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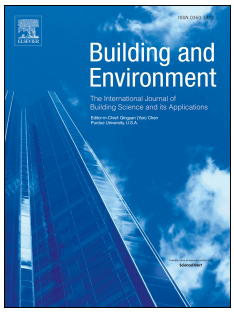

Thermal comfort, vibration, and noise in Chinese ship cabin environment in winter time

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Thermal comfort, vibration, and noise in Chinese ship cabin environment in winter time

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Abstract

The temperature, vibration, and noise in air-conditioned Chinese vessel cabins in wintertime were investigated in this study. Field measurements were used to appraise the thermal sensation vote (TSV) of crew members and passengers in specific cabin environments. The survey data was summarized and analyzed to determine the neutral temperature, preferred temperature, thermal preference, and thermal acceptance rate. The determined neutral and preferred temperatures of 20.9 and 21.5℃ indicated that the ship occupants preferred a temperature higher than the neutral temperature in winter. The acceptable operative temperature range was determined to be 18.54–23.29℃. Although most passengers preferred the neutral environment or a slightly warmer one, the acceptable air temperature was appropriately lower. A fitting analysis was conducted on the TSV and predicted mean vote (PMV) using different levels of subject activity. The thermal neutral temperature predicted by the PMV was higher than that predicted by the TSV; however, a modification of the PMV brought the former closer to the latter. The vibration vote indicated that most of the subjects considered the ship's vibration level to be acceptable. Although the noise level in the passenger cabins was higher than the recommendation, only 12% of the subjects considered it a little troublesome. Conversely, the noise evaluation in the dining room was not particularly impressive, with 6% of the subjects considering it very troublesome, and24% considering it a little troublesome.

Keywords: Thermal comfort; Predicted mean vote; Thermal sensation vote; Questionnaire survey; Vibration; Noise

1 Introduction

Ship crew and passengers spend most of their sailing time, which extend over days or weeks, in cabins,

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