

CBC Aids NYSDOT with Buried Flexible Bridge Evaluation Program



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In late summer of 2009, CBC Engineers & Associates, Ltd. received a phone call from New York State Department of Transportation (NYSDOT), Region 6. NYSDOT trying to be proactive in the requests of the Federal Highway Administration (FHWA), were in process of putting a culvert inspection program together similar to the already well established National Bridge Inspection System (NBIS). Although FHWA has not mandated this program yet, NYSDOT was preparing to launch their program. The call was to gather information to aid them in preparing their program.



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Project Summary

NYSDOT Region 6 called CBC because of Dave Cowherd's, CBC's Chief Engineer, lives work on the subject. With a dozen or so papers written on the subject, and many as a result of FHWA and DOT sponsorship, Dave is seen as one of few experts on the subject of inspection, evaluation, load rating and remediation design of Buried Flexible Culverts & Bridges. CBC has been traveling and training DOT's on the subject for years, however what Region 6 was after required a much more in-depth approach.

It was decided that CBC would come and train a few inspectors on the methods of inspection on a Buried Bridge in their system and perform a full evaluation and load rating on the structure. Once all this information was put together we would then return later in the fall with a full day training program. One of the problems with starting a "culvert inspection program" is funding. FHWA is not supporting this new action on the DOT's part with any money or resources and very few details on what the program should look like. Because of this funding issue NYSDOT picked a "Buried Flexible Bridge" instead of a culvert. Although the Chemung County culvert only measured 16'-7" in span by 10'-1" rise (not 20 feet in span), the structure crossed the roadway on a 30 degree skew and that made the span fall into the 20 feet and greater NBIS program structure.

One of CBC's inspectors and engineers met 3 Region 6 personnel to take the days worth of measurements, photos and field notes of this 218 foot long , 12 gage , 6 x 2 Corrugations, Multi-Plate Pipe Arch with step beveled ends and grouted rip-rap for headwall/ slope protection. The structure was installed in 1985 and upon initial visual inspection showed typical signs of wear. The structure also had a post construction applied concrete paved invert providing a hard wearing surface protecting the base steel from abrasion over the years. With most Buried Flexible Structures this culvert showed geometry changes through out the length of the structure. This was later confirmed by the field measurements.

CBC used the Patten Pending laser shape monitoring system to take measurements at approximately every 10 feet down the structure and every 10 degrees around the structure. Back at the office this allows the shape profile at every station to be drawn in CAD. from there the remaining geometry can be evaluated in a program developed by Dave Cowherd called MULTSPAN and load ratings and structural checks were made. Before CBC left the site all photos were taken as well as ultrasound readings for the metal thickness. Extensive field notes were also made.

Structure Analysis and NYSDOT Training

Based on the shape measurements taken in the field and plotted into CAD, the results of the MULTSPAN analysis, and AASHTO evaluation both showed the current shape (Geometry) of the structure is satisfactory with the maximum shortening of any top mid-ordinate being 13.2%. Based on the rating of the structure, the results of this evaluation show a rating of 34 out of a possible 42. The lowest individual rating for any category was a 3 for leaning, which probably happened during original backfill. The structure geometry was good, however there was visible rust perforations just above the concrete paved invert at the left outlet wingwall which should be fixed. The remainder of any rusted surface appeared at the interface of the concrete paved invert and corrugated plates. CBC recommended a new pavement put in that would feather up to the area of corrosion to extend its service life.

All of this data from given in a day long technical training session on September 30th, 2009. There were over 50 DOT personnel in attendance. Although NYSDOT continues to struggle with funding to get this new inspection program underway, they continue to put the bolts & nuts of the program together and continue to train personnel who will be doing the inspections. Hats off to NYSDOT for being Proactive.

For more information on this project please contact our **Director of Marketing** - [Joe Dennis](mailto:Joe.Dennis@CBCEng.com) @ 937-428-6150.