

Actions speak louder . . .

Fact Sheet no.13: Being prepared for the next Earthquake

Description and analysis

Lightning is said not to strike the same place twice but earthquakes, which occur in certain regions, return again and again. In rich parts of the world, like Japan and California, building codes anticipate future earthquakes and when they occur there is little loss of life caused by collapsing walls and roofs. Not so in the rural areas of the 'south', such as in Guatemala, Ecuador, the Philippines, Indonesia, Iran, Afghanistan, Pakistan and Kashmir, where poorer people in towns and villages hardly ever take account of earthquakes in the way they build. Being poor, they feel they cannot afford to.

Construction systems based, for instance, on California Building Standards are essentially high cost because of the specification of the type and quantity of materials which are needed in order to comply. In the minds of most people, low-cost construction inevitably involves the downgrading of the elements and techniques which makes the building robust.

Design response

The mass of a building comprises the footings, the walls and - in desert and arid regions - heavy flat roofs, sometimes using timber and mud but now more frequently reinforced concrete slabs

In our review of traditional design we concluded that it would be possible to stick with the traditional format and style of construction but come up with an approach which greatly reduces the risk of roof collapse during earthquakes.

This could be done by concentrating the support to the roof on specially-designed columns with integral reinforcement which joins to the reinforcement in the flat roof. The masonry which makes up the panels in between the columns no longer has any load bearing requirement and can use low grade materials to hand.

Parry Associates technical input possibilities

The company supplies complete small-scale sets of equipment to manufacture all of the construction elements required. We have developed a new hollow coffer or 'waffle' which, together with hollow column blocks, slab tops and shuttering slabs, completes the construction. We can offer design advice and training, and we can send associate technicians to the location to supervise manufacture, construction and the training of local labour.

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Local resources required

Cement and standard gauges of steel reinforcing bar can be obtained from local stores. Labour (to be trained), clays, sands, gravels, gravels and/or laterites are generally available. There is also a limited possibility of using straight-growing poles in substitution for sawn timber in roof structures.

Potential local business response

With the low cost equipment and easily-learned skills to construct the new type of frame buildings, there is also scope for small business activity after the project is completed. The existence of earthquake-resistant designs will change attitudes - for example to investment in property - encouraging enterprise and the move from subsistence to the evolution of a more stable settlement. The circulation of incomes will advance the integration of local communities into the larger economy, giving its people ever greater control over their lives

Real case studies

The challenge of coping with other types of natural disasters such as floods has already been successfully resolved using Parry technology in the 'High School' project, Mozambique (2002). After man-made disasters such as the civil wars in Sierra Leone, Nicaragua and Sudan, Parry technology was and still is used extensively in the process of rehabilitating displaced communities. For a list of case studies where Parry technology has been used to combat problems in the developing world, see the Success Stories page on our website.

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9. Work for women
10. Roof structures without using timber
11. Living with diurnal extremes
12. Living with environmental extremes
13. Being prepared for the next Earthquake