can *blow* to a point far away, we get the idea we can *draw in* from far away. We cannot. Mathematically speaking, we "blow" about 30 times farther than we can "suck." This is because air is drawn *in* uniformly from *all* directions, from almost a sphere *surrounding* the source of *suction*. But when you blow, the moving air is confined to a tube-shaped pattern, or *narrow cone*, so its influence reaches a relatively long distance from the discharge point.

2. Place an exhaust hood so contaminated air is drawn *away* or *down and away* from the operator of the dust-making tool. In other words, don't use an overhead or canopy hood (like a conventional kitchen range hood) that will draw the contaminated air up past the operator's nose. An exception: when particles are driven off in a fixed direction, as by a pedestal grinding wheel, locate the hood so the dusty air shoots into it.

3. A simple smoke tube will show visually how air is moving in a room, and will quickly settle many an argument.

4. Be sure every local exhaust system has an air cleaner. We can no longer use the outdoor atmosphere as a trash collector.

5. A disease like silicosis is caused by breathing dust that gets into the far reaches of the lungs. This means it's the particles of extremely fine size that are important—sizes of something like one-half to three microns in diameter (one micron equals 1/25,000 inch). Such dust settles by gravity very slowly. A one-half micron particle in still air takes over three hours to fall one foot. So the inhalable dust of health significance is wafted by air currents almost as though it were a gas.

The final step in a local exhaust project is all too often neglected. After the system is installed and set in operation, its performance should be checked to see it meets engineering specifications—correct rates of air flow, duct velocities, negative pressures, *etc.* Its performance should be rechecked periodically as a maintenance measure. Proof of success is for the exhaust system to bring the concentration of harmful air contaminants to below their respective threshold limit values. Therefore, air samples should be taken and evaluated periodically during the life of the system.

Local exhaust ventilation is commonly used for controlling dust and other air-borne contaminants at grinding wheels, saws, spray painting, electroplating, degreasing, pickling, abrasive blasting, conveyor belt transfer points, welding, chemical laboratory hoods, and sources of other operations. Industry could not profitably conduct these processes without it. It is ideal for such discrete, major sources of air contaminants.

For many small, scattered sources, general ventilation to dilute the contaminant in the room air is the only economical control measure. How much air to exhaust to provide safe ventilation by dilution can be calculated with some precision. If you know, for example, how many pints of a certain solvent evaporate in a given time, a simple formula will tell how many cubic feet of outdoor air must be brought in to keep the solvent vapor in the room down to a safe level. By directing the pattern of flow so the incoming outdoor air first passes over the workmen, then goes through the contaminated area and finally outdoors, ventilation by dilution becomes rather effective. But this depends in large part on whether the pattern of flow is encouraged or opposed by the direction of movement of outdoor air, for the latter can easily override man-made indoor air currents.

There is one fundamental that sounds so simple it seems presumptuous to mention it, and yet it is forever being disregarded, even by otherwise good engineers. You cannot remove air from a building by local or general exhaust without having replacement air enter to take its place. Otherwise the building will be under vacuum. (As a matter of fact, in wintertime all too many buildings are.) Supply air systems that deliver tempered outdoor air distributed through ductwork with diffusers having adjustable louvres mounted eight or 10 foot above the floor are a must, when air is exhausted for contaminant control.

They are just as essential when exhaust systems are used to remove hot air for reasons of employee comfort. In a large flat-roof plant, for example, hot air is often released by one or many roof exhaust fans. Here a makeup air system is also called for, and there is even more reason for delivering it by ducts and diffusers so the men get direct cooling from the incoming air, which is generally cooler and more comfortable than the in-plant air. Further heat relief