

Apartment Building Subsidence Remediated



INDUSTRY

Commercial

STRUCTURE

Apartment building

PROBLEM

Earthquake remediation

LOCATION

Christchurch, New Zealand

DURATION / YEAR

20 days / 2013

TECHNOLOGY

Jet Grouting &
JOG Computer-
Controlled Grouting

BUSINESS UNIT

Mainmark New Zealand

Above: 1. Technicians and engineers inspect the site. 2. Jet Grout injection from very confined spaces. 3. A larger machine Jet Grouting from a more spacious area. 4. Cement batching plant: high speed mixing equipment in front and cement silo behind. This plant can produce and deliver 24m³ of cement slurry per hour.

Summary

A shallow, weak soil stratum under a heavy-weight concrete six-storey apartment block in Christchurch had caused the building to suffer differential settlement of up to 70mm after the recent earthquakes.

It was rectified using Jet Grouting to strengthen the foundation ground and by using JOG Computer-Controlled Grouting to raise the building back precisely to its design levels.

Objectives

Firstly to strengthen the entire foundation ground and secondly, to correct the settlement and precisely re-level the whole building.

Solution

1. Jet Grouting method.

Installation of 22 Jet-Crete columns under the critical load points of the building to support and transfer loads down to the gravels. (These columns are sometimes called “soil-crete”, being a mix of cementitious grout and in-situ soil).

2. JOG Computer-Controlled Grouting levelling method.

The computer-controlled grout levelling system was used to level the differential settlement of the structure.

20 injection ports were installed through the concrete foundations, down to the top of the Jet-Crete columns, where the high mobility grout was introduced.

Apartment Building Subsidence Remediated continued

It took 10 working days to set up, install the 22 columns and then remove the Jet-Crete equipment.

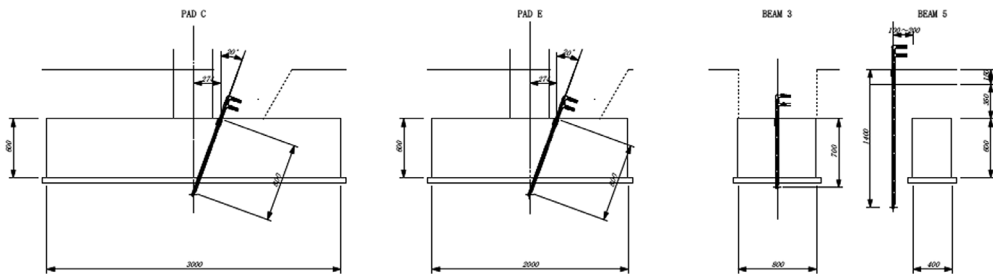
A further 10 working days were required to install the JOG Computer-Controlled Grouting levelling equipment, level the building back to the agreed lift requirement and then remove the equipment.

The building was brought back exactly as required with the foundation ground greatly strengthened to better protect the structure from future seismic activity.



Above, left: Typical JOG site control centre with computer controls, slurry tanks and pumping equipment. Above, right: Angular insertion of JOG injector.

Indicative Array for JOG Injection



Jet Grouting Layout

