

Winter Thermal Comfort of Residents in the Himalaya Region of Nepal

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Abstract

A thermal comfort survey and a thermal investigation were conducted in traditional houses, during the winter in the Mustang district of Nepal. The surveys were carried out over 4 days, gathering a total of 1,584 thermal sensations from 36 subjects. The results show that 1) residents are highly satisfied with the thermal condition of their houses, 2) the mean neutral temperature is 10.7 °C and 3) the neutral temperatures are different according to the thermal environment of the evaluated spaces. These findings reveal that people are well adapted to the thermal environment of traditional houses, as a result of which the neutral temperature is lower than the thermal comfort standard.

Keywords: Nepal, Himalayas, thermal comfort, thermal comfort zone, neutral temp.

1. Introduction

In order to establish indoor air temperature standards, we have been doing research in the sub-tropical, temperate and cold climate zones of Nepal. Although we have already conducted research in one cold climate zone (the Solukhunbu district) of Nepal, we have again focused on another cold climate area (Mustang district, Lomangtang). The reasons for this are;

- 1) Due to the high altitude of this Himalayan region, it has a low outdoor air temperature (minimum air temperature -22.5 °C), high wind velocity and low sensory temperature (H.M.G. of Nepal (1995)). To protect inhabitants from the cold, courtyard houses are built connected to each other. The houses are also constructed with 450 mm thick dry brick walls and small windows.
- 2) As the area is located in the rain shadow on the northern side of the Himalayas, there is no effect from monsoons and the precipitation is low (113 mm per year, H.M.G. of Nepal (1995)). Consequently, the houses have flat roofs in which small holes are made for lighting and ventilation.
- 3) Due to the low precipitation, firewood is very scarce. Residents therefore burn livestock dung (yak, goat and horse) for cooking and heating.