11 ● From the results of Questions 7 and 9, calculate the heat loads per heating season in Btu and note the savings by better construction.

The 7851 degree days for the heating season multiplied by 24 hours, times the Btu loss per hour for 1 F drop in temperature gives the Btu load per heating season.

Saving = 250,800,000 − 148,000,000 = 102,800,000 Btu.

Chapter 8

COOLING LOAD

Conditions to be Maintained, Cooling Load, Transmission for Surfaces not Exposed to the Sun, Outside Temperatures, Solar Radiation, Time Lag, Transmission of Solar Radiation Through Glass, Heat and Moisture Leakage, Heat and Moisture Sources

THE method of calculating the cooling load is similar to that used in calculating the heating load. The direction of the flow of heat is reversed, however, and in most cases additional factors must be considered, such as solar radiation and the heat from occupants, lights, motors, and other sources. The character of the load depends on the type of building to be cooled as, for example, in auditoriums and other places of assemblage where the maximum load usually is that due to the heat and moisture given off by the occupants, or in office buildings and residences where solar radiation and the transmission and infiltration of heat through the building shell are most important.

While cooling is generally identified with the summer season, it is often necessary to cool in winter as well as in summer. In a crowded place of assemblage the heat given off by the occupants, together with that given off by the lighting and power equipment, may be more than the normal heat loss through the structure even in winter under cold climatic conditions.

Much of the basic information for the design of comfort conditioning installations has resulted from research conducted at the A.S.H.V.E. Research Laboratory and at institutions with which coöperative research investigations have been carried on. These data include the effective temperature index, and heat and moisture loss data given in Chapter 3.

COMFORT CONDITIONS

The conditions to be maintained in an enclosure are variable and depend on many factors, especially the season of the year and (during the summer) the outside dry-bulb temperature and the duration of the period of occupancy. Information concerning the proper effective temperatures to be maintained for various seasons is given in Chapter 3, where are also tabulated the most desirable indoor air conditions to be maintained in summer for exposures less than three hours. (See Table 2, Chapter 3.)

In installations for restaurants and theaters the requirements are different from those in offices, since there must be a considerable volume of air circulated in order to provide ventilation and cooling.