

## Rankine Brown Building Victoria University of Wellington

### Retrofit for Earthquake Resistance

The Rankine Brown Library building, a 10 storey reinforced concrete framed building, built in the 1960's is being base isolated with Lead Rubber Bearings manufactured by Robinson Seismic Ltd.

The retrofit works, designed by Sinclair Knight Mertz, came about because Wellington, New Zealand has a high seismic activity and more stringent safety requirements now than were necessary in 1965 when the building was constructed. As insurance premiums for earthquake seismic risk have dramatically increased over the past two years, there is a potential future benefit of lower premiums in respect of strengthened buildings.

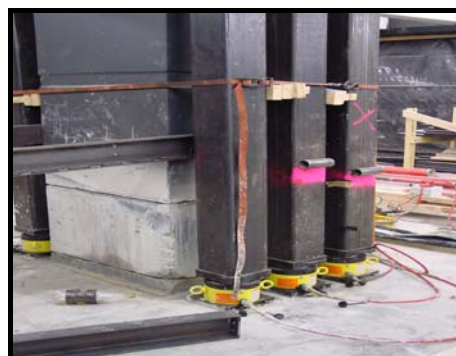
The retrofit contract was awarded in 2003 to McFee Fehl Constructors, a Wellington company specializing in building earthquake strengthening and refurbishment. The whole operation is being undertaken without any disruption to the library facilities.

The metre square columns which carry up to 1000T are propped individually and preloaded with twelve 165T Enerpac Pancake Lock Nut Cylinder jacks, the load being taken out over the lower three floors of the building. The column is cut near the base, the load being held on the hydraulic jacks with lock nut back up. The column section is then removed, the bearing inserted, grouted and cured; the whole cycle, including propping and de-propping, taking less than a week to repeat.

Robinson Seismic Chairman, Dr Bill Robinson, is the inventor of the Lead Rubber Bearing. The LRB's have been extensively used in NZ to protect important buildings such as Parliament, hospitals and the Museum of New Zealand Te Papa. Robinson Seismic Ltd have also supplied LRB's for the first seismically isolated building on the India subcontinent, the 300 bed Hospital in Bhuj which has been completely rebuilt in just 18 months from its total destruction in an earthquake. The bearing design has been used in California, Japan and other seismically active areas of the World.



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Concrete block cut at base of column



Concrete block removed from column



Lead rubber bearing in place at base of column