PROPOSED EARTHQUAKE RESISTANT REINFORCEMENT DETAILING FOR BUILDINGS IN SRI LANKA

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Earthquakes can occur on land or sea, or at any place on the surface of the earth. When an earthquake occurs on the land, it affects man made structures around the place of its origin as well as places far away. Earthquakes are among the most awesome of natural forces. They occur suddenly, generally without warning, and within 10-20 seconds can turn cities into wastelands. Any earthquake occurring in Sri Lanka is intra-plate type, because Sri Lanka is located away from well known plate boundaries. In an intra-plate area, it is almost impossible to predict the location or likely time of an earthquake event. Numbers of earthquakes have been reported in the recent past in central India and one event close to Sri Lanka which has hitherto been considered as seismically inactive. Hence assumption that Sri Lanka is seismically inactive has been proven wrong at the cost of human life and severe destruction to the infrastructures of an area.

Due to the rising demand of clients and insurance companies for earthquake designing and detailing, there is a trend to design most of the high rise buildings for earthquakes in Sri Lanka today. But British Standard Codes of Practice used in Sri Lanka for structural design do not cover earthquake design and some of the reinforcement details widely adopted are not desirable with respect to earthquake performance. Hence development of a guideline for building design and detailing for earthquake is of utmost importance.

In this context, Response Spectrum Method can be effectively used for dynamic analysis of buildings in Sri Lanka. It considers important engineering properties of the structure such as the fundamental natural period of vibration of the building, the damping properties of the structure, type of foundation provided for the building, importance factor of the building and the ductility of the structure. Ductile detailing is also advisable since earthquake forces sometimes can be much more than the forces for which we design the structure and reversal of these forces can also occur many times during an earthquake. The members and the connections are designed by ductile detailing to resist the large forces and reversals by inelastic deformation beyond yield without serious failure.

Through this study, it has been learnt that the seismic effect on regular low rise buildings in Sri Lanka can be economically mitigated by ductile detailing without dynamic analysis with British Standard Codes of Practice and also, it has been understood that the seismic effect of high rise buildings tends to be higher thus resulting higher dynamic responses. But buildings with irregular plan shape with different mass or stiffness distribution can be separated using seismic joints. So in this study it is proposed to improve existing details of reinforcement which are obtained from conventional designs with British Codes of Practice applying ductile details for earthquakes.