

Cleaning and purification are necessary for safe use in the hospital.

A surface or subsurface burst of an atomic bomb will result in a wide dispersion of airborne radioactive particles.¹⁴ Windows of buildings within a three-mile radius from the point of detonation of a 20 KT bomb will be broken, and consequently, no appreciable protection will be afforded by the use of conventional air-conditioning systems under these conditions. Beyond the three-mile radius many structures may be found with windows undamaged and otherwise capable of providing some degree of protection from airborne radioactive particles by the utilization of an air-conditioning system. However, conventional air-conditioning systems should not be relied upon for protection in urban structures which may be utilized in the accomplishment of specific missions following an atomic detonation. Special techniques and devices are available to provide this protection.

The smog incident in Donora, Pa., in 1948 focused the attention of health authorities and engineers on the problem of air contamination by the gaseous wastes discharged into the air above cities. The U. S. Public Health team investigating the incident¹⁵ found that in this city several previous incidences of lesser severity had occurred during the preceding 30 years as indicated by an increase of mortality rates during certain periods. A high percentage of the population suffered to some extent during the 1948 smog. Older individuals particularly were seriously affected with cardio-respiratory symptoms.

The exact way in which the contaminants due to gaseous wastes affect the human being is unknown.¹⁶ It is believed that the combination of contaminants rather than any single substance produces the toxic effects. The medical profession has much to learn about the effects of contaminants on human beings as a basis for determining when precise controls are needed.¹⁷

PROBLEM OF ODORS

Experiences in the evacuation of battle casualties in aircraft and their subsequent hospitalization have stimulated efforts to find ways of minimizing odors arising from draining wounds, old odorous casts, and gangrenous wounds. For aircraft, chemical sprays and vapors, perfumes, oxidizing gases and simple exhaust methods are unsatisfactory. An ideal deodorant would purify the air by means of odor adsorption so that subsequently the air could be recirculated. Individual adsorption units, utilizing the effectiveness of activated carbon, have been successfully employed to adsorb odors in commercial and industrial applications.

MAINTENANCE OF AIR-CONDITIONING SYSTEMS

New hospitals are often designed with air-conditioning systems in the wards. More and more often air conditioning is added to buildings.

Many of the problems which besiege hospitals are created in the designer's office. Basic errors, such as air inlets that are soon contaminated and necessitate a major revision, creep into the design. Moreover, in the necessity for saving space, units are so placed that maintenance becomes well-nigh impossible.

Since most hospitals are in economic difficulty, an effort is made to reduce the cost of equipment. Air-conditioning equipment takes its share of such deprecations, which never fail to incur hazards in such a case.

Since most hospitals are not staffed by mechanics expert in the maintenance of air-conditioning equipment, adequate preventive maintenance is not available. Repairs are made

when the equipment fails to work, or the occupants are overheated and underventilated. Also, for months without service electronic air filters may be broken and ionizer wires shorted out, leaving a good system in a sub-par condition.

CONCLUSION

References on hospital air conditioning do not always recommend complete air conditioning, yet there is direct evidence of the necessity for complete atmospheric environmental control for patients with heart and lung disease, premature infants, and patients undergoing long operations. Air conditioning is required in order to provide the required conditions under proper control.

The results with regard to health that can be achieved by a perfect air-conditioning system are evident from the operation of a U. S. submarine¹⁸ submerged for 61 days without surfacing and without encountering any problems, either physically or psychically, in connection with the personnel of 116 men. This fine medical record was made in spite of the opportunity for gross contamination from carbon dioxide, carbon monoxide, refrigerants, radon, and a wealth of bacterial and viral organisms.

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