



Illinois Department of Transportation

2300 South Dirksen Parkway / Springfield, Illinois / 62764

August 28, 2014

CIRCULAR LETTER 2014-15

EXPOSED BRIDGE PILING

COUNTY ENGINEERS/SUPERINTENDENT OF HIGHWAYS
MUNICIPAL ENGINEERS/DIRECTOR OF PUBLIC WORKS
CONSULTING ENGINEERS

The purpose of this Circular Letter is to make bridge owners and bridge inspectors aware of recent Department findings regarding exposed bridge piling. Additionally, inspection and design guidance is provided as a result of these findings.

In September 2013, a bridge pier supporting a bridge on an Illinois county highway collapsed moments after a legally-configured vehicle crossed the structure. There were no load restrictions on the structure, and the structure's most recent condition ratings indicated the structure as being in satisfactory condition. The three-span bridge had two piers with exposed steel piling supporting a concrete cap. The subsequent investigation found the steel piling supporting the pier along the bank of the creek had severe section loss just at or below where the water surface elevation would have been at the time of the last routine NBIS inspection. It is theorized the corrosion occurred at that location due to the frequent wet/dry cycles the steel experienced over the course of time; in this case, approximately thirty years.

Prior to the bridge collapse in September 2013, the Department closed a different local agency structure after finding similar severe section loss of the exposed steel piling during a load rating inspection. Again, the deterioration was located near the normal water surface elevation and may not have been visible during routine NBIS inspections at the time of year the inspections were performed.

These two examples, in conjunction with several other structures with advanced section loss of the exposed piling, highlight the need for special inspection considerations. As mentioned in the examples above, the deterioration of exposed piling often occurs near the water surface elevation where, depending on the water elevation at the time of inspection, visual observations alone may not detect section loss. Additionally, deterioration of exposed piles is often found along the ground line. Extra attention should be given to these areas during all routine NBIS inspections.

Since the vast majority of structures with exposed piling do not meet the submergence requirements for an underwater inspection, it is recommended the routine NBIS inspection for structures with exposed steel piling be scheduled during times of low water, typically during the late summer months. If this is not feasible, a return visit to the site shall be scheduled when the water elevation is low enough to inspect previously obscured elements. The site visit shall be documented in the bridge file, and if any deterioration is observed warranting a change in the condition rating, an addendum to the previous routine NBIS inspection must be completed. If for any reason the water surface elevation is not low enough at any time during the year to enable a thorough inspection of the exposed piling, an Underwater Inspection or Special Inspection should be implemented that would ensure verification of the amount of section of the pile below the water line.

As mentioned above, exposed pile deterioration can also occur along the interface where the ground line intersects the piling. This area should be inspected closely, and periodic removal of the soil around the piling is recommended to assess the pile condition just below the ground line.

If moderate to severe deterioration of exposed steel piles is discovered in subsequent inspections, contact the Bureau of Bridges and Structures Local Bridge Unit (LBU) immediately to have the damage evaluated. Emergency repairs may be required to keep the structure in service. Even if the deterioration is mild or non-existent, consideration should be given to proactively protecting the piles from future deterioration. The LBU may be contacted for assistance in developing repair plans or encasement details.

The inspection of exposed piling is challenging, even with the best inspection techniques. Potential deterioration can be difficult to locate with visual observations and often additional methods are necessary. Therefore, in order to mitigate these challenges, all new structures with proposed individual steel H-piles or metal shell piles shall provide for concrete encasement of the piling. For piling located within channel bank limits, the concrete encasement shall extend from 2.5 feet below the streambed to a minimum 2 feet above the estimated water surface elevation. For piling beyond the channel bank limits, concrete encasement shall extend from 2.5 feet below the ground line to a minimum 2 feet above the ground line. For existing structures with exposed piling, alternative forms of corrosion protection can be used in lieu of concrete encasement. Please coordinate with the LBU prior to implementation.

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If you have any questions, please contact Mr. Jack Elston at (217) 782-5928.

Sincerely,



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