



STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION



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June 7, 2018

Mr. Lyle Wray
Executive Director
Capitol Region Council of Governments
241 Main Street
Hartford, CT 06106

Dear Mr. Wray:

Subject: Pyrrhotite in Bridges and other CTDOT Structures – Request for Testing or Preservation of Concrete in Potentially Affected Areas

This is in response to your May 29, 2018, letter to Commissioner Redeker regarding pyrrhotite in bridges and other CTDOT (Department) structures. Thank you for conveying your concerns regarding the pyrrhotite issue to the Department. The Department has previously reviewed the pyrrhotite issue and is confident that our bridges and other structures are not impacted by crumbling or cracking concrete for a myriad of reasons. Specifically, the following procedures differentiate Department concrete work from residential or commercial concrete work:

- The Department has specifications for aggregates used in concrete and regularly tests for soundness, abrasion, and gradation. Department inspectors also perform periodic visual inspections of aggregates for any anomalies.
- The Department also samples and tests concrete at the project site, including slump and air entrainment tests. Cylinder samples of material are also made and subsequently tested at our laboratory to determine compressive strength.
- In addition, the Department specifies the water/cement ratio permitted in the concrete mixture and closely monitors those requirements, both at the concrete plant and at the project site. One of the theories regarding the deterioration of concrete caused by pyrrhotite is that there is excess water in the mix, and this allows pyrrhotite to degrade faster and to a greater degree. On residential work, it is common practice for contractors to add water for ease of placement and workability. That practice is very detrimental to strength and significantly increases the opportunity for negative chemical reactions. This practice is prohibited on Department projects.
- The Department designs all structures with reinforcement steel, which controls stresses due to expansion and contraction of the structure, where most residential work does not.

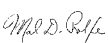
- The Department requires waterproofing/damp proofing on any concrete surface that is below ground. This protective coating of asphaltic material protects the concrete from water intrusion that creates the environment for negative chemical reactions if any reactive material, such as pyrrhotite, is present. Again, during the impacted time frame of the issue, most residential work did not use waterproofing/damp proofing.
- Lastly, the most significant procedure the Department uses that differentiates our work from residential work is that we periodically inspect all of our bridges every two (2) years. Each structure is thoroughly inspected by qualified engineers in accordance with national standards. If there are any serious issues with the condition of the concrete, they are documented, and addressed in a timely manner.

With regards to Bridge 00847, Potter School Road over I-84, it was constructed in 1960. In the December 30, 2016, report issued by the Department of Consumer Protection "REPORT ON DETERIORATING CONCRETE IN RESIDENTIAL FOUNDATIONS," the time range identified for reported problems was between 1983 and 2010. This bridge was constructed well before the period in question and therefore would not be a candidate for the pyrrhotite contaminated concrete.

The Potter School Road Bridge was last inspected in October 2016. The inspection report notes that some of the reinforcing bars in the concrete foundation are close to the surface and are corroded. The expanding rust of the reinforcing steel is believed to be causing much of the cracking that is seen at this bridge. This type of deterioration is common for a 60-year-old concrete exposed to deicing chemicals with inadequate concrete cover over the reinforcing. Consequently, the Department does not believe that pyrrhotite is present in the Potter School Road Bridge

In summary, the Department has, and has had, specifications and procedures in place, along with a systematic bridge inspection program, where the risk of pyrrhotite-related deterioration to the Department's infrastructure is nominal. Therefore, the Department does not believe that an action plan to deal with the pyrrhotite issue is warranted.

Very truly yours,


Mark D. Rolfe,
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Mark. D. Rolfe, P.E.
Chief Engineer
Bureau of Engineering and Construction