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ENTUITIVE

July 31, 2014 (Revised)

Christine Perrin
Montgomery Ross & Associates
400, 1414 – 8th Street SW
Calgary, AB T2R 1J6

Re: Westmount Place (1100 8th Avenue SW)
2014 Post-Tension System Update Testing – Summary Report
Entuitive Project Number: C014-0749

Dear: Ms. Perrin,

As outlined in our proposal dated June 3rd, 2014 Entuitive has completed an investigation update testing of the post tensioned strands at the Westmount Place building located at 1100 8 Ave SW, Calgary, AB. Site work was completed by July 24th, 2014. The following is a summary of our review.

1.0 DESCRIPTION OF STRUCTURE

Westmount Place, located at 1100 8 Ave SW, Calgary, AB, is a 27 story residential/commercial building with a four level underground parking structure. Architectural/ Structural drawings produced by Clark James Coupland Architects dated 1982 detail concrete flat-slab floor slabs supported on column capitals and concrete columns. The columns are reinforced using conventional mild steel. The floor slabs are reinforced using a combination of conventional mild steel and unbonded post-tensioned strands.

2.0 DESCRIPTION OF POST-TENSIONED SYSTEMS

Unbonded post-tensioned strands are placed in their final locations prior casting of concrete. Once the concrete is placed and cured, the strands are tensioned to provide structural capacity to the floor slab. The strands are fabricated from multiple wires enclosed in a plastic sheathing. The space between the strand and the sheathing contains grease to lubricate the strand and inhibit corrosion.

Post-tension strands are susceptible to corrosion deterioration in higher-risk exposure conditions such as parking decks, below grade construction, and discontinuities in the building envelope. Moisture can access the strands at end anchorages or through cracks in the concrete where the strand sheath has been compromised. Damage can also occur due to improper handling during construction, strand slippage at the anchors during original stressing, brittle wire cracking, or coring/drilling after construction.

Strand failure (i.e. loss in strand tension) can result from one or more of the above noted occurrences. A loss in strand tension will reduce the load carrying capacity of the structure.

Consequently, periodic monitoring is recommended to identify any changes in strand tension in a timely manner.

3.0 OBSERVATIONS

The following observations and discussion are based on our assessment of the unbonded post-tension strands accessible at inspection recesses installed on the underside of the suspended parking level, ground floor, upper floor, and roof slabs.

3.1 Ground Floor and Suspended Parking Levels

Penetration testing was completed on 227 strands at 70 available inspection recesses in the ground floor and suspended parking level slabs. As of the current testing, six strands were detected as having full tension deficiencies, five strands were noted as having partial tension deficiencies and 3 strands were notes as having corrosion issues.

3.2 Residential/Commercial Tower

Penetration testing was completed on 60 strands at 21 available inspection recesses in the upper floor and roof slabs of the office tower. As of the current testing, three strands were detected as having full tension deficiencies and four strands were noted as having partial tension deficiencies.

4.0 DISCUSSION

Partially tension deficient strands are classified as strands where one or more of the individual wires comprising the strand are tension deficient but at least one of the wires remains under tension. All wires without tension in a strand are classified as fully tension deficient.

The tension deficiencies could be the result of mechanical damage, strand slippage, stressing defects, or moisture contact during original construction or through defects in the waterproofing. Removal of a tension deficient strand could also be completed to determine the cause of the tension deficiency. In cases where strands have been removed for full length examination, moisture, if present, is typically observed at anchor locations as well as along various locations of the strand (i.e. the strand may be exposed to moisture even though it was not identified in the inspection recess).

The previous report noted deterioration in parkade level 1 floor slab from two stands in 2010 to four in 2012. During the current testing, five fully tension deficient and one partially tension deficient strands were noted in this area. This is an increase from 2012. These strands are within the recess panels P1-11, P1-12 and P1-13 (See APPENDIX B – Recess panel locations). It appears that deterioration of the post-tension system is progressing in this area. A capacity analysis of the structure will identify the amount of breakage allowable prior to repairs being required.

Regular testing of the strand tension at all existing recesses will provide an indication if loss in tension is occurring and allow a timely initiation of remedial repairs.

5.0 RECOMMENDATIONS

In light of the above observations and discussion, the following recommendations are presented for your consideration. Please note that GST would be in addition to the budget presented below.

5.1 CAPACITY ANALYSIS

Completion of a capacity analysis of the parking level 1 and 5th floor will confirm the level of tolerable strand breakage prior to replacement of strands being required.

5.2 POST TENIONING SYSTEM MONITORING

Given the current changes in tension, tension testing of the post-tension strands at existing recesses is recommended on an annual basis. The next update test should be scheduled for July 2015.

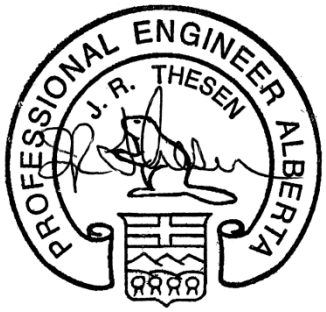
6.0 CLOSURE

Trusting the above addresses your immediate requirements; we remain available to answer any questions or to proceed with the recommendations presented above.

Sincerely,

Entuitive
APEGA Permit to Practice No. P11274

Reviewed By:



July 31, 2014

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