

Referring to Table 2:

$$a = (4 \times 12 \times 30 \times 0.031) + (2 \times 30 \times 30 \times 0.016) = 73.4$$

$$a' = (2 \times 12 \times 30 \times 0.031) + (30 \times 30 \times 0.016) + (2 \times 12 \times 30 \times 0.6) + (30 \times 30 \times 0.6) = 1008.7$$

$$\frac{I}{I_1} = \frac{a'}{a} = \frac{1008.7}{73.4} = 13.7$$

$$\text{Noise level reduction} = 10 \log_{10} \frac{I}{I_1} = 10 \log_{10} 13.7 = 11.4 \text{ db.}$$

14 • What relation does the movement for the suppression of noise bear to the trend toward air conditioning of offices and other places in cities where people work or congregate?

Very important sources of disturbing sounds are the various street noises that gain entrance, not only through open windows but to a certain extent even through closed windows. If windows are to be kept closed to exclude noise, air conditioning is a practical necessity, especially in summertime. Summertime air conditioning makes use of awnings, which are not only desirable but economical in that they keep down cooling loads. To obviate condensation and frost on windows, wintertime air conditioning calls for storm sash or double glazing which in turn reduces the transmission of street noises.

Chapter 19

AIR DISTRIBUTION

*Opening Characteristics, Residences, Stores and
Offices, Auditoriums, Railroad Cars*

TO produce proper air distribution in an enclosed space to be ventilated, heated, or cooled by air, the design and location of the air inlet and exhaust openings must be carefully considered. A system may fail, though it handles the proper amount of air at the required temperature, if such important design principles of air distribution are ignored. Since air temperature and quantity are now moderately easy to control and vary, air distribution becomes the prime factor, particularly when comfort air conditioning is involved.

Owing to the lack of practical and satisfactory instruments for measuring accurately air movement all air distribution information available may be justly criticized; but for practical design purposes this information is sufficiently accurate.

OPENING CHARACTERISTICS

Any temperature differential between an occupied space air and inlet air causes the air to rise or fall a given vertical distance in a given time. This vertical rise or fall of the air stream can be moved horizontally by velocity, and if the mass of supply air is not diffused, the horizontal movement may be accomplished without changing the given vertical distance or the given time. This horizontal movement at a constant velocity may be reduced by expanding the air stream either by deflection, changing the dimensional ratio of the stream, or breaking the air into a series of streams in close proximity.

With a few exceptions a high velocity should be used, with a large compact mass of air for a long air throw (Fig. 1), so that the periphery of the air stream will be reduced as much as is consistent with good practice.

A grille used for a long air throw should have a large free area, and should have a number of fins, bars, or tubes with sufficient depth so that the width of each slot is approximately one-half the depth of the fins or bars. The grille opening should be as near square as possible and should be expanded only slightly between the riser or duct and opening. When using grilles with a large free area, if the supply air makes an abrupt turn before being introduced into the occupied space, turning blades (Fig. 2) may be used to equalize the velocity and volume over the entire grille area and assist in controlling the direction of the air stream.