

Housing/Construction:

Roorkee is divided in to two areas- urban and semi urban. Pure rural area is not found in Roorkee because villages are also developing and getting converted into industrial area. Very less number of villagers are living in hut and without house. Some villagers are living in row houses (kacche maken) and these villagers take subsidy facility from the government.



View of house (Kacche Makan) in Village of Roorkee

a. Indigenous measures for earthquake safety:

The people habituating the rugged Himalayan terrain witnessed the fury of earthquakes (Chalak in Kumauni; the local parlance) ever since they chose to settle in this region. Accepting the challenge put forth by nature they attempted ways of protecting them and their community from nature's wrath and evidences suggest relatively early evolution of the elements of earthquake safe construction in the region. Undeterred by the threat high structures being razed to ground by seismic tremors construction of high rise structures was in vogue in the region and even today apart from cattle sheds it is hard to locate single storied houses in the region. There exist different words and terms to identify four different floors in both the local dialects of the region; in Kumauni (ground floor, goth; first floor, chaak; second floor, paan; third floor, chaj) and in Garhwali (ground floor, kholi; first floor, manjua; second floor, baund; third floor, baraur).¹¹

Different floors of Building	Local Name (Kumauni)	Local Name (Garhwali)
Ground Floor	Goth	Kholi
First Floor	Chaak	Manjua
Second Floor	Paan	Baund
Third Floor	Chaj	Baraur

Incorporation of unique terms for identifying individual floors in the local dialect is suggestive of their frequent use. This implies common occurrence of four storied houses in the region. Magnificent four to five storied structures can still be observed in Yamuna and Bhagirathi valleys. These have survived many earthquakes and lack of the elements of earthquake safety would have razed these to ground. Highlights of the technology utilized

for erecting multi-storied houses is observed to be commonly used in other structures of the region as well.

This includes¹¹:

- ✓ the use of thick wooden logs running through the entire length of each of the walls alternately with heavy stones.
- ✓ at the corners the edges of the pair of logs on the adjacent walls are joined together by hammering thick wooden nails through them. This has the effect of turning the structure into a single piece construction like the beam of the modern construction.
- ✓ all the windows, doorways, ventilators and floor- joists are joined to these well-secured pairs of logs and these further strengthened the structure.

There was a tradition of carefully selecting the construction site and detailing the various foundation related aspects. The foundation was dug till the hard rock or a large boulder (dal in Kumaoni) was reached. The foundation was then left open for long durations, before the commencement of construction. According to the tradition the foundation should have witnessed seven monsoons before the construction. This helped in minimizing ground subsidence after the construction.

11. Source: Assessing Impact of Earthquake Safety Initiatives in Uttarakhand (India), Disaster Mitigation and Management Centre, Department of Disaster Management, Government of Uttarakhand, Dehradun – 248 001, Uttarakhand (India), April, 2007.