Thornton Tomasetti

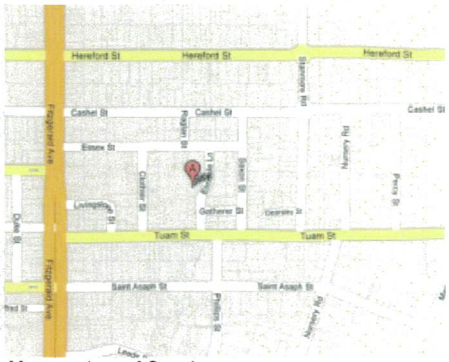
Initial Report

PROJECT NO	C11090.00	DATE	6th June, 2011
CLIENT FILE NO	174289	FROM	R Autenrieth, K Jackson
PROJECT NAME	Gary Lee Electrical	ADJUSTER:	Crawford and Company – Stuart Mintz
PROJECT LOCATION	7 Elmdale Lane Christchurch, New Zealand	INSURER:	Chartis

The following comments and observations are based upon a brief initial review only, and are not intended to be all inclusive.

Location

The building is located at 3-15 Elmdale Lane in Linwood, Christchurch, as shown below.



Map courtesy of Google

Introduction

The building is a single storey retail development and is approximately 770 square meters in area. The building is divided into seven spaces for individual tenants, and each space is denoted with an odd-numbered numerical address from 3 through 15.

Thornton Tomasetti (TT) visited the site with Crawford and Company on 25th May 2011, to survey the building damage due to the M6.3, 22nd February earthquake. TT was able to survey the majority of the exterior of the building, and gained access to units 3, 5, 7 and 9. We did not observe units 11, 13, or 15, as we were informed that they sustained no apparent damage. At the time of our visit, the entrance to unit 3 was marked with a green placard indicating "No restriction on use or occupancy" (Photo 1).

Each unit is separated by concrete tilt-up wall panels, and the majority of the exterior walls are concrete tilt-up panels. At each exterior wall panel joint observed, TT observed concrete columns, or concrete-encased steel columns, that extend to roughly half of the panel height (Photo 2). The ground floor of each unit is a concrete slab on grade. The roof structure consists of light gauge steel purlins that span in the north-south direction and are supported by steel ledger angles bolted to the tilt-up concrete walls. Lateral loads are resisted by the concrete wall panels.

Observations

The primary type of damage observed at the building was cracks in the slab on grade (Photo 3). Although many of the cracks observed appear to be located at control joints in the slab, or at the interface between the slab and what is presumably the strip footing below a concrete tilt-up panel, TT also observed irregularly shaped cracks within the field of the slab. During the earthquake, liquefied soil reportedly flowed up through the joints and cracks, causing portions of the slab became unlevel. Soil liquefaction and the resulting cracks also caused damage to the floor finishes in units 7, 9, and a portion of unit 3. The other units observed did not have finished floors.

In unit 3, TT observed separation between an exterior wall panel and the adjacent half-height column (Photo 4). TT observed a separation of approximately 1mm between panels at two panel joint locations at demising walls between units (Photo 5). Markings on one of the panels indicate that some of the separation observed may have been noted after the September 2010 earthquake.

From the exterior of the building, TT observed isolated shallow spalls in the concrete wall panels. The spalls were primarily located at intersections between perpendicular wall panels (Photo 6).

Damage Summary		
	Nonstructural	Structural
	Isolated interior Gib board damage Damage to floor linings Separation at sealant joints	Isolated cracks in slab on grade Spalls in concrete wall panels
Damage Extent	0 -25%	0 - 25%

Repair Recommendations

TT recommends that the cracks noted in the field of the slab that are not located at control joints be repaired using an epoxy injection compound. Suitable products for this repair are Sikadur Injectokit – LV for cracks between 0.2mm and 0.4mm, Sikadur Injectokit – TH for cracks between 0.2mm and 2mm, or Sikadur 52 for cracks up to 5mm wide. Products from an alternate manufacturer with similar properties may be substituted.

Cracks that occur at a control joint, gaps that occur at construction joints, or at the joint between the slab and strip footing, should be re-cut if needed, cleaned, and filled with an elastomeric sealant, such as Sikaflex 11FC, or similar, applied over a backing strip.

At locations where adjacent slab edges are uneven across a crack or joint, the high points in the slab should be ground down so they are level with the adjacent slab. Low points in the slab that are between 5mm and 30mm in depth should be primed with Sika MonoTop primer, and filled with Sika MonoTop mortar, or a similar product.

At locations where the panel sealant joints have separated, TT recommends removing the existing sealant joint between panels, and replacing it with a new backing strip and elastomeric sealant, such as Sikaflex 11FC, or similar. Where concrete spalls were observed at the exterior face of the panels, TT recommends repairing the spalls with Sika MonoTop primer in conjunction with Sika MonoTop mortar, or with similar products. The contractor should ensure that the patching material is applied only to the spalls, and not across the panel to panel joints.

Please note, all of the products specified above (or equivalent alternate products) should be installed per the manufacturer's specifications.

Damaged Gib-board should be patched and repaired. Floor linings damaged as a result of slab movement or cracking should be replaced.

END OF REPORT

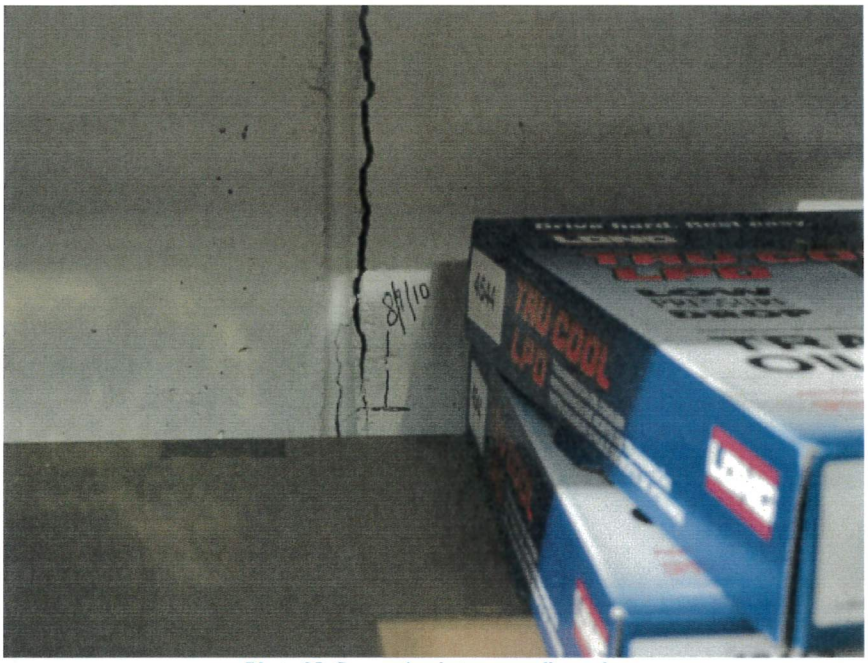


Photo 05: Separation between wall panels.

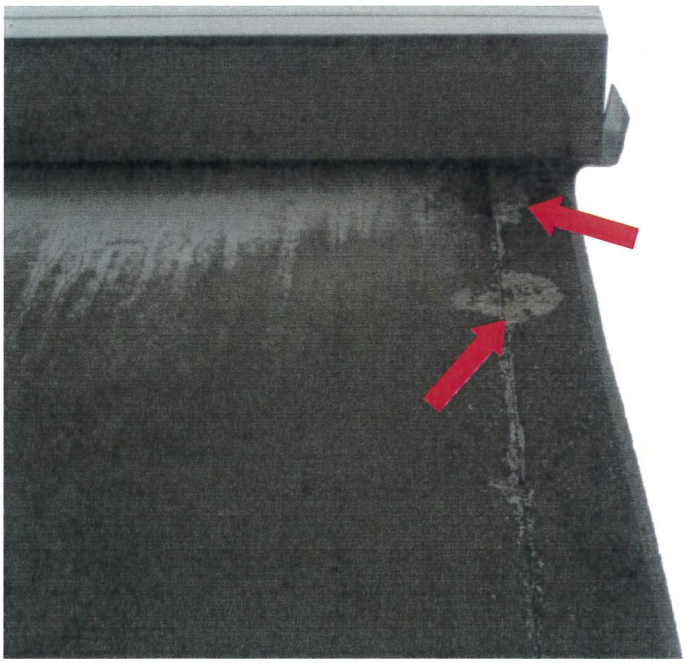


Photo 06: Spalls at exterior face of panel

Photo 03: Crack at control joint in slab on grade

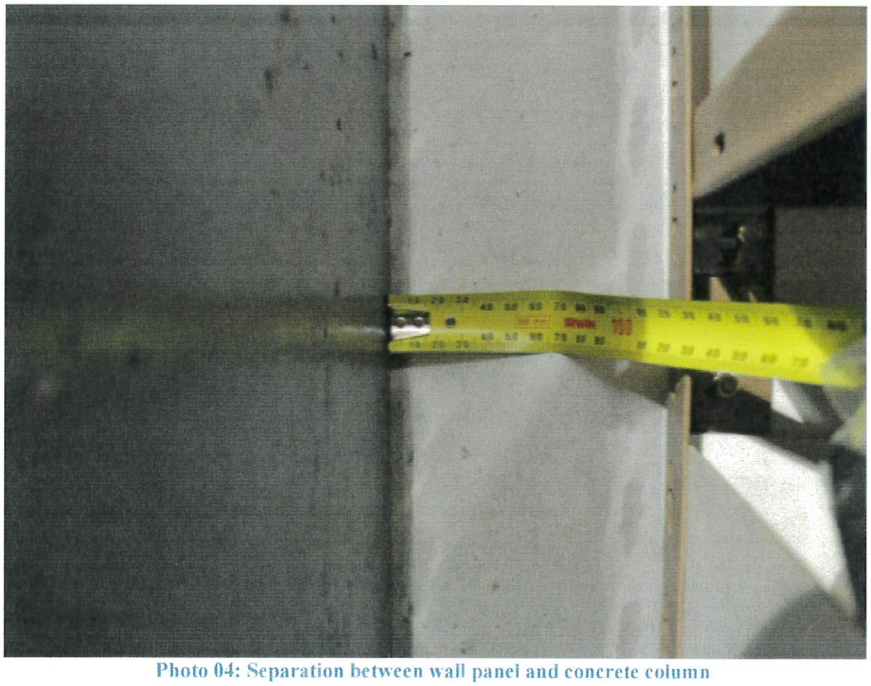


Photo 04: Separation between wall panel and concrete column

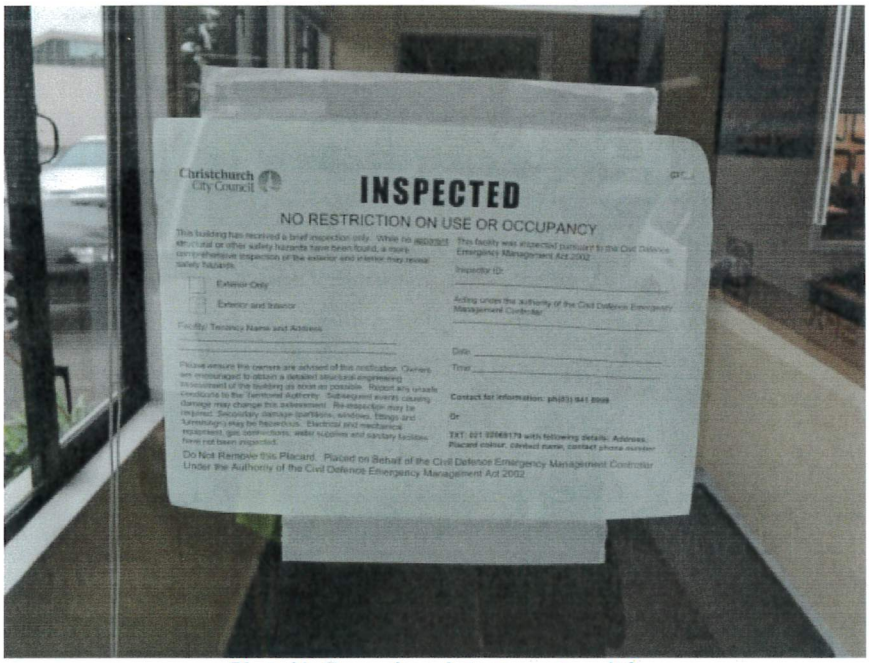


Photo 01: Green placard at entrance to unit 3

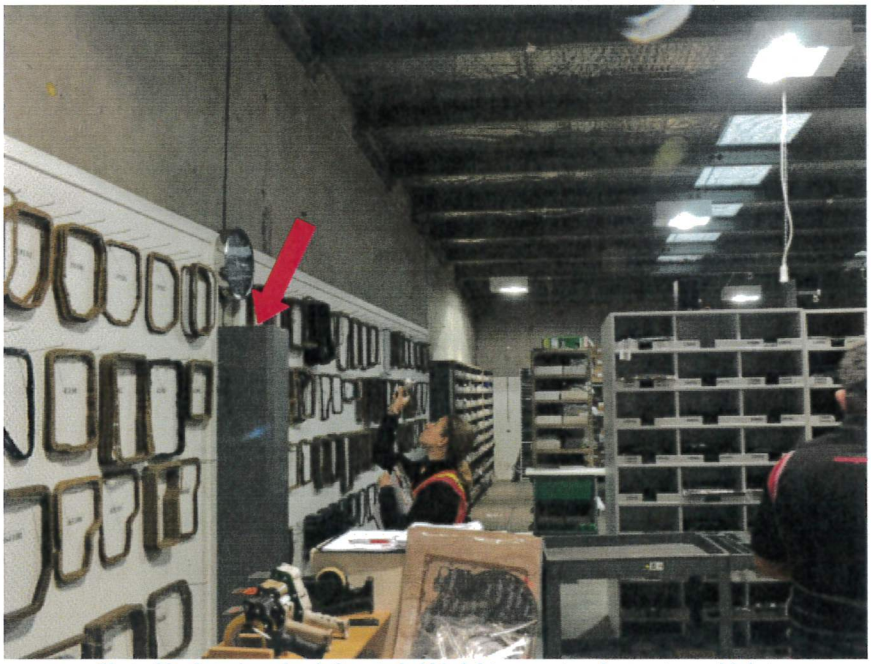


Photo 02: Interior of unit 3, note half-height concrete column at panel joint