

Severe damage to Manchester Courts

By Jason Ingham and Michael Griffith



Overview

160 Manchester Street is a 7-storey load bearing masonry office building and the most significant, in terms of height, masonry building in Christchurch. It has a heritage order on it and is a significant part of the fabric of the Christchurch city landscape. Unfortunately, it suffered significant damage in the earthquake. According to the New Zealand Historic Places Trust (refer <http://www.historic.org.nz/TheRegister/RegisterSearch/RegisterResults.aspx?RID=5307>) the bottom two stories are reinforced concrete while the top five stories have load bearing unreinforced masonry piers around the exterior of the building and steel frame internally (columns spaced roughly at 5 m) with timber floors throughout. The masonry piers, having dimensions of approximately 1200 x 900 mm, were badly cracked at levels 3 and 4. This was most likely due to the transition from concrete to masonry at level 3 and the fact that the adjoining 2-storey building was along the southern wall side stopped providing lateral support at that level. It appears that the lift core had received some strengthening at some point, perhaps in the late 1980s as reported on the Historic Places website. Close up photographs of the masonry piers at levels 3 and 4 show the primary damage that concerned the assessment teams. The cracks were observed to open up with subsequent aftershocks. On the Monday (day 2), structural engineers met with Urban Search and Rescue Team leaders and city officials to determine a strategy for making the structure safe enough for building contractors and engineers to enter to determine more fully the extent of damage and the viability of repair. By day 3, the building had suffered three M5.4 and one M5.1 aftershock which induced further damage. At the time of writing, it appears that the building will have to be demolished. As it stands, it poses a significant falling hazard for buildings within 70 m in all 4 directions. This has resulted in all

the buildings within this distance being closed to the public (red-tagged) as well as both main streets (Manchester and Hereford) that run adjacent to the building.

History

(For full details, consult:

<http://www.historic.org.nz/TheRegister/RegisterSearch/RegisterResults.aspx?RID=5307>)

This building was built for the New Zealand Express Company in 1905-1906 and at the time of its construction it was the tallest commercial building in Christchurch. The building was designed by Alfred and Sidney Luttrell, who arrived in New Zealand in 1902, and whose principal contribution to the history of New Zealand architecture was the introduction of the Chicago 'skyscraper'. They were also noted for their use of concrete. The foundation and first two storeys of the New Zealand Express building are reinforced concrete. This was probably, according to Geoffrey Thornton, the first use of reinforced concrete in a commercial building in Christchurch.

Stylistically, this building is a compromise between British Edwardian architecture and the Chicago skyscraper style of the 1880s and 1890s. One example of this eclecticism can be seen in the corner tourelle, which was unusual in contemporary American architecture, but common within the English tradition. Technically the use of steel ties and standards, combined with the traditional brick masonry of the top five floors shows the same mix of sources. The 'Chicago style' was defined by the use of internal steel frames, which meant that the external walls were no longer load-bearing and therefore the height of the buildings could increase, and windows rather than masonry could dominate the exterior.

Earthquake Damage

External inspection on September 10 (the day after the earthquake) indicated that most of the load bearing masonry piers had some form of visible damage, with the most clearly discernable damage photographed below.





In addition, diagonal cracks at the top of the rear walls suggested that the building had been subjected to torsional deformations during the earthquake.





A particular concern was the safety of the corner tourelle, as open cracks could be traced at various locations up the full height of this ornamental protrusion, and it seemed plausible to imagine that the entire element could shear off from the main building structure.



Internal views

During the initial building inspection it was observed that building contents had been shaken about, as shown below.



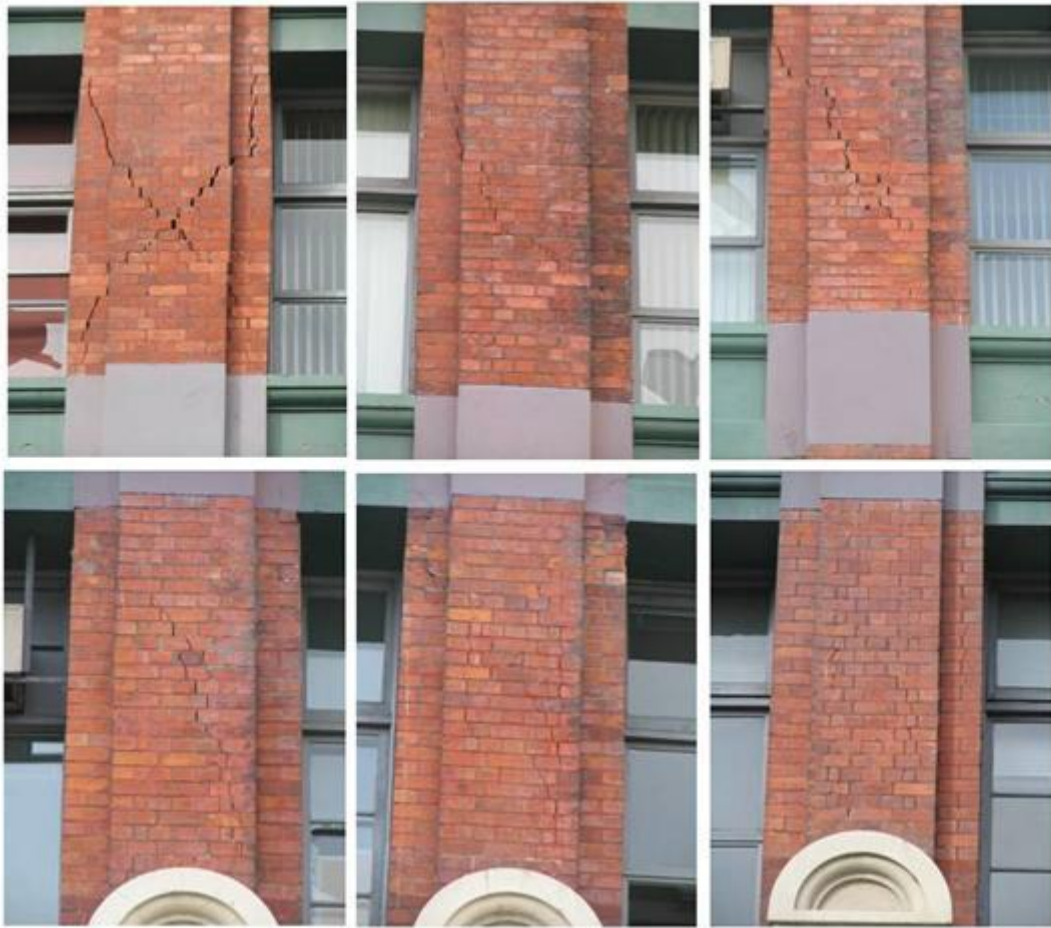
In order to establish the severity of the cracking that was observed on the exterior of the masonry piers, it was necessary to remove the claddings on the internal surfaces of the piers as shown below.



Damage rating and effect of aftershocks

During the first inspection on September 10 the building received a rating of Y2, indicating that the building was dangerous to occupy and that repairs to the building were necessary before it could be returned to service, but that it was not expected to be necessary to demolish the building.

However, after repeated aftershocks the building was reclassified on September 12 as red, indicating that it was now expected that complete building collapse was plausible. A review of some of the damaged external masonry piers is shown below.



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