



Builders & Managers

May 15, 2012

Hardin County Board of Education
Attn: Gary Milby
65 W. A. Jenkins Road
Elizabethtown, KY 42701

RE: North Middle School
Roof Test

Dear Mr. Milby

As you aware Alliance Corporation hired an outside consultant, Building Diagnostic Group, from Atlanta, Ga. to perform additional testing on the gym/corridor wall. On April 11, 2012 this test were performed. We had this testing performed to confirm the sporadic leak in front of the gym was in fact due to a flashing issue and was not a roofing issue, and attempt to isolate the problem area to a specific area

I have attached a copy of the report as provided and as you can see upon reviewing the report the water infiltration problem is coming from what appears to be in the thru wall flashing issue. Although the test was successful in determining that there is a flashing problem present it was not able to isolate the location of the problem and tell us exactly what is going on within the cavity wall. With that in mind Alliance Corporation outlines the following plan of action plan to remediate this issue.

Action Plan

- Starting the week of May 21, 2012 is mobilization of materials.
- Starting the week of May 28, 2012 removing small sections of the brick immediately above the counter flashing to determine what is exactly going on in the cavity wall that is causing some of the water to bypass the flashing and infiltrate the building. Upon opening up an area we will have the architect to come down and review to determine the best plan of action.
- In the 3-4 weeks following the 28th the brick will be removed in small sections at a time to perform the necessary requirements to repair the flashing in the manner to correct the issue.

Please review the information as presented and advise if you have any questions or comments.

If I can be of further assistance please do not hesitate to call.

Sincerely,

Brandon Akers,
President

BA: bh

Attachment

April 25, 2012

Via email: bakers@alliancecorporation.com

Brandon Akers
Alliance Corporation
2014 KY RT 321
Prestonsburg, KY 41653

Project: North Middle School, Vine Grove KY - Masonry Wall Drainage Testing

Mr. Akers,

At your request, Building Diagnostics Group, Inc. (BDG) visited the North Middle School building located at 100 Trojan Way, Vine Grove KY 40175 on April 11, 2012 to perform masonry wall drainage testing.

Attendees: The following persons performed all or part of the testing procedures:

Robert Scherer – Building Diagnostics Group, Inc.
Ronald Asbury – Building Diagnostics Group, Inc.

Project Overview

Building Diagnostics Group, Inc. (BDG) was retained by Alliance Corporation to conduct masonry wall drainage testing at North Middle School. The purpose of testing was to determine the effectiveness of the masonry drainage system along the upper gymnasium wall / hallway corridor. Approximately 100 lineal feet of masonry wall was tested during the one (1) day of testing. Photo documentation is provided at the end of this report.

Water Testing Procedures

Testing was conducted in general accordance with procedures published in the ASTM C1715-10 *Standard Test Method for Evaluation of Water Leakage Performance of Masonry Wall Drainage Systems*. This test method introduces water directly into the masonry wall drainage system through holes drilled in the exterior masonry wythe. Water is introduced along the interior face of the exterior masonry wythe by means of hoses at each entry point. These hoses are connected to a common water source. The flow rates are controlled by flow regulators attached to each of the entry point hoses or to a manifold that distributes water uniformly to multiple hoses. This standard sets limits for several parameters to control the velocity and volume of the water at points of entry as well as limits the minimum number and maximum spacing of entry points to provide uniform distribution of water along the interior face of the exterior masonry wythe. Entry points are drilled in the head joints along the exterior masonry wall. The spacing between any two-

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entry points shall not to exceed 32 inches. The testing apparatus consists of a distribution manifold, calibrated flow meter, and flow regulators beneath the water entry points. Entry hoses point into the drilled holes at each water entry point. Hoses are held at least 0.375 in. (9.5 mm) back from the end of the hole to prevent water from direct contact to the inner wall system. The test apparatus is then connected to the main water source. Prior to the commencement of the test, the test apparatus is purged to remove all air from the system. Once fully primed, the flow rate is adjusted to the proper testing level and the hoses are reinserted into the wall system. Each hose introduces water at a rate not to exceed .032 gal/min (120 mL/min). The minimum time of testing is ninety minutes or when leakage occurs. Leakage and/or failures are defined as penetration of water beyond the innermost plane bounding the masonry wall drainage system or water penetration below or behind flashings.

Summary of Testing Results

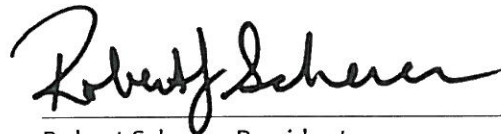
Since the test location was along a rake detail on the gymnasium upper wall, we began testing from the lowest point of the adjoining roof, as the thru-wall flashing along this wall was step-flashed from the base to the ridge. Initially, we ran the test manifolds in full capacity by injecting water at a rate of .032 gal/min in each of the sixteen drilled injection ports, for a total of forty-two feet. Water appeared within the interior almost immediately. We then, and for the remainder of the testing, limited the testing to only include two injection ports at a time. This would allow us to determine the general location of the flashing failure(s). Test duration varied from ten to twenty minutes per location. We documented water dripping from the steel angle in twenty-four separate locations. These intrusions occurred during the testing of sixteen separate tests, starting at the base (see P1) and continuing up to the peak of the ridge.

Without destructive testing we can only speculate that an inadequate flashing detail exists within the wall cavity. In some cases, the water intrusion appeared to build up (static head) prior to “over-flowing” on to the steel angle. This may indicate a possible deficiency in the sealant joint along the termination bar.

This field-testing report is prepared for you our customer to provide accurate project information. It contains a summary of observations made by a representative of BDG. This report was relinquished to Alliance Corporation on April 25, 2012 and is the exclusive property of the client so named herein.

If we can be of any further assistance pertaining to this project please contact us immediately.

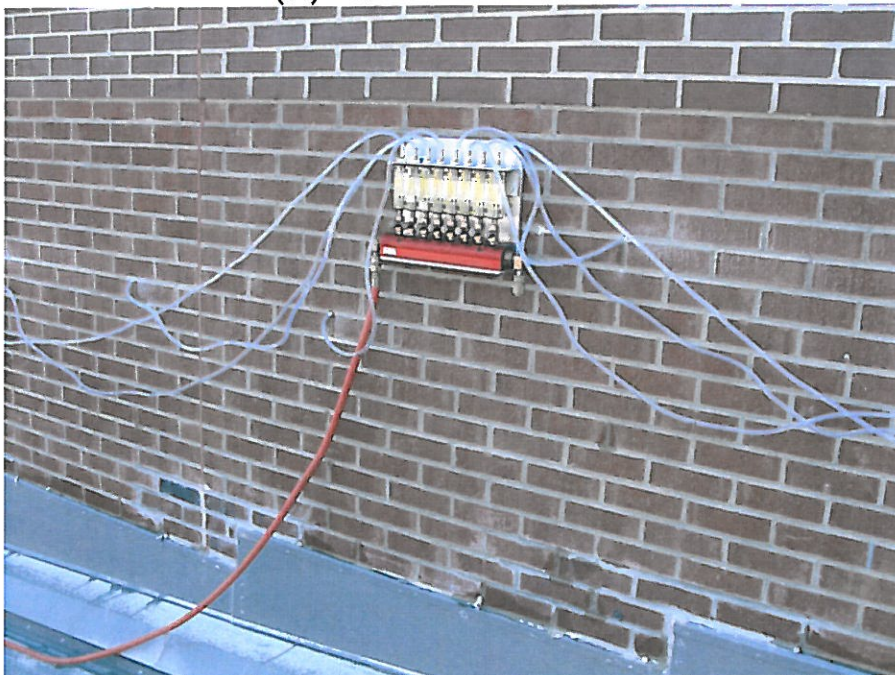
Respectfully submitted,

A handwritten signature in black ink, reading "Robert Scherer".

Robert Scherer, President
Building Diagnostics Group, Inc.



(P1) – Overall view of test area



(P2) – Test apparatus – Water was injected every 32 inches



(P3) – Testing in progress



(P4) – Drainage from base flashing (thru-wall) was observed during testing



(P5) – Water penetration observed from above exterior soffit



(P6) – Water penetration observed from gap at steel angle



(P7) – Testing in progress



(P8) – Water observed dripping down CMU wall from gap in steel angle



(P11) – Water intrusion began dripping rapidly. Above P10 (previous page)



(P12) – Upper portion of roof (toward ridge)



(P9) – Testing in progress



(P10) – Testing in progress