

PHASE ONE

Two identical eight-story dormitory buildings on the campus of The Pennsylvania State University were used for investigating natural ventilation effects. Equipment for measuring air change rates, consisting of an electronegative gas detector, a system of plastic pipe, a collection and valve control device, and necessary recording instruments, was used to gather data. Results are reported on ventilation of a closed, unoccupied building, and on ventilation of shelters in the basement and on the fifth floor with simulated occupants. A portable ventilation fan and opening of selected exterior doors were used in several tests to determine the possibility of increasing ventilation rates. Generally, ventilation of shelter spaces was lower than expected and below that which would be needed in hot, humid weather when such spaces were occupied to the normal density limit. Neither changing exterior temperature nor moderate winds had significant effects on ventilation rates of the closed buildings under conditions encountered during the testing period.

PHASE TWO

Building B, one of the buildings used in Phase I was used in this project to determine the effects loading multiple floors when using natural and forced ventilation. Using a tracer gas technique, a series of tests were run to determine the rates of natural and forced ventilation in upper story shelter spaces. Basement and floors 2 through 7 in the eight story dormitory were loaded to maximum capacity in terms of effective temperature. Generally, measured natural ventilation rates were low and occupancy levels were severely restricted because of high effective temperature within the building. With forced exhaust ventilation effective temperatures leveled off in the occupied areas on the upper floors. Evaluation of portable package ventilation units used in the tests is included and problems which were encountered are reported upon.