

ISSUES ON CONSERVATION AND PRACTICE OF EARTHEN ARCHITECTURE IN THE HIMLAYAS

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ABSTRACT

The Himalayan range in Asia, spanning through Bhutan, India, Nepal, and Tibet; displays some unique Earthen Architectural heritage sites as well as living traditions of earthen construction. It has the climatic and geo-physical rationale for earthen building traditions; and the same has been integrated and reflected in the culture that have been alive there for centuries. However, the Himalayan region, being one of the active seismic areas; possesses problems and threats to the earthen buildings which are considered very weak in seismic performance. There are other causes of deteriorations which combined with the seismic movements cause greater threats for the survival of these buildings. Hence, the analysis in this context needs to be carried out in both the aspects of traditional practice and modern engineering developments.

The issues from the Himalayan region should be analyzed in following contexts:

- Himalayan region is seismically very active zone, and so these earthen architecture do have threats of earthquake; and displays several problems probably due to earthquakes in past.
- Due to high altitude and difficult geographic conditions; these regions still are relatively isolated region in terms of connectivity to the rest of the country. Due to such isolation, the culture and building traditions are still intact, and thus much can be learnt from these cultural practices; and also appropriate measures should be introduced to ensure a better building practice for future.
- The above points lead to the necessity of appropriate codes and building guidelines; and accordingly the need of institutional set up to disseminate the appropriate information and skills. Again, much can be learnt from the traditional practices which, if integrated with modern engineering codes; would definitely result a relevant building guidelines/codes.

INTRODUCTION

Himalayan range, formed due to the tectonic movement of the Indian plate and the Tibetan plate, is one of the younger geographical formations and still is said to be in process of slow growth. Owing to its geological movements, the Himalayan region is considered active seismic zone.

Himalayan region in Asia, spanning through Bhutan, India, Nepal and Tibet is also home of different cultural population, and accordingly art and architecture. In most part of the Himalayas, earth has been used as building material for both art and architecture. In many cases, the remoteness and difficult geography of the Himalayas have kept the traditional practice of Earthen Architecture untouched from the intervention of modern development in building sector. However, such tradition seems to have attained a height of its technical development using the local resources and knowledge. Many of such traditionally advanced techniques are still important in context of contemporary standards, where as in some aspects the traditional practice needs to be updated on the basis of modern engineering needs. As is common, the seismic performance of Earthen structures depend on the seismic measures taken during construction, or later retrofitting. Due to its material nature, earthen structures do not have a good seismic performance of its own. Hence, Conservation and Practice of Earthen architecture

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in the Himalayan region should be based on the essence of traditional practice, and with application of contemporary engineering knowledge as appropriate.

Overall Scenario of Traditional Practice

There are slight variations of practice of earthen architecture in the Himalayas. Due to climatic needs, such variation results in different architectural features. For example – Bhutan displays its unique form of buildings having rammed earth construction at the ground floor and a combination of timber frame and rammed earth system at the upper floors. Then it is topped by a heavy, wide overhanging sloped roof. On the dry, arid regions of the Himalayas in India, Nepal and Tibet; the construction simply follows a rammed earth construction with flat mud roofs. Such construction system requires protection of wall from erosion due to rain (even the rain fall is minimum), snow, and wind. These functional requirements are integrated with culture of the people and have resulted traditional practices, which provides typical wall capping systems and practices. Such wall capping could be in form of a stack of twigs collected as fire-fuel, or a specifically collected subsoil cake (containing roots of a typical grass-plants), or a compilation of thin twigs arranged in certain order. Other form of wall capping has been to simply use slates or flat stones to divert the run off water at a safer distance from wall.

Similarly, the protection of wall surfaces becomes another concern. Traditionally this has been dealt with by the cultural practice where in many cases, an annual ritual of pouring colorful clays over the structure is common. This contributes as a sacrificial layer on the surface of the structure.

In view of seismic consideration, I think most of the surviving historic buildings have withstood the seismic movements due to their massiveness. Even if we see serious cracks on the structures, basically the massive structure constructed in a tapering profile in section, contributes for its seismic performance. In some cases, for example in some places in Ladakh, the intermediate layers of twigs embedded in the rammed earth wall, perhaps contributes towards the seismic performance. However, such systems are not very evident in case of Mustang (Nepal).

In my observation, the problems caused by other reasons, when combined with seismic movements, get worsened and ultimately lead to the collapse of the structure. Hence, some of such problems will be mentioned here:

ISSUES & PROBLEMS: SOME OBSERVATIONS

Several problems and issues are observed that are related to conservation and practice of earthen architecture in the Himalayan region. Some of these are reflected through examples that author encountered while working in Mustang district of Nepal.

Foundation problems - Many of old structures have stone as the foundation base. However, the old structure and settlement has seen a gradual rise of street level, and this has brought the dampness effect up above the original foundation level. In Lomanthang (Mustang, Nepal), the Gompa's structures have suffered from this kind of problems, which renders the internal decay of the walls. Thus, even the massive structure becomes fragile in seismic movements. Improper drainage around the structure obviously causes a foundation problem, and may lead to the collapse of the wall. A striking example was seen in Lomanthang (Mustang, Nepal) in 1999 when a section of the town wall collapsed due to the inadequate drainage in that particular area.

Erosion Problem – Erosion due to run off water, rain splashes at the ground, leakage of water through rain spouts are of major concerns in earthen architecture. These erosions take place

gradually, but inadequate maintenance or protection could weaken the structure – thus making fragile in seismic movements.

Joint problem – Another problem that gets significantly amplified during a seismic movement is the joint between the old structure and new structure. Even in the same structure, sometimes the joints of day works may experience a joint problem. In conservation works, often the joint between the old section and the repairs have the same problem after sometime. In a slight seismic movement, such joints easily detach and amplify the problem.

Other problems – One interesting problem observed in some old structures in Lomanthang occurs on the North wall of the buildings. The walls on the northern sides of the buildings have collapsed again and again in past where as the walls on the other sides were intact. It could have been caused by climatic reason. For example – the arid landscape of this region experiences strong dry wind from South to North, but in winter the wind direction changes and blows to South from North. This combined with snow could be a possible reason for such collapses of walls on the northern side.

Management and Development Planning Problems – As many of these places have been isolated because of their remote locations and difficult geographic features; the tradition and settlements have been intact. Now, as the development activities are being planned; care in planning and management of such modern developments become necessary. Few years back, the ignorance of local development authorities had resulted a newly planned dirt road right next to the 15th century town wall of Lomanthang along with its numerous historic and cultural structures. Later on, concerns shown by many have resulted a diversion of the road to a safer distance from the historic earthen settlement. However, such management issues are also related with the awareness and introduction of appropriate technologies.

RECOMMENDATIONS

1. **Need of continuity of cultural practices:** As has been explained above, the cultural and traditional practices have lots to deal with the maintenance of the built up environment. Hence, it is to the best interest of the built up environment as well as the preservation of culture that the cultural practices be appropriately promoted as part of methodologies for conservation and improvement of contemporary practice. A living built up environment can not be conceived as totally maintenance free, and the existing maintenance practice must be taken in to consideration before opting for modern less maintenance approach.
2. **Incorporation of conservation techniques in cultural practice** – In many of those traditional settlements, a mere conservation approach may not work in terms of its sustainability. Hence, the sustainable approach of conservation would be to incorporate certain conservation concepts and methods in to existing cultural practices. Rather than introducing brand new techniques, it would be appropriate to develop intermediate techniques.
3. **Regional Consortium for advancement of Earthen Architecture:** In summer 2004, UNESCO and NIRLAC (Namgyal Institute for Research in to Ladakhi Art and Culture) organized two sets of workshops in Ladakh, India, on conservation of i) Earthen Structures, and ii) wall paintings in the Himalayan region. It was attended by participants from Bhutan, Nepal, India, and also from other countries, who were working in the region. Apart from the professionals, this workshop had a very good involvement of the local community. Such an event not only could brought the professionals to share their

experiences, concerns and learn from each other; but also discussed some techniques that could be applicable to the whole region. For example – learning from the horizontal band of twigs and other organic material embedded in the rammed earth wall, as seen in some structures in Ladakh, was a good practice in seismic consideration. Further elaborating on that lesson, John Hurd – UNESCO expert in the workshop, demonstrated some soft stitching techniques for cracks on rammed earth wall that could be done using locally available materials. Also, the participation of the local community including their master craftsmen convinced the possibility of development of intermediate techniques by participatory approach. I think, the knowledge and practice from various parts of the region, thus could be brought together for a fruitful synthesis of appropriate methodologies.

4. **Formulation of guidelines:** As many remote regions, such as Lomanthang, are going through the modern development process, it is important that a balance between conservation needs and development aspirations be maintained. In architecture, this implies for a development of appropriate guidelines for practice. There are certain contemporary needs that may not be feasible to meet within traditional techniques and systems, and also there are assets of traditional practice that are valid in developing a local architectural character. Hence, the guidelines should approach from these two perspectives, and come up with appropriate methodologies that could easily be understandable to the local building workers. Author is working in this regard for his Architecture Doctorate degree at the University of Hawaii.