

25 INVESTIGATION OF THE THERMAL COMFORT IN NEPAL

H. B. Rijal¹, H. Yoshida¹ and N. Umemiya²

¹Dept. of Global Environment Engineering, Faculty of Engineering
Kyoto University, Japan

²Dept. of Urban Engineering, Faculty of Eng., Osaka City University, Japan

Abstract

Two surveys of the thermal environment and thermal sensations were conducted in the indoor and the semi-open spaces of the traditional houses, during both summer and winter, in five districts of Nepal: Banke, Bhaktapur, Dhading, Kaski and Solukhumbu. The surveys were carried out for 40 days, gathering a total of 7,116 thermal sensations from 103 subjects. The results show that residents are highly satisfied with the thermal condition of their houses, since they adjust well to the thermal conditions. The residents prefer higher neutral temperatures in semi-open spaces such as verandas, compared to indoor spaces. The findings reveal that people in the regions studied adapt well to the natural environment, as a result of which neutral temperatures are different in different climates. They are lowest in the cool climate, medium in the temperate climate and highest in the sub-tropical climate.

Keywords: Nepal, Traditional house, Semi-open, Field investigation, Neutral temperature

1. INTRODUCTION

Nepal has a small land area of 147,181 km². Its climate varies from sub-tropical to frigid due to large differences in altitude, typically 60 m to 8,848 m. Traditional houses are built to adapt to the climate; similar types of house are found in locations of similar climate and culture. In other words, houses and lifestyles vary to allow for the most comfortable thermal environments possible. For example, 1) there exists the custom of wearing traditional clothing, which is designed to protect the people from both extreme heat and cold ^{a)}, 2) houses have cool or warmer spaces and residents move between them ^{b)} residents sleep in the semi-open spaces or front yard to stay cool ^{c)}, 3) firewood is burnt to provide heat in winter ^{d)}, 4) people drink large quantities of cold water and take more showers to keep cool in summer ^{e)}, and drink large quantities of butter tea to keep warm in winter ^{f)}.

However, the Nepalese face extremes of heat and cold in everyday life, the results of which range from discomfort to illness and death. They also need to consume great amounts of energy. There are many problems to solve. For instance, 1) the prevalence of infectious diseases in summer and the high mortality rate of the aged people due to cold in winter ^{g)}, 2) thermal discomfort due to living barefoot on very cold earthen floors in winter, 3) excessive heat and smoke due to burning firewood in open hearths, 4) scarcity of firewood in winter due to excessive consumption.