Seminar Report

Indoor air quality

Federal agencies seek to cure "problem buildings" and protect human health

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AN INCREASING number of complaints about indoor air quality in new and older buildings, offices and private homes have attracted the attention of building owners, occupants, designers, researchers, and federal, state and local government agencies. The type and number of complaints correlate to several recent changes in building practice, building use, and expectations to the level of comfort in modern buildings. Although a number of such correlations have been demonstrated in relation to indoor environment, building design and performance, no generally accepted casualty has been documented for complaints especially in what has come to be known as "problem buildings".

Indoor air quality and energy conservation are not mutually exclusive. Hence, solutions to the problems associated with indoor air pollutants do not involve abandonment of energy conserving measures but the development of strategies to assure that indoor air quality does not pose a threat to human health.

The Federal Interagency Committee on Indoor Air Quality (CIAQ) is co-chaired by representatives of the Departments of Energy (DOE), Health and Human Services (DHHS), Environmental Protection Agency (EPA) and the Consumer Product Safety Commission (CPSC). The aim of CIAQ is to develop an understanding of the magnitude of the risk to human health from exposures to indoor air pollutants and the contributions of various energy conservation measures and introduction of new building materials and consumer products. CIAQ also provides technical information and guidance, including cost-effective mitigation measures, to state and local governments, the private sector and the general public.

As a co-chair agency of CIAQ, the U.S. Department of Energy is very active in coordinating its research on indoor air quality (IAQ) with that of the other member agencies. The mission of the DOE, which dictates the scope and extent of its IAQ research, is to promote energy conservation compatible with safe and healthful indoor environments. The intent of DOE's efforts is to provide information, not regulation. Within DOE, IAQ related research is performed by the Office of Conservation and Renewable Energy, Office of Health and Environmental Research, and the Bonneville Power Administration.

Emerson L. Besch, Ph.D., was chairman of the seminar "Dealing with the Indoor Air Quality Issue: Strategies and Experiences", which was presented at the recent ASHRAE Annual Meeting in Portland, Oregon. He is chairman of the Environmental Health Committee.

The Consumer Product Safety Commission has regulatory authority and has been involved in assessing the impact on the indoor air quality from the use of consumer products in homes and schools. In the last few years, the Commission had devoted substantial resources in this area because: a) the use of consumer products has been implicated as the major source of pollutants, b) the time spent indoors can be 70 percent or greater, and c) the exposure of susceptible populations such as infants, children, elderly and infirm. Specific products that have been investigated include urea-formaldehyde foam insulation, pressed wood products, textiles, asbestos products, kerosene heaters, unvented gas space heaters, glues, and paint strippers. Most of these products were investigated for the emission of volatile components such as formaldehyde, carbon monoxide, nitrous oxides, hexane, and methylene chloride, which have the potential of causing health effects in an exposed population.

The goals of EPA indoor air quality strategy include the characterization of indoor air quality in the United States, determination of the health effects of indoor air pollution and alternatives for their mitigation, integration of the IAQ characterization - health - source data with other environmental data to give an assessment of total human exposure to a broad range of chemicals, and the ultimate development of more practical and effective strategies for controlling and managing risk associated with total human exposure. A multipollutant national survey for organic compounds, combustion products and formaldehyde will determine the distributions of indoor air pollutant concentrations in homes in the U.S., measure indoor pollutant concentrations for relative risk and evaluation and identify possible sources contributing to indoor levels. Other EPA studies deal with non-occupational pesticides exposures, health effects of hazardous pollutants and source mitigation and toxic emissions.

A group of complaints have been identified by the World Health Organization (WHO) as being correlated in many problem buildings. This pattern of symptoms has been used for definition of the "Sick Building Syndrome," which include a number of non-specific symptoms including sensory irritation, effects in the airways and weak neurotoxic or hypersensitivity reactions. A multifactorial dose response relation between the number of complaints and indoor environment has been suggested. This relationship incorporates factors from such disciplines as medicine, chemistry, physics, sociology, psychology, and economics. The multifactorial dose response model may be used in evaluating "problem buildings". ■