

Strengthening an Existing Low-Rise for Conversion to a New Hip Hotel with a Rooftop Swimming Pool, Bangkok

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Abstract

An existing low-rise building was constructed in 1996 and then bought in 2006 for conversion into a new hip hotel with a rooftop swimming pool. A reinforced concrete static analysis was performed using relevant computer programs, consideration of codes, the actual reinforcement amounts, as well as concrete core compression values, UPV test results of the concrete properties, and existing structure dimensions. It was found that there were 6 existing columns with insufficient strength. Hence, a structural engineer decided to strengthen these existing columns by using steel jacketing in order to increase their strength and ductility including the improvement of its earthquake-resistance capacity to support all loads. Finally, it was found that the strengthening had been done effectively and proved that the existing columns have sufficient strength. Since its renovation in 2009, the hotel has been in continuous use with no signs of structural deficiencies.

Keywords: strengthening; an existing low-rise building; steel jacketing; reinforced concrete columns; flat slabs; wind loads; earthquake loads.

1 Introduction



Figure 1. The building top view

An existing low-rise building was built in 1996 and then bought in 2006 for conversion into a new hip hotel with 50 rooms, a rooftop swimming pool and a restaurant. The hotel was opened in 2009.

The seven-storey (26,4 m high) building is comprised of a ground floor with a lobby, car park, and office while the 2nd to 6th floors consist of guest rooms. The 7th floor (Figure 1) includes a swimming pool and a restaurant with access to a roof deck floor with a machine room, and a rooftop floor with 1785 m² of total constructed area including modifications. The hotel is located in an area where the spectral acceleration values for periods of 0,2 sec (S_s) = 0,13 g and for periods of 1 sec (S_1) = 0,17 g according to the Thai standard DPT 1302 (2009): the seismic resistant design of buildings and structures issued by the