EXECUTIVE DEPARTMENT
OFFICE OF GENERAL SERVICES
DESIGN AND CONSTRUCTION GROUP - DIVISION OF DESIGN

PROFESSIONAL CONSULTATION REPORT

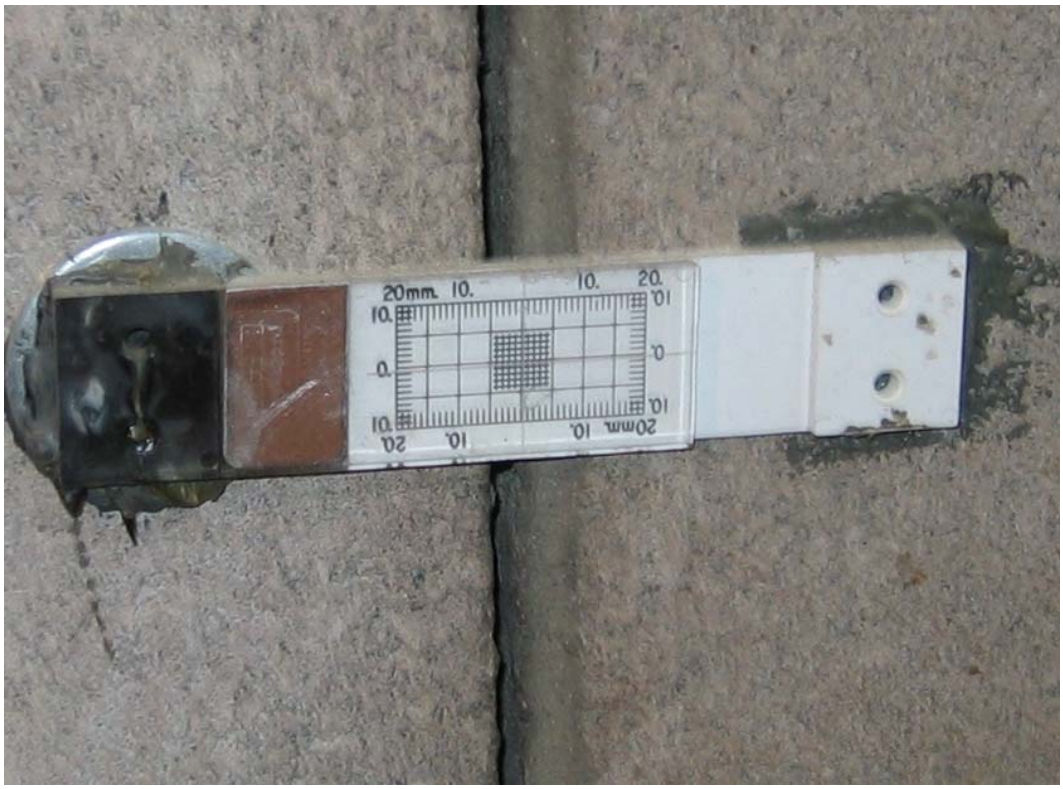
Structural Survey S1390 March 21, 2005
Study Backboard Structural Support
Building No. 16
Rochester Psychiatric Center
1111 Elmwood Avenue
Rochester, NY 14620

On February 22, 2005, David Hodgkins, Structural Engineer from our office, inspected the Rochester Psychiatric Center Building 16, with Tom Cutter, the O.G.S. Construction Engineer for the facility. The objective was to determine the adequacy of the gymnasium basketball backboard support structure to support a new backboard of additional weight, and to evaluate the condition of the supporting walls in the gymnasium. Additionally, an investigation was made into the cause of spalling concrete in the adjacent pool roof structure.

FINDINGS

BASKETBALL BACKBOARD SUPPORT: The existing basketball backboard is mounted to a support frame which holds the backboard approximately eight feet off of the concrete block wall. Vertical support is provided by two cables which run upwards at a 45 degree angle from the backboard edge of the frame to the concrete block wall, 8’ above the backboard frame. Each 3/8” diameter cable is attached to an anchor which runs through a 2x8 x 2’-0” long board mounted vertically against the wall. Additional each board has three more anchors passing through it, assumable anchored into the concrete block wall.

GYMNASIUM WALL CRACKS: The gymnasium walls are concrete block constructed without contraction joints. There are cracks in the walls at the corners, these cracks are primarily vertical, but occasionally follow a horizontal block joint, and then continue vertically. Crack gages were installed eight years ago by the Dormitory Authority of the State of New York. This indicates that the cracks were a concern at that time. Crack gages are set on zero when they are installed. Currently they indicate that the cracks have widened from 0 to 2 millimeters, which corresponds to 0 to 1/16 of an inch.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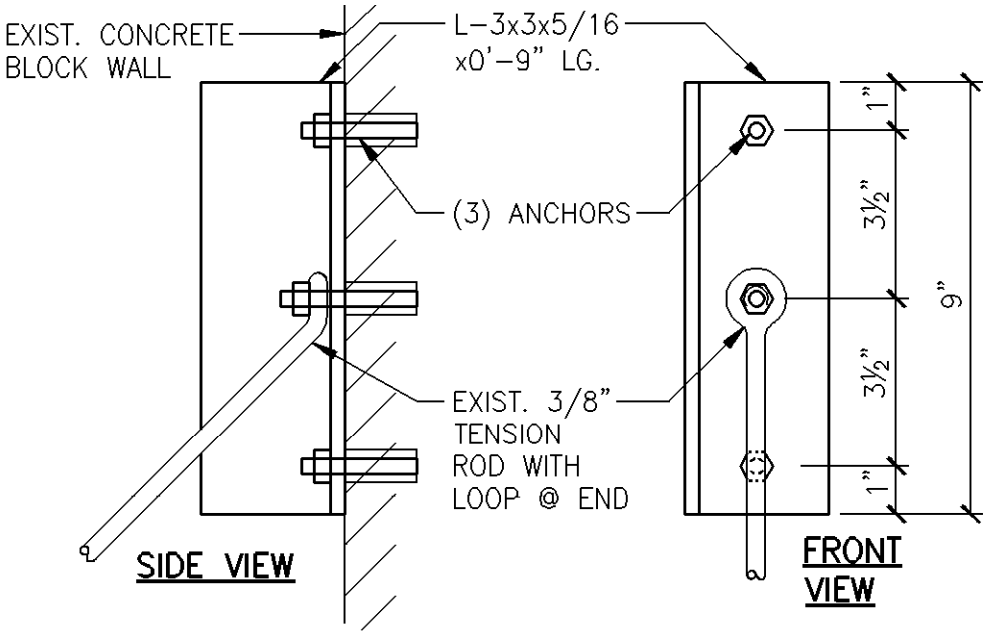
SPALLING CONCRETE AT POOL: The pool room is constructed with a precast ‘T beam” roof structure. They bear on concrete beams at the long walls of the pool room. There are steel weld plates at the T-beam ends that are welded to the supports. The West end of the South window wall exhibits a fair amount of spalling of the concrete below these plates. There is a concrete joint at the T-beam bearing elevation, below which the concrete is darkened from wetting and shows white efflorescence deposits at the bottom of the dark wetness stain. Additionally the North-West and North-East corners of the wall and roof intersection are stained from water infiltration. See photographs on page 9.

ANALYSIS AND RECOMMENDATION

BASKETBALL BACKBOARD SUPPORT: Currently the backboard tension rod anchorage is probably more than adequate for the new backboard weight. However verification would be required. One method would be to remove the current support boards and all of their anchors, and then performing pull out testing on the installed anchors. The second method would be to perform a load test on the existing support structure. This would involve suspending weights, equal to twice the design loads, from the structure for 24 hours. If the structure doesn't fail then the anchorage is acceptable. The third method is to install new anchors, of known capacity, to safely carry the anticipated loads. This is our recommendation since it is the least expensive and the easiest to perform. The design loads for these anchors would exceed the weight of a 100 pound backboard, the existing support frame, and the weight of a 300 pound person hanging onto the net. Even though the hoop will be breakaway, it is still possible for a person to hang onto the net. The existing 3/8' diameter rod is more than adequate, so it will be reused and anchored adjacent to the current anchorage location (just inward from their current location.).



NOTES: 1) TURNBUCKLE AT OTHER END OF RADIUS TO BE TIGHTENED UNTIL RODS IS TAUGHT
2) TWO REQUIRED PER BACKBOARD
3) ANCHORS TO BE POWER/RAWL 5/16" "DOUBLE", EMBED 1½", FOLLOW MANUFACTURER'S INSTALLATION INSTRUCTIONS.
4) HOLES IN ANGLE TO BE 3/8" DIAM.

SUPPORT DETAILS

GYMNASIUM WALL CRACKS: The cracks most likely developed soon after construction and building enclosure, due to normal concrete block shrinkage. The original design provided no contraction joints although the short wall should have had at least one vertical caulked joint to accommodate shrinkage, and the longer walls should have had two joints to accommodate shrinkage. The change in the last eight years is minimal (1/8" maximum). These cracks are not detrimental to the structural performance of the building. Our recommendation is to caulk the vertical segments of the cracks, and to repoint the horizontal segments of the cracks.

SPALLING CONCRETE AT POOL: The spalling of the concrete is due to corrosion of the T-beam steel anchor plates. The same source of water is wetting the concrete below the T-beam bearing elevation and causing the dark stain in the concrete. This water which is absorbed by the concrete dissolves salts from the concrete. These salts are left behind on the concrete surface when the water evaporates. This is the cause of the white stain, known as efflorescence, visible below the dark water stain. Pool room moisture conditions are not both wetting the concrete and allowing the concrete wall to dry a few inches away at the same time. The moisture must be coming from outside of the room. Most likely there is a roof leak in the area above the T-beam bearing elevation. The spalling concrete is at the West end of the South wall, there is also water staining at the North-West wall and roof intersection corner, and the North-East wall and roof intersection corner.

On March 21, 2005, Tom Cutter of OGS inspected the Building #16 roof and found no obvious roofing leaks or problems, but apparently this roof has had previous leaks which were repaired under a Dasny contract warranty. Further investigation is necessary to determine if the entire roof should be replaced.

Our recommended action is to immediately remove loose concrete from the T-beam bearing locations. Locate and repair the source of the water infiltration at the three locations, or replace the entire roof if this is not practicable. If the water source is correctly identified and repaired, than the dark staining below the T-beam bearing should disappear, leaving only the white efflorescence stain on the concrete surface. The corrosion will need to be removed from the T-beam anchor plates and the plates should be painted with a corrosion inhibiting coating. Finally the spalled concrete should be patched.

Stopping the water infiltration in the immediate future is the only way to prevent further structural damage to the pool roof structure. Long term corrosion could lead to loss of T-beam bearing, which would create a hazardous condition in the future. If the water infiltration is not identified and repaired by September 1, 2005, then it will be necessary for a structural engineer to re-evaluate the pool roof framing. Until the water infiltration is eliminated additional concrete spalling is possible. Therefore it will be necessary to keep the area below the concrete spalling roped off to prevent persons from entering the area.

END OF REPORT