ELLiot LAKE TECHNICAL NOTE No. 13

TRIAL OF BENTONITE PANELS
AS AN EXTERIOR WALL SEALANT

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<table>
<thead>
<tr>
<th>Section</th>
<th>Page No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. INTRODUCTION</td>
<td>1</td>
</tr>
<tr>
<td>2. DESCRIPTION OF WORK</td>
<td>1</td>
</tr>
<tr>
<td>3. RESULTS</td>
<td>2</td>
</tr>
<tr>
<td>4. COMMENTS</td>
<td>2</td>
</tr>
<tr>
<td>5. CONCLUSION</td>
<td>2</td>
</tr>
</tbody>
</table>
1. **INTRODUCTION**

A house identified as requiring remedial action had a concrete block basement with water leaks at the footing and through the block walls at the rear corner of the house. As there was an evident connection to the soil in this area, and usual remedial materials will not adhere to wet surfaces, it was decided to seal the outside surface of the wall in this area to prevent the entry of water and soil gas. If this area was the major entry route for soil gas, this would also reduce the average $WL$ in the house. The method proposed was to

- Excavate area and check weeping tile
- Reroute downspouts so that rain water discharge was no longer by basement wall
- Place bentonite panels and tubes along affected wall
- Backfill

2. **DESCRIPTION OF WORK**

Excavation showed that weeping tile in the corner was intact and in good working order, but was placed above the footing by a few inches. The tile was removed and replaced with flex weeping tile properly located at level of footing.

Non-hydrated bentonite clay is supplied laminated between two layers of paper in panels about 125 cm x 125 cm, or inside a soluble plastic tube about 5 cm diameter by 2 m long (Hydro-bar). A partially hydrated clay (Joint Seal) is supplied for use as an adhesive.

The exposed wall was allowed to dry, and cleaned with wire brushes to remove loose material. The clay tubes were then placed along the footing, and Joint Seal applied about 1/8 inch thick over concrete block wall. The panels did not stick at all to the Joint Seal. Nailing the panels to the wall was rejected, as it would produce penetrations of the clay and the wall, and so the panels were braced against the wall with wood supports to allow backfilling. However, it was not possible to avoid disturbing the panels, and after about 3 feet of material had been placed in the hole, it was clear that this would not be satisfactory.
The area was re-excavated and the walls and footing cleaned. 'Joint Seal' was re-applied, and small areas of block wall were cleaned off and epoxy applied as an adhesive for the panels. Complete panels were butted together with a one foot section of panel taped over the joint to close it. 'Hydro-bar' tubes were placed along the entire length of exposed footing.

Gravel backfill was placed by hand to 10 cm above the top of the new weeping tile and compacted. Hand filling was continued in 30 cm layers to finished grade.

The rain water leaders were modified so that the discharge was led clear of the house and ran directly to the ditch at the front of the house.

3. **RESULTS**

Within a week the wet area within the basement dried up. No further water has appeared in the basement even after extremely heavy rainfall. The average WL in the house also decreased to below criterion.

4. **COMMENTS**

The edges of the panels were easily damaged and therefore required careful handling. This is difficult to achieve under field conditions.

The panels would not adhere to the clay adhesive. The use of epoxy as an adhesive to hold the panels onto the wall without nailing was found to be adequate. Overlapping panels may be suitable for water prevention but the junction is not satisfactory as a gas seal.

5. **CONCLUSION**

It is probable that diverting the roof discharge away from the house and locating the weeping tile in the correct location alone would have prevented further inflow of water to the basement.

The reduction of radon levels is probably due to the sealing of openings (probably at the wall/footing joint) by the layers of Joint Seal and Hydro-bar. This may also have had an effect on the water inflow.
It is unlikely that the bentonite panels themselves played a major part in the reduction of radon entry into the basement. The panels were not in place long enough for the clay to hydrate and the paper to degrade before the reduction in WL was noted.

A similar job was performed at another house at the same time, only a polymeric coating Tremproof 90 V was used. The cost of materials was lower, and the time involved was less. For field use, Tremproof 90 V is easier and cheaper to use than bentonite panels.