

**WORKSHOP ON SEISMIC HAZARD MITIGATION OF
NON-ENGINEERED STRUCTURES
NATIONAL GEOPHYSICS RESEARCH INSTITUTE
HYDERABAD, INDIA 2 - 8 JUNE 1996**

Mr. Andrew Charleson (School of Architecture, Victoria University) and Dr Richard Sharpe (Beca Carter Hollings and Ferner Ltd, Wellington) attended this workshop sponsored by the Commonwealth Science Council (CSC) of the Commonwealth secretariat.

The workshop was attended by a total of eighteen representatives of Commonwealth countries including a representative of the CSC. The professions of those attending were very varied - from seismologists, geologists and geochemists through to materials and structural engineers. Most were senior personnel in their country's universities or civil service. During brief presentations from each participant on the seismicity and state of earthquake engineering of their country, it became clear that many countries, particularly those affected by the African rift valley faulting, are without their own earthquake codes. In some other cases, such as in the West Indies, the seismic risk is relatively high. These islands have experienced thirteen major earthquakes in the last three hundred years.

The workshop consisted mainly of a series of lectures from staff of the Earthquake Engineering Department, Roorkee, India, and the Director of the NGRI, Dr Harsh Gupta. The major contribution and co-ordination came from Emeritus Professor A S Arya of Roorkee, an internationally recognised expert on the seismic resistance of non-engineered structures in developing countries. He covered topics such as the seismic performance of masonry, stone, wood and adobe buildings, and the vulnerability and reconstruction and relocation of housing units. One most impressive anecdote involved rebuilding earthquake damaged adobe houses. Professor Arya arranged for two half scale houses to be built on a low tech shaking table located within the damaged region. Traditional construction methods were applied to both houses, except that one house incorporated recommended seismic detailing. With government officials and community representatives present, tractor impacts simulated earthquake shaking. By comparing the damage between buildings, the value of seismic detailing was obvious to all.

The workshop revealed the large gap that exists between the so called developed and developing countries, in terms of their knowledge and practice of earthquake hazard mitigation. Significant hazard reduction can be achieved by implementing existing techniques, proven in the context of developing countries. The challenge for the international earthquake engineering community is to assist with the dissemination of this technologically appropriate information. Appropriate indigenous research efforts should also be encouraged.

Both Sharpe and Charleson gave lectures during the week. Charleson spoke on the non-specific design rules applying to domestic structures in New Zealand and illustrated this with examples and slides of typical construction, including damage experienced in the 1987 Edgecombe Earthquake. This was well received, particularly the aspect of the difficulty of actioning compliance in an apparently well-regulated and aware society. Dr Sharpe gave two lectures on his recent work in Nepal for a Building Code Project. This contribution was particularly relevant to the workshop as it was exactly the type of project being contemplated by a number of the countries, and was a practical example of the theoretical aspects covered earlier in the workshop.

During the closing panel discussion, workshop participants endorsed a proposal to establish a earthquake hazard mitigation resource centre based at Victoria University of Wellington. If approval and funding is provided by the CSC, the centre's objectives will be as follows: first, to compile the outcomes of appropriate earthquake hazard mitigation research and monitor on-going international research and hazard mitigation programs, and secondly, to disseminate earthquake hazard mitigation information that is particularly relevant to the needs of developing countries. A quarterly newsletter is one of the envisaged outcomes.