PROBLEMS IN PRACTICE

1 ● Does a soft pad under the ventilating-machinery prevent building vibration?

It may or it may not. In some cases a soft pad causes more vibration than no pad. A flexible mounting should be carefully designed to be effective.

2 ● Are especially designed walls necessary in an equipment room to keep noise out of adjoining spaces?

Ordinarily good brick, tile, or concrete walls are satisfactory. Window and door openings should be made as tight as possible with weather-stripping, etc.

3 ● How should mechanical noise be eliminated from the duct system?

A flexible connection between the fan discharge and the duct should be used. The duct should be lined from the fan end for a certain length, depending on the degree of quietness desired.

4 ● Given the choice of two types of equipment, one generating high-pitched sounds and the other low-pitched sounds, which would you choose? Why?

The equipment generating the high-pitched noise should be chosen since high-pitched sounds are more easily absorbed than are low-pitched sounds.

5 ● In building an acoustic filter in a short duct 32 by 24 in. which direction should the splitters run?

The splitters should be installed parallel to the longest dimension, since they will provide more acoustical material per splitter.

6 ● What should be the characteristics of a good duct-lining material?

a. High noise reduction.
b. Physical strength.
c. Easy working and installation.
d. Fire resistance.
e. Cleanliness, absence of loose fibers or pieces.
f. Smooth surface to reduce air friction.

7 ● Should a ventilating duct be lagged or covered on the outside?

Yes, in some locations, and particularly in the equipment room and where the duct runs through noisy rooms to serve a quiet room. This lagging will prevent air-borne sounds from entering the duct through its sides and causing annoying sound in the quiet room.

8 ● How can cross-talk be eliminated when one duct serves two or more rooms?

Install proper filters adjacent to the grilles in each room, using splitters if the duct leads to the rooms are short.

9 ● Space limitations and maximum air velocities for the introduction of air to a broadcasting studio restrict the size of duct to 30 by 16 in. and in addition the length of branch duct which is suitable for lining with sound absorption material is limited to 22 ft. Determine the length of duct lining necessary to attenuate an average fan noise and establish a permissable room noise level.

Referring to Fig. 2 the noise level for broadcasting tudio is 14 db and the corresponding duct lining factor f is 28. Minimum cross sectional dimension of duct = 16 in.

$$\frac{16 \times 28}{12} = 37.3 \text{ ft duct lining required.}$$

Maximum length of duct is 22 ft, therefore it is necessary to divide the duct with a splitter, resulting in a minimum duct dimension = 8 in.

$$\frac{8 \times 28}{12} = 18.7 \text{ ft duct lining required to attenuate and average fan noise.}$$

Chapter 19

AIR DISTRIBUTION

Definitions, Grille Locations, Standards for Satisfactory Conditions, Factors Affecting Distribution for Cooling and Heating, Air Outlet Noises, Selection of Supply Outlets, Balancing System

CORRECT air distribution contributes as much or more to the success of a forced air heating, ventilating, cooling or air conditioning system as does any other single factor. Supplying the proper amount of air is one problem: properly distributing it from the point where it leaves the fan is another. The distribution problem may be further divided into: (*a*) distribution *to* the various spaces served by the system, (*b*) distribution *in* these spaces. This discussion is primarily limited to division (*b*), reference being made to the duct system only insofar as it affects the performance of the air distribution outlets.

Definitions

In this discussion, the term *air outlets* or *outlets* will be used to designate a cover for an opening, whether it is a grille or a register.

A *register* is defined as an outlet with a damper, and a *grille* is defined as an outlet without a damper.

The perpendicular distance over which the air will satisfactorily carry measured between the face of the outlet and the opposite wall is the *throw*. In the case of directional flow outlets, this may be less than the actual carry of the air.

The *core area* of the outlet is the area of that portion of the grille inside the frame through which the air can flow.

The ratio of width to height of the core area is termed the *aspect ratio*.

GRILLE LOCATIONS

The location of supply and exhaust outlets is extremely important if a satisfactory installation is to be secured. Very frequently, however, the room or building is planned and constructed with practically no consideration of this problem. The engineer of today is more likely than not to have as his problem a building that was constructed long before any consideration whatever was given to air conditioning it. Consequently, the room shapes, the location of columns and beams, and other details of architecture frequently make it difficult to properly locate the outlets. In general, for a cooling installation, the grilles should be located high enough from the floor to prevent the discharge of air directly upon the occupants of the room, and far enough down from the ceiling to minimize