

Pedestrian Bridges – Wesley Lake



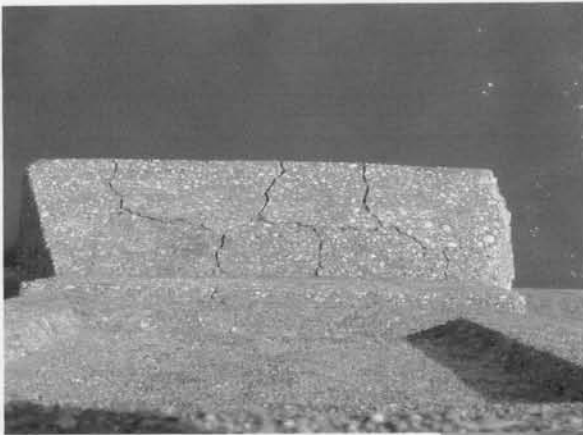
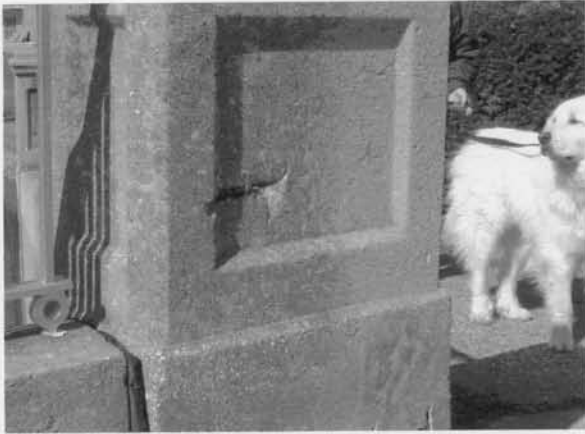
Sunday March 7, 2004, at the request of Mr Alan Oberman, the first steps of a survey to determine the structural integrity of the two pedestrian bridges spanning Wesley Lake were taken. These steps

include a visual examination of both structures, the beginning of a photographic record of conditions, and a mechanical assay of the concrete. Included in the scope of the project is a similar examination of the bulkheads and retaining walls lining the shores.

In this initial foray, being afoot, and not having access to the under-structure, we were limited to the bridge approaches, bed, balustrade, and those sections of the piers visible from the shore or roadbed.



The breakdown is most notable due to the plenitude of cracks and flaws such as that shown, in the photo, at left. As will be seen in other images presented, these imperfections are numerous, and in their numbers somewhat daunting. However, when probing the concrete with a metal blade, the material itself proved to be hard and the aggregates well bonded.



The two photos above, taken at the same approach as the first, are further examples of a similar decay. The four in the lower half of the page are indicative of the conditions prevalent among the piers that support the roadbed.



In order to gain a more complete understanding of the situation, an appointment was made to obtain the use of a boat, and examine the undersides of the bridges. On May 30, 2004, the following photos were taken.





Using these photos as reference, it is possible to make these observations:

- a) As with most problems in concrete structures, a major contributor is probably water infiltration.
- b) The concrete itself, although exhibiting many fractures and flaws is still for the most part hard and intact.

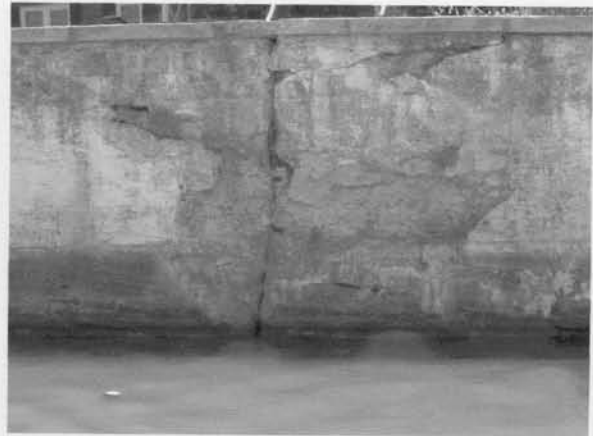
Water infiltration in reinforced concrete construction attacks in two ways. One causes the breakdown of the concrete itself through accretion of salts and acids, and the other, which seems more applicable to this particular situation, causes corrosion of the reinforcing rods. The oxides created by this corrosion occupy a larger volume than the intact metal and the expansion of the mass supplies sufficient internal pressure to crack the concrete. Once these cracks occur, increased ingress for moisture accelerates the corrosion, resulting in further deterioration. The reinforcing rods in these last eight images appear to have been set too close to the surface of the pour, and so, expansion of the oxides has caused first cracking, as shown in the earlier photos, and then exfoliation, exposing the rods completely.

Porosity due to poor compaction during the initial pour, such as that shown, at right, probably also contributed to the decay.



A visual inspection can only provide indicators as to the problem, and suggest possibilities as to how one might attempt to rectify the situation. However, in order to accurately assess conditions, as they currently exist, it will be necessary to probe the structures. Possibilities include intrusive procedures such as coring, or non-intrusive techniques such as ultra-sound, or boroscopy. It is commonly accepted that the services of an engineer be retained to conduct or guide this process. Rick Burke, of Becht Engineering has been contacted; he has visited the site, and is preparing a proposal recommending technique and procedure for in depth analysis.

Retaining Walls – Wesley Lake



As the photos above illustrate, there has been significant decay in the concrete retaining walls that line the lake. Cracks, shifted sections, and crumbling are the major concerns. For the most part, as with the bridges, the concrete is still hard and well bonded. At this time it should not be too difficult to stabilize the segments relative to each other, and inject a grout to seal the cracks. Likewise, excision and repair, of the crumbled areas, should not present too great a difficulty.

There is noticeable rot in the metal bulkheads that line the balance of the shore. Areas have corroded to the point that soil backing up to the walls is washing into the lake, leaving potentially dangerous depressions. In addressing these problems, it is suggested that the product line and services of a company called Green Mountain International, Inc, be explored. They

offer proven solutions to all the questions mentioned above, from soil stabilization, to structural repair.

GREEN MOUNTAIN INTERNATIONAL INC.
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WAYNESVILLE NC 28786

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COMPANY PROFILE

Green Mountain International, Inc. was established in 1987. The company manufactures a variety of polyurethane and epoxy products for the construction industry. Some are designed to stop water leaks. Other uses are to repair cracks or joints in concrete structures, such as foundation walls, tunnels, dams, and large diameter pipes.

The company is located in Waynesville, North Carolina with the principal distribution center in Chicago, IL. Green Mountain sells its products directly to specialty contractors, other end-users and to construction-oriented distributors throughout the USA. The company has independent sales representatives in most areas. Experienced technical staff may be reached at the corporate office either by telephone, facsimile or by e-mail.

The products are sold under the registered trademark of Mountain Grout®. Mountain Grout "Flexible" is UL Listed for contact with potable water and USDA approved for use in food processing plants. All Green Mountain products have been tested extensively for environmental impact and have been proven to be safe and effective. All products are manufactured in the United States of America and are warranted to be free of defect.

Green Mountain International, Inc. employs professional staff that includes personnel experienced in technical application procedures, material safety and handling, chemical formulations as well as export procedures relating to shipping and financial issues.

Contractors

Over the years the author has had occasion to deal with various contractors. Two companies active in the area and qualified to handle the scope of this project are listed below.

C&C Ripoll Masonry Inc
122 State Highway 34N
Howell, NJ, 07731
Phone: (732)-919-3733 Fax: (732) 919-3736
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Masonry Preservation Group Inc.
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About the author

Joel Monesson has experience in the building trades dating from 1971, an involvement with the plastic arts since 1976, and operated as a masonry contractor beginning in 1992. From 2002 to the present time, he has been on staff at Georgian Court University, in Lakewood, NJ, charged with conservation and restoration of sculpture and historic masonry. Georgian Court is listed on the state and national level as a Historic Landmark Site.