

RA Longview Portico stone

- Aug 21st 2024
- Ray Elkins
- D&R Masonry
- 8890 SE McLoughlin Blvd, Portland OR 97222
- RE: Condition Assessment for located at 2903 Nichols Blvd, Longview WA 98632.
- Structural observations performed by **Kyle Kraxberger**

At your request, on Aug 1st 2024 we visited the above referenced property. The purpose of our visit was to:

- Observe the building's front entrance portico due to large cracks in the beam. DCI was asked to assess the structural integrity of the overhead stone at the building's portico.
- Provide a due diligence review/condition assessment of visible structural elements and the building façade.
- Observe the structural framing and identify visible structural deficiencies as well as signs of settlement and distress.

1. EXECUTIVE SUMMARY

- The cracking is most likely caused by differential settlement. It is unclear if the settlement is still on going. The settlement appears to be very slow based on the age of the building and the cracking observed on site.
- Helical ties should be added vertically in bottom stones for additional reinforcement.
- After the removal of the south bottom stone, DCI did not observe any additional loose or critically failing stone that required immediate attention.

2. REPAIR RECOMMENDATIONS

South Bottom stone

We recommend replacing the stone with a similar cast stone making all attempts to match the color, shape and size. The stone should have internal steel reinforcement to prevent future cracking and spalling. The attachment of the stone should be per the Appendix, figure 4.

All Stones

While not required we recommend adding additional helical ties to all bottom stones as shown in figure 5.

3. GENERAL INFORMATION

- The VA High School building is a 2 - stories public school.
- Original structural drawings were not available.
- We were accompanied on our visit by Ben Meafoou of D&R. Access was available for our observations from a scaffold, a high-lift and inside the attic space.
- The date of the original construction was 1927 per a stone carving at the entrance of the building.
- The building is currently occupied.
- Generally, the floor and roof framing consist of light framed wood construction, the perimeter wall construction is Unreinforced masonry roughly 12" thick at the roof.
- This report is based on a review of open/visible elements.

Portico Framing

- The primary support for the Portico is (2) back-to-back steel channels with flat unreinforced cast stone top and bottom. The two stones are tied together with embed steel anchors (see photo # 1).
- This element spans between either two columns or a column and the building (see photo #2).
- This element bears on the URM wall and supports the roof framing as well as a concrete ceiling slab.

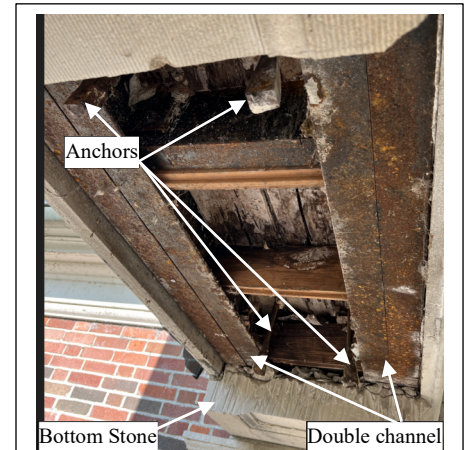


Photo 1: Portico Framing

4. ANALYSIS & DISCUSSION

Cracks in concrete and masonry are common and have a wide array of sources. One of the more common sources of cracking is settlement. The damage observed to the concrete beam appears to be caused by long term differential settlement. Settlement is a complicated process depending on several factors such as the weight of the building, the composition of the soil and the amount of water moving through the soil to name a few. Settlement can will occur during the construction of the building or occur throughout the life.

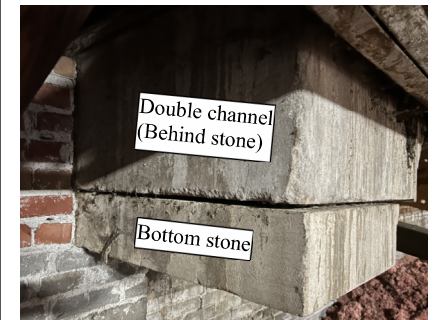


Photo 2: Portico Stone inside attic space

The length, severity, direction and width of cracked elements also depend on many factors. In the case of the bottom stone the lack of reinforcement combined with the high stiffness and size of the anchors most likely played major roles. It is better to have embedded anchors to bend, twist and deform outside of embed portion instead of inside. As an analogy embedding a steel cable will allow for a high level of movement without passing the movement into the embed portion. This is in contrast to the portico's stone framing as the connection is very stiff and the stone very brittle. This means any movement, such as settlement, will impose loads through the anchor and crack the stone.

Based on our observations it appears the VA Longview's two corner columns of the portico have settled more than the two interior columns. Settlement cracks tend to be diagonal but not exclusively. Other cracks and minor spalling were also observed supporting settlement our conclusion.

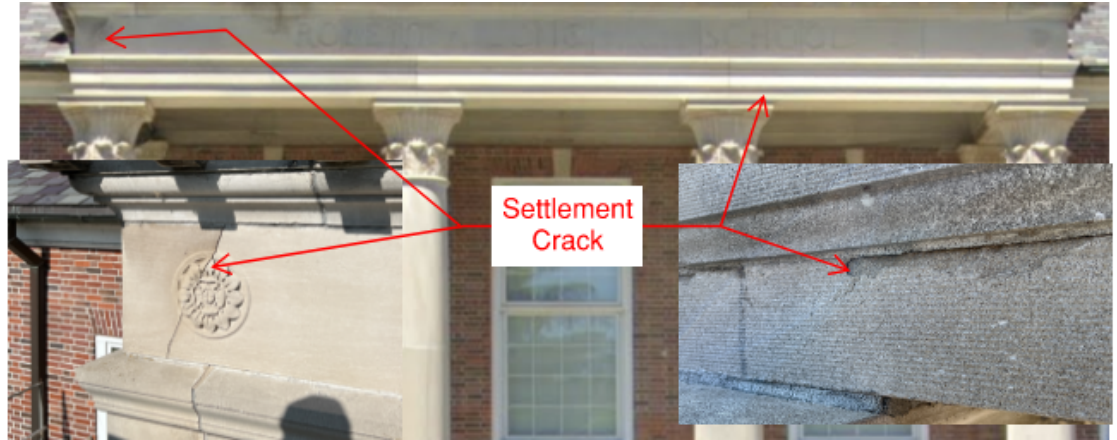


Figure 1 Front elevation and settlement cracks.

Settlement mitigation

Settlement can be slowed but not stopped entirely, by adding deep foundation elements such as micro piles. Micro piles are steel rods drilled or driven deep into the ground, often over 50ft, and then a steel bracket is attached at the foundation. These elements will need to be added in triplicate or more under each column for stability reasons. This is a very expensive solution and will require additional exploration in the form of soil borings and structural analysis.

Historic Society

Sine this building is on the national historic registry the repair will most likely require reviewed by the State historic and Preservation Office (SHPO). SHPO has a 90day review period with each subsequent submittal taking 90days.

As mentioned, the bottom beam is in three parts tied together through large diameter anchors. To replace the bottom stone would require removing the double channel as well as the stone above. This in turn would require shoring the ceiling slab and roof framing. It is very possible to cause more damage removing and replacing the stone then to introduce two new construction joints so we can simply replace the stone.

However, the introduction of the new construction joints will most likely need approval through SHPO prior to the construction.

5. LIMITATIONS/DISCLAIMER

This (conditions assessment/due diligence study/feasibility study) report is not intended to identify all defects in existing workmanship, damage or failures. It is intended to identify basic structural systems as well as conditions/deficiencies that are likely to be structural hazards. This report is based on site observations of exposed-to-view structural members in the area of concentration and does not address any portions of the structure other than those areas specifically mentioned. Nor does it provide any warrant, either expressed or implied, for any portion of the structure. Drainage, insect activity, moisture proofing design, mechanical systems evaluation and hazardous materials removal are outside of DCI's scope of services.

6. RESOLUTION OF DEFICIENCIES

Design and documentation for implementing the recommended repairs suitable for bidding and construction are beyond the scope of this report. If requested, our office would be glad to provide a proposal to assist your office in developing construction level documents to resolve the observed deficiencies.

If you have any questions or require any additional information regarding this report, please do not hesitate to contact our office.

Signature


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Appendix

Repair Recommendations

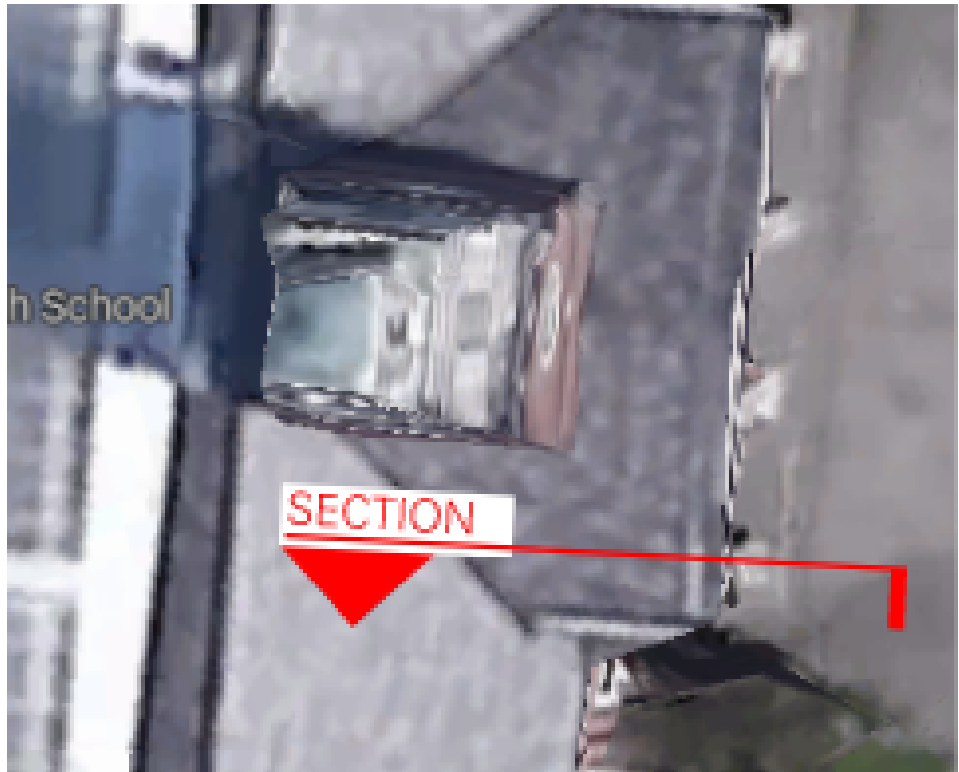


Figure 2: Site Map

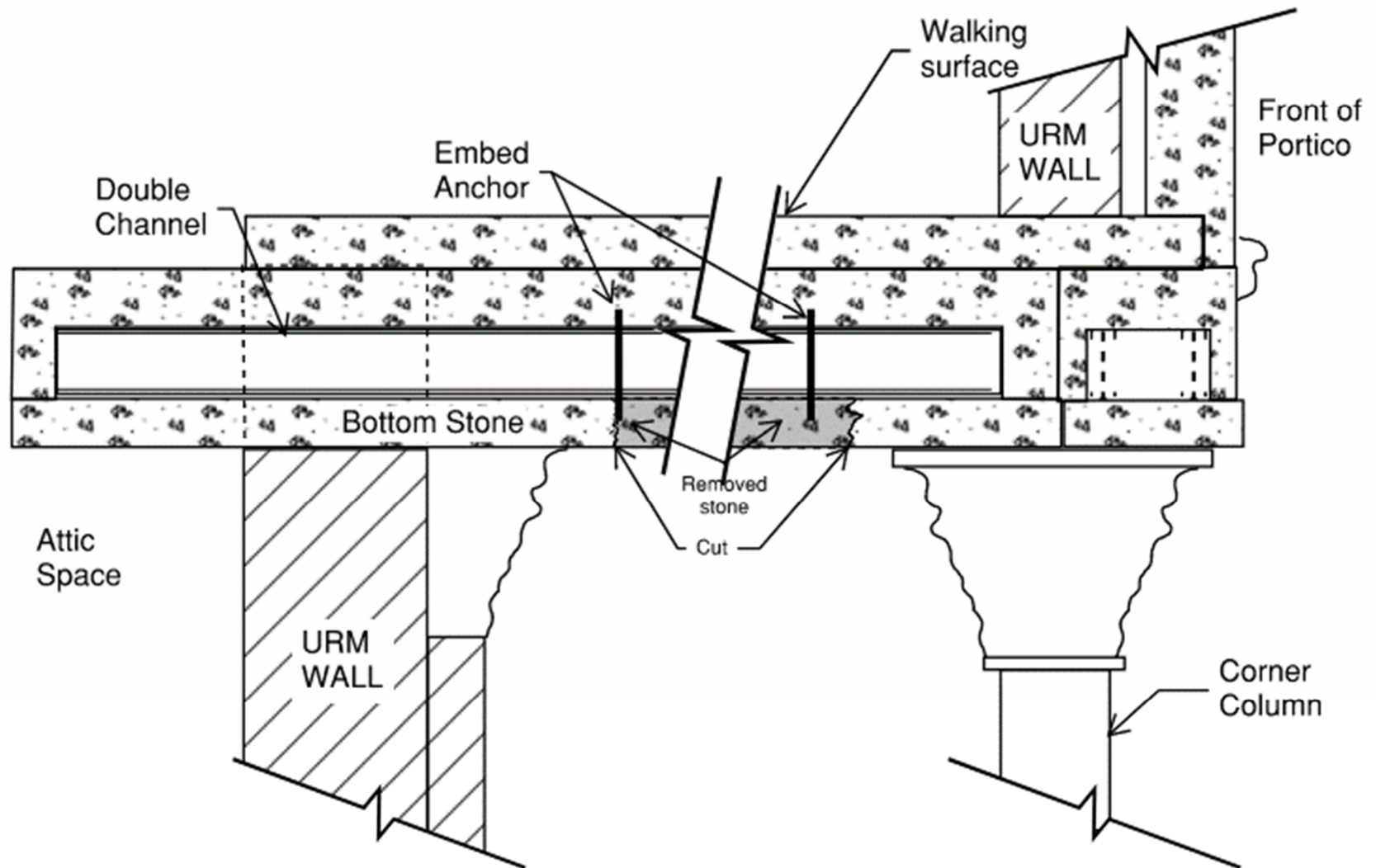


Figure 3: Current Condition

Figure 4: Stone Replacement

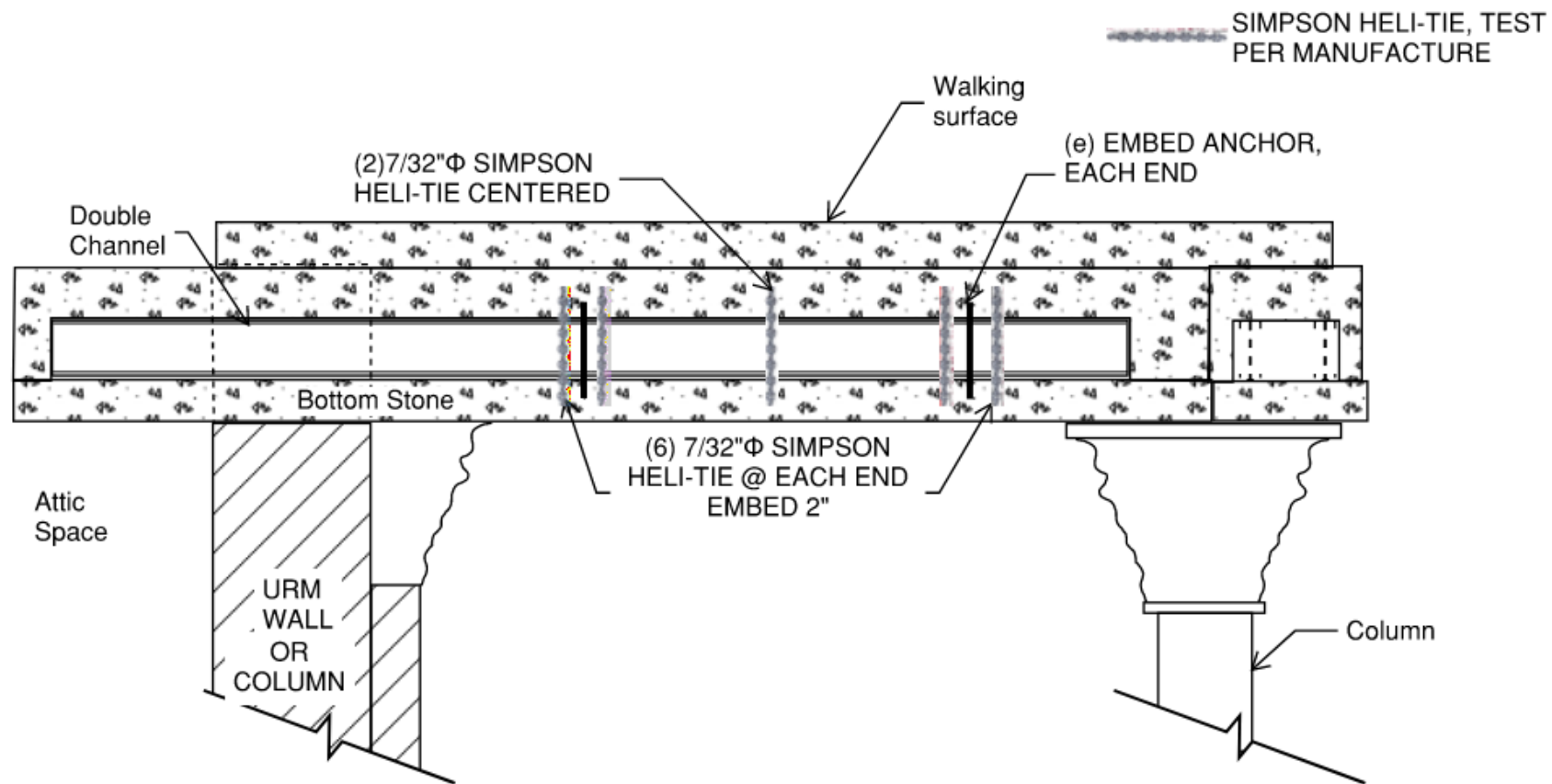


Figure 5: All stone reinforcement