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CHAPTER 48

TRANSPORTATION AIR CONDITIONING

Railway Passenger Car Air Conditioning, Passenger Bus Air Conditioning, Streetcar and Trolley Coach Heating and Ventilating, Automobile Air Conditioning, Airplane Air Conditioning

THE principles of air conditioning applying to stores, restaurants, hospitals, theaters, and homes are applicable to railway passenger cars, passenger buses, automobiles, streetcars, trolley coaches, airplanes and ships. However, equipment used for mobile applications differs from that used for stationary purposes in that it must meet additional requirements. Equipment must be compact, accessible for quick inspection and servicing, light-weight and unaffected by vibration and impact. Freedom from vibration which could be transmitted to supporting vehicle and thus to passengers is essential. (For Air Conditioning Ships see Chapter 49.)

RAILWAY PASSENGER CAR AIR CONDITIONING

The railway passenger car represents a very difficult air conditioning problem. Space is strictly limited so that all equipment and ducts must be reduced to minimum size. Electric power supply and water supply also are limited. All equipment must withstand severe vibration and shock and must be very reliable in performance since major servicing points are frequently far apart.

During heating season it is necessary to heat conventional cars with steam from locomotive at pressures that may vary from 250 psi to only 5 or 10 psi on last car in long trains. Passengers in window seats must sit only a few inches from cold outside walls and windows, and must also be very close to standing radiation installed along sides of cars. Sudden changes in load may be caused by changes in sun, wind, or train movement. Even in coldest weather, outside doors must be opened frequently.

During cooling season, the problem is further complicated by high concentrated internal load represented by the passengers. Also, air distribution problems are increased by low ceilings and short air throws.

Heating

The heating of passenger cars is accomplished by using a split system consisting of an overhead air circulating system with heating and cooling coils and standing radiation (floor heat) along car sides. The floor heaters, which usually consist of finned tubing, may be made more efficient by using covers designed to increase gravity air circulation and to direct the warm air from finned heating surface along cold outside walls and car windows. In some new cars, wall convector panels are used and extend the full length of the car with air intakes along the floor and outlets at window-sill height and at window head height in dead-light panels. The heated wall panel protects passengers from cold outside walls and the chimney effect of slender panel duct increases air flow and improves heating surface efficiency.

Steam may be used directly in finned tubing or steam may be used to heat a liquid, (usually a mixture of water and diethylene glycol), which is