL
Internet: www.nysdot.gov/divisions/operating/oom/transportation-maintenance/transportation-maintenance-general/bridge-maint

The final report on "Guidelines for the Selection of Bridge Deck Overlays, Sealers, and Treatments can be downloaded from the AASHTO Sub Committee on Maintenance website. http://maintenance.transportation.org/Pages/default.aspx

Presentations provided at the Regional Structure Engineers meeting held last October in Syracuse can be viewed through the Intradot at http://axim22.nysdot.private:7779/portal/page?

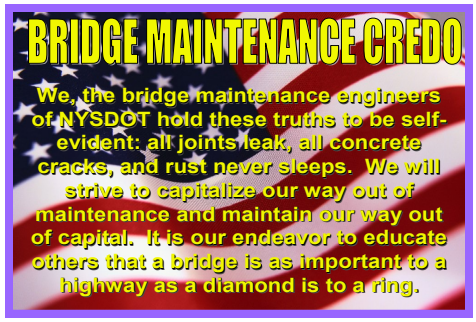
Bridge & Culvert Maintenance Conference

***Breaking News*: The Mohawk Valley Community College is sponsoring a Structures Maintenance Conference to be held June 23-24th, 2010. The first annual conference should be of interest for maintenance engineers and field crews. The Bridge Maintenance Group in NYSDOT is working on the agenda. A half day session on the 23rd will feature presentations on bridge maintenance management and will offer CEU credits. The following day will offer a full day of presentations by crew supervisors with displays from material and equipment suppliers.**

Stay tuned for more information.

Cool Tool dubbed "Joint Scooter"

Check out this cool tool that Don Ratliff and his crew from the Peru BM shop fabricated to do a Silfoam Joint installation.



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