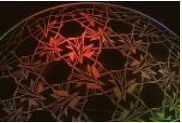


# Recent Examples of Base Isolated Buildings

12<sup>th</sup> March 2012

Grant Wilkinson, Ruamoko Solutions

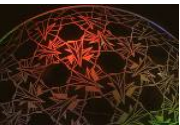


# Christchurch Women's Hospital



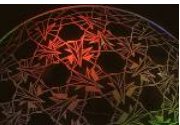
## Christchurch Women's Hospital

- **First (and only?) base isolated building in the South Island**
- 
- **Total of 20,000m<sup>2</sup> floor area, spread over 9 levels**
- 
- **76m x 32m floor plates, Height 33m**
- 
- **Approx. \$60M construction cost, opened in March 2005**
- 
- **CDHB, the owner, considered 'international best practice' before selecting base isolation for this building**
- 
- **Superstructure has a reinforced concrete perimeter frame, plus two low height eccentrically braced steel frames**
- 
- **It has 41 Lead-Rubber bearings - 830mm square x 275mm high**



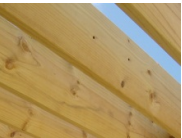
## Christchurch Women's Hospital

- It also has 4 pot bearings and several Teflon sliding bearings.
- Approx. cost of the bearing supply was \$800,000 in March 2003 (approx. \$18,000 each)
- Supply of base isolators was about 1.3% of the total construction cost
- Designed for  $\pm 420\text{mm}$  movement at MCE (2500 year return period)
- Observed approx.  $\pm 40\text{mm}$  movement across the isolation plane in 04 September 2010 event with 25mm residual slope in the bearings
- Observed approx.  $\pm 120\text{mm}$  movement across the isolation plane in 22 February 2011 event with very little residual slope in the bearings



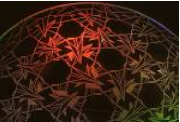


# St Elmo Courts Rebuild



## St Elmo Courts Rebuild

- Currently this project is at the detailed design stage with the base isolator supply contract out to tender
- Completion of the building is scheduled for June 2013
- 6 Storeys high plus a full depth car-park basement
- Floor plates are approx. 21m x 40m
- Total gross office floor area is 4,800m<sup>2</sup> incl. large penthouse terrace, plus a 1000m<sup>2</sup> basement
- The owner is offering tenants a premium level of seismic safety



## St Elmo Courts Rebuild

- St Elmos will be supported on 16 Lead-Rubber base isolation bearings (LRBs)
- The LRBs will move  $\pm 220\text{mm}$  in a 500 year return period earthquake (DBE) and will move  $\pm 400\text{mm}$  in a maximum credible earthquake (MCE) with a return period of 2500 years
- The LRBs will only transmit 0.24g accelerations (at DBE) across the isolation plane into the superstructure at a slow period of vibration of 2.2 seconds.
- Isolator damping is 30% and effective system damping is 20%

