



**Randolph County Courthouse Building
110 South Main Street
Huntsville, Missouri
July 14, 2007**

INVESTIGATIVE ENGINEERING REPORT

General Structural Building Condition Investigation

**Randolph County Commission
110 S. Main Street
Huntsville, Missouri 65259**

PREAMBLE

Per your request on June 19, 2007, our office has performed a nondestructive investigation into the general structural condition of the courthouse building in Huntsville, Missouri. Greg Linneman, Structural Engineer, performed the investigation.

BACKGROUND INFORMATION

It was reported to us that there had been a large crack in the brick on the northwest corner of the courthouse building that was patched with mortar. We were asked to investigate this and any other items of structural concern that could be visually identified for the entire building.

PURPOSE AND SCOPE

The purpose for the investigation was to identify all visual structural issues. The scope of our investigation included the following:

1. Contact Mr. Sears the county clerk to arrange our investigation.
2. Perform site investigation.
3. Document the investigation with photographs.
4. Record findings and evaluate in a written report.

INSPECTION RESULTS

I met with Mr. Sears on the morning of June 19th. He and several other county employees identified issues that they were seeing on the interior of the courthouse building. After briefly visually identifying the areas of concern, I began my investigation at the exterior perimeter of the building.

As can be seen in photo #1 there was a large crack in the brick that starts at the foundation and travels to the top of the wall on the northwest corner of the main building that had been filled with mortar. Photos #2 and #3 show how this corner has moved relative to the cap at the top of the wall. Photos #4 through #7 show general deterioration of patches made to various stone elements along the west and southwestern perimeter of the main building. Photos #8 and #9 show a rod and channel element that have sunk into the brick wall in a very isolated area on the south elevation of the main building. Photos #10 and #11 show brick above openings on the southward elevation that have been replaced as is evident by the mismatched running bond. Photo #12 shows a crack that has been patched under a window along the southwest corner of the main building. Photos #13 and #14 show vegetation that has grown at the corner of the south vault and the southeast addition to the main structure. Photo #15 shows how water sits on the south vault roof due to the vegetation growing in the gutter system.

The next few photos are of the southeast addition to the main building. Photo #16 and #17 show some delaminated bricks near the top of the wall on the west face of the southeast addition to the main structure. The east elevation of this southeast addition is shown in photo #18, and a crack that has occurred both above and below one of the windows on this elevation is shown in photo #19.

The following are issues found at the perimeter of the northeast addition to the main structure. As can be seen by photo #20, the expansion joint between the main building and the northeast addition is quite large and is no longer functioning as originally intended. Photo #21 shows a crack that has developed under a northward facing window, and photo #22 shows the west side of the addition where it connects to the main building. As can be seen by photo #22, the brick from the addition was placed on top of the stone base of the main structure, and a crack has occurred at this location.

The following are issues found at the north vault structure and the northwest addition to the main building. As can be seen by photo #23, there has been a repair on the northeast corner of the vault, and it has a bit of an outward bulge. Photo #24 shows how the north vault is tied into the brick on the main building. Photo #25 shows a deteriorated expansion joint from the main building to the northwest addition.

The remaining exterior perimeter photos show the north face of the main structure. Photo #26 again shows some patches along the stone base that have deteriorated. Photo #27 again shows some brick that has been patched as is evident by the mismatched running bond. Photo #28 shows a well installed rod and plate at the roof level, while photo #29 shows a poorly installed rod and plate on the northwest corner at the roof level.

My next step was to investigate the interior of the building. There were several locations identified by county employees where the roof or perimeter wall had leaked as was evident by stains on the ceiling tile. However, above the drop ceiling line was another fixed ceiling, so little was discovered with regards to roof leaks. I was able to get into the attic space of the main building, which is really the original second floor. Apparently, the northwest corner of the building, where the large crack had occurred, was the original stairwell. I used an access hole in the ceiling in this area to access this stairwell, and thus climb up onto the original second floor. My main area of concern was to see the interior portion of the northwest exterior wall where the large crack occurred on the outside of the building. Mr. Sears had indicated some mortar had been crumbling from behind the paneling in this area as is evident in photo #30. Photos #31 and #32 show the extents of the large crack at the northwest exterior wall from inside of the original stairwell. This crack was over an inch in width and traveled below the ceiling line. Also, the brick at the crack appeared to be loose. Generally, my roof structure investigation was isolated to a small area along the west side of the main structure, but I saw nothing of concern.

After my investigation, I reported my findings both to Mr. Sears and to the County Commissioners that were present on the day of my investigation.

CONCLUSIONS

It is our opinion that most of the issues that were found are currently cosmetic. However, there were two items that we feel will need to be addressed in the near future, first being the large crack in the brick at the northwest corner of the main building and second, the rod and plate/channel connections that have over time sank into the brick.

Our concern with the large crack in the brick at the northwest corner of the main building is that the bricks on the interior of the building appear to show deterioration due to water infiltration. The brick mortar at the interior portion of the wall in the vicinity of the crack appears to be in a very delicate state, and thus making the wall susceptible to losing bricks to the interior of the building. Also, the inside row of brick is now carrying some of the roof load at this corner of the building, which will also increase the likelihood of the wall shedding bricks to the inside of the building.

Our concern with the rod and plate connections at the roof level on the exterior of the main building is that the rod and plate may not be providing the support to the wall as originally intended. We believe that this rod connection was installed to provide support for the end walls when the second story of the main building burnt. We recommend that the brick behind these existing connections be repaired and that a new larger bearing plate be installed that will distribute the load over a larger area and prevent the likelihood of the bricks to sink into the wall in a localized area as is now the case.

The general deterioration of patches to the stone features, delamination of bricks, isolated cracks, and expansion joint issues all will require attention in the next year or two. The main concern is that each will allow water to get inside of the wall cavity and with freeze and thaw cycles will eventually cause the wall structure to deteriorate. The deteriorated patches on the stone should be removed and replaced properly, the delaminated bricks should be replaced, and the expansion joints should be reinstalled properly. Also, the building should be tuck pointed and sealed at that time and a regular maintenance program should be implemented. Lastly, any aesthetic issues as with the brick patches that were installed without fingerings in the bricks can be addressed at that time.

The cracks should be addressed one by one. For example the crack above and below the window in the east wall of the southeast addition to the main building is caused by the long stretch of brick not having an expansion joint, which is typically installed every 20 to 30 feet in one continuous wall. Since this crack will continue to operate as an expansion joint, opening and closing, this crack can be sealed with a silicone sealant that will expand and contract with the crack movement. The crack where the brick is placed on top of the stone base of the main building at the west side of the northeast addition will need to be disassembled and properly rebuilt to allow for the added structure to move independently of the main building. The problem being that the addition is trying to settle, which is typical for all newer structures, and the main building has mainly finished settling.

The last item of concern is the ivy growing on the south elevation at the vault. This vegetation is causing the gutter to clog and is allowing water to sit on the roof of the vault. This vegetation is also seriously close to the power inlet to the building and will cause future problems. Lastly, this vegetation is allowing moisture to stay in direct contact with the exterior surface of the brick wall for long periods of time, which can also contribute to water infiltration. Obviously, the vegetation should be removed.

Once the large crack and the rod and plate connections are repaired, we believe that the building should perform structurally as any building of this age and type. However, the building does need maintenance in the near future to prevent future issues caused by water infiltration. We recommend that once the water infiltration issues are repaired and the

building has been sealed, that a maintenance program be implemented to determine when future sealers and repairs should be done so that the building will continue to perform well into the future. We have also attached a short list of qualified contractors along with some very preliminary cost estimates to make the recommended repairs.

Our conclusions are based on information made available to us at the time of our investigation. Please note that our investigation was limited to a non-destructive nature and only represents items that were visible during our time on site. Should additional information be made available, we retain the right to revise or supplement our report accordingly. We trust this is the information you require. Please call if we can provide you with any further assistance in this case.

Respectfully submitted,
LJB ENGINEERS AND ARCHITECTS

A handwritten signature in black ink, appearing to read "Gregory L. Linneman". The signature is written in a cursive, flowing style.

Gregory L. Linneman, P.E.
Structural Engineer



PHOTOGRAPHS

Photo #1



Photo #2



Photo #3

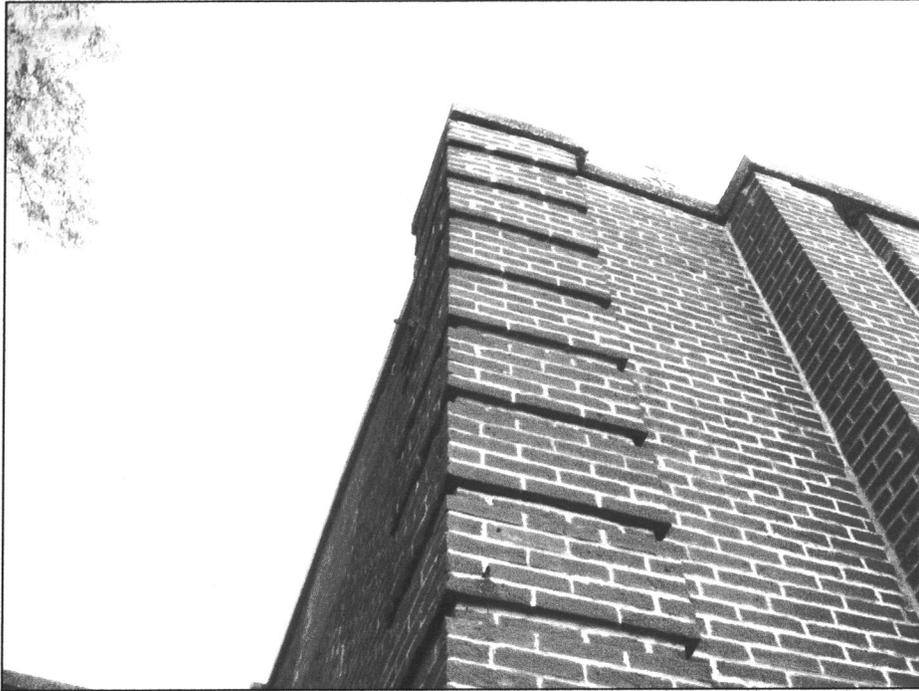


Photo #4



Photo #5



Photo #6



Photo #7



Photo #8



Photo #9

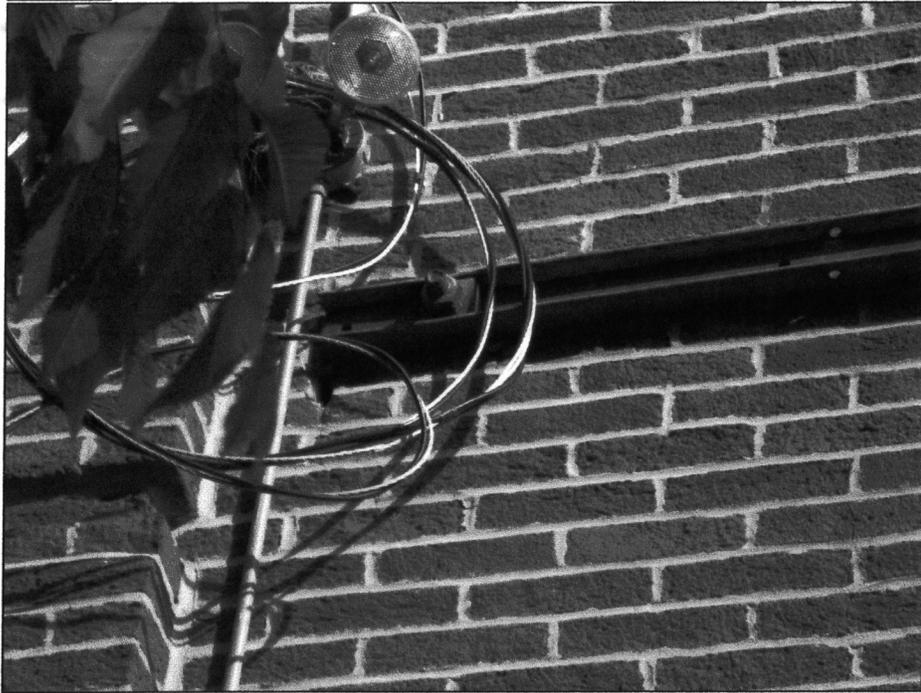


Photo #10



Photo #11



Photo #12



Photo #13



Photo #14



Photo #15



Photo #16



Photo #17



Photo #18



Photo #19



Photo #20



Photo #21



Photo #22



Photo #23



Photo #24



Photo #25



Photo #26



Photo #27



Photo #28



Photo #29



Photo #30



Photo #31



Photo #32



SHORT LIST OF QUALIFIED CONTRACTORS

Wulff Brothers Masonry
1101 Lakeview Avenue
Columbia, Missouri 65203
(573) 874-2323

J.L. Heath Masonry
3460 State Road J
Fulton, Missouri 65251
(573) 489-5039

Mike Zekoll Masonry
RR #1 Box 22
Jonesburg, Missouri 63351
(660) 338-2988

PRELIMINARY ESTIMATE OF COSTS

- Repair to northwest crack and rod plate repair
 - Estimated \$20,000 to \$30,000
- Tuckpoint, repair, and seal brick and stone
 - Estimated \$30,000 to \$50,000