

Chapter

5

Seismic Strengthening of the Majestic Centre, Wellington, New Zealand

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Abstract

The Majestic Centre is a 30-storey office tower in the centre of Wellington, New Zealand. The structure has a dual lateral system (reinforced concrete (RC) moment frame + shear cores) and hollow-core floors. The building's assessed seismic performance was found to be below expected levels, leading to a strengthening exercise. Over a period of 5 years, the structures performance was raised to meet current seismic loading requirements, at a cost of €50M.

Keywords: dual system, transfer beam, diaphragm, frame elongation

5.1 Introduction

The Majestic Centre is an iconic landmark in Wellington, the capital city of New Zealand. Constructed circa 1991, it is a 30-storey modern office tower and the tallest building in the city. The building was assessed in 2011 using a performance-based approach and found to have a lower than expected level of seismic performance. Over a period of 5 years, at a cost of NZ\$83.5 million (€50M), the building has been systematically strengthened, while remaining fully tenanted. The project has spurred new assessment and strengthening techniques and overcome several major logistical challenges to reach a successful completion.

The project team comprised Holmes Consulting (Structural Engineers), Tonkin & Taylor (Geotech Engineers), Fletcher Construction Company (Main Contractor), The Building Intelligence Group (Project Manager), WSP Opus (Architects) and Beca (Peer Reviewer) (*Fig. 5.1*).

5.1.1 The Building

The Majestic Centre sits on a sloping site in the centre of the city. The building is 116 m tall, comprising a 25-storey tower with a 5-storey podium beneath. The tower dominates the building's presence, providing high-grade commercial space for approximately 2700 people. The podium