# EARTHQUAKE RESISTANT DETAILING OF REINFORCED CONCRETE STRUCTURES

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There are two major factors that discourage the use of earthquake resistant design and detailing of structures constructed in Sri Lanka. They are the belief that the earthquake resistant structures will cost a lot more than the normal structures and the misconception that Sri Lanka is located at area where no earthquakes will occur. On many occasions, the assumption that a particular area is seismically inactive has been proven wrong at the cost of human life and severe destruction to the infrastructure of an area. This is true for Sri Lanka as well since a number of earthquakes have been reported in the recent past in Central India and one event close to Sri Lanka which have hitherto be considered as seismically inactive.

Earthquakes are among the most awesome of natural forces. They occur suddenly, generally without warning, and within 10-20 seconds can turn cities into wasteland. Since Sri Lanka is located away from well known plate boundaries, any earthquake occurring in Sri Lanka is intra-plate type. In an intraplate area, it is almost impossible to predict the location or likely time of an earthquake event.

British Standard Codes of Practice used in Sri Lanka for structural design does not cover earthquake design and some of the reinforcement details widely adopted are not desirable with respect to earthquake performance. Dynamic analysis of structures responding elastically to ground motions recorded during severe earthquakes have shown that the theoretical response inertial loads may be much greater than the static design lateral loads recommended by various codes. Although this difference is too large to be reconciled by safety factors in design, it is often seen that structures designed to the lateral loads of codes have survived severe earthquakes. This can be attributed mainly to the ability of ductile structures to dissipate energy by post-elastic deformations helped by such other factors as a reduced response due to increased damping. The ductility of members is generally considered as the most important factor.

This poster paper highlights the special details that are required to provide sufficient ductility to undergo cyclic deformations without collapse for framed structures and shear wall structures. A detailed cost comparison carried out between normal details and earthquake resistant details show that the cost increase due to adopting earthquake resistant details would only be in the order of 2% of the overall cost of the project or it could even be less.