interferes with the effectiveness of the exhaust hood, nor should he be allowed to make adjustments in the exhaust system He should tell his supervisor when he notices a decline in exhaust control

Hoods must be fixed wherever possible, as it is false security to depend on employees to move them around as needed

Hood classification Hoods have been classified by Brandt* according to their shape as follows

1. Enclosing hoods
   - Spray paint booths
   - Laboratory hoods
   - Luminous dial painting hoods
   - Abrasive blasting cabinets
   - Some grinder hoods
2. Rectangular or round hoods
   - Welding
   - Stone cutting
   - Down-draft table tops for degreasing, cleaning, and cementing
   - Drilling
   - Masonry saws (not portable)
   - Material transfer
3. Slot hoods
   - Lateral exhausts at tanks or vessels such as used for degreasing, pickling, and plating
   - At table tops or on flat surfaces where the contaminant is released over a large area
4. Canopy hoods
   - Above tanks, furnaces, melting pots, tables, and the like

Hood summary The points to remember in good hood design are

1. Do not expect an exhaust hood to "reach out" very far and suck in the contaminant. With a pressure hose, a stream of air can be blown for many feet from the hose, but the process does not work in reverse
2. Enclose the process as much as possible
3. Use flanges, side shields, and baffles to the fullest
4. Use flared connection at the end of the duct
5. Be sure the air velocity at the point of contaminant dispersal, the capture velocity, is high enough Achieve this by emphasis on mass air movement into the hood face, rather than hood face velocity.
6. Do not draw the contaminant past the operator's face
7. Take advantage (when positioning the hood) of air movement caused by heat currents and trajectory, if heavy particles are thrown off
8. Keep the hood from interfering with the operator's work.

Ducts

After contaminated air has been drawn into a hood, ducts serve the purpose of guiding the air to an air cleaner or to the outdoors When air passes through any duct or pipe, friction must be overcome, that is, energy must be expended The amount of this friction loss must be calculated before the system is installed, so the proper size fan and motor can be purchased However, this is a task for a plant engineer, not for the safety director Several excellent references have appeared in the past few years which remove the guesswork from duct design (See "References" at the end of this chapter, especially Brandt, DallaValle, and Hemeon, and the publications of American Foundrymen's Society and the American Conference of Governmental Industrial Hygienists)

Some general comments on sizing of ducts will be helpful to the safety man in appraising the merits of a given system

Starting point in designing a local exhaust system is determining how many cubic feet of air per minute (cfm) must be handled by each hood to control the contaminant released in the workroom (see the topic "Hoods" in this chapter). Based on such data, careful duct design accomplishes these objectives maintains proper transport velocity so the contaminant, if it is a dust or fume, will not settle out and plug the pipe, holds power consumption to a minimum; keeps the system "balanced" at all times

Balance means that duct branches *near* the fan, where suction is high, must not rob air from branches at the *far* end For

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*Brandt, Allen D "A Summary of Design Data for Exhaust Systems" *Heating and Ventilating* (May 1945).