APPLIED SCIENCE INTERNATIONAL SUCCESS STORY

HOTEL ST. GEORGE PEER REVIEW

Wellington, New Zealand, 2014

Performance Based Seismic Vulnerability Assessment

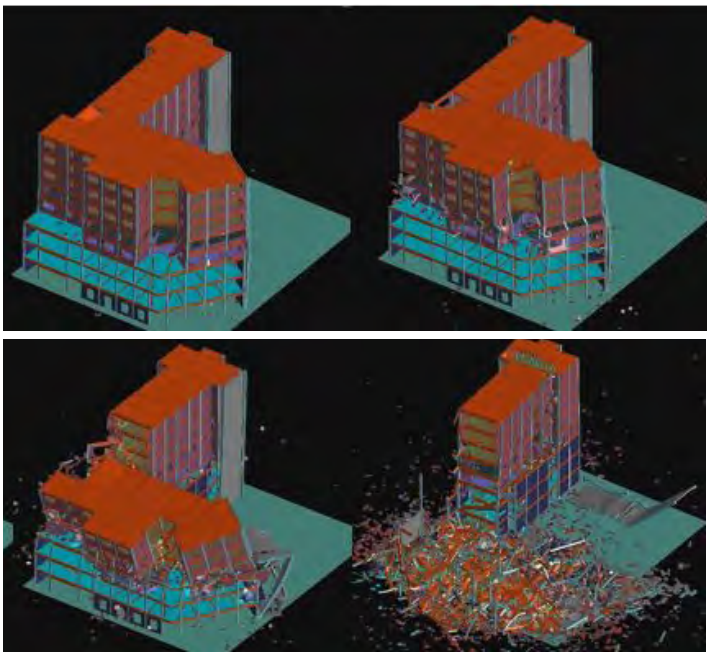
Harrison Grierson tasked ASI with the peer review of its seismic analysis of a historic hotel constructed in 1929-1930 in Wellington, New Zealand. The structure, a 7-story concrete encased steel frame, with a facade consisting of reinforced concrete infill panels, with an irregular L-shape configuration. It was designated for retail use to the ground floor and hotel accommodation for the upper stories.

It is currently listed as Class II heritage building by the New Zealand Historic Places Trust. Partial seismic strengthening of the building was previously undertaken in 2006 by addition of concrete shear walls in different locations of the building.

Areal View of the St. George Hotel

ASI's peer review services including assisted Harrison Grierson in the construction and evaluation of the numerical model in its Extreme Loading for Structures (ELS) software. This included a complete review of all structural details, reinforcement, connections, shear walls, etc. This also included an evaluation of loading as well as analysis results.

Upon completion of analyses of the existing building subjected to 100% of the selected time history ground motions it was found that the existence of critical structural weaknesses such as plan irregularity and vertical stiffness irregularity leading to global or significant partial collapse of the building.



Analysis Results from Earthquake Showing Significant Collapse

The next step of Harrison Grierson's investigation was to determine the building's rating with respect to the New Building Standard (NBS %). Therefore the building was subjected to a certain percentage of the scaled ground motions in an iterative process to determine a performance level in which the building performed satisfactorily.

Detailed Seismic Assessment of the building in accordance with NZSEE and ASCE41-06 performance criteria was then carried out to validate the results of the NITH progressive collapse analysis.

Following the analyses of the existing structure a strengthening scheme was developed to address the soft story mechanism and slab diaphragm deficiencies found during analysis.

ASI supported Harrison Grierson throughout the project including modeling, analysis, code implementation, and final recommendations. In the end, the performance based ELS analysis and final proposed strengthening plan for the Hotel St. George potentially saved Prime Property Group nearly $1m in strengthening costs.

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