Indoor Air Quality Update®

A Guide to the Practical Control of Indoor Air Problems, from Cutter Information Corp.

Vol. 6, No. 1 January 1993

US Government Workers Overwhelmingly Report Poor IAQ

The union that represents workers in the US Social Security Administration (SSA) is targeting poor indoor air quality as an issue that affects thousands of workers nationwide.

The union made the move because nearly two-thirds of SSA employees who responded to a survey on working conditions and health said they have suffered symptoms that they blame on poor indoor air quality. While many reported these symptoms to their supervisors, very few felt that management did anything to remedy the situation.

The American Federation of Government Employees (AFGE) commissioned the survey in response to a 1991 outbreak of Legionnaire's Disease at the Richmond, California, Social Security office, in which one person died, three others contracted the disease, and about a dozen more required medical attention (see ***IAQU***, November 1991).

In the recent survey, conducted by Frederick/Schneiders Inc. of Washington, DC, researchers sent questionnaires to 48,000 SSA employees across the country. Of those, 5,420 responded, and researchers reported a margin of error of ± 1% at the 95% confidence level.

Among those who responded to the survey, a majority reported suffering the following symptoms:

- Sinus or nasal congestion — 65%;
- Sneezing and coughing — 60%;
- Fatigue — 52%; and
- Eye, nose, or throat irritation — 51%.

Over three-fourths of those who reported the above reactions said the symptoms disappear when they are away from the office.

In addition to these subjective reports of symptoms, many employees said they have been diagnosed by physicians as having specific conditions:

- Allergies — 30%;
- Reproductive disorders — 9%;
- Asthma — 8%; and
- Dermatitis — 8%.

IN THIS ISSUE

One-third of the respondents reported that they have had a respiratory illness that caused them to be absent from work for more than three days, and 56% of those said that there often appears to be a pattern of illness in the areas where they work.

A significant finding of the survey is that almost all of the respondents feel that indoor air quality at least contributes to their health problems. According to the survey results, of those who reported symptoms, diagnosed conditions, or both, 63% believe their working conditions caused these problems. However, 95% said they feel that poor IAQ contributed to their condition.

Over half of those surveyed indicated that they lost time from work and were seen by a physician, while one-third said they lost three or more days of work.

Of those who didn't lose time from work, more than one-third said they feel they were unable to perform their jobs effectively and safely.

Ventilation

Some 96% of those responding said their workplace has an air conditioning system, but many reported problems with these systems.

A common complaint (89%) was that dramatic temperature change occurs during the day. Humidity problems also formed the basis for many complaints. Low humidity at times caused problems — dry, scratchy skin or throats — for 69% of the respondents, while high humidity at times was a problem for 56%.

Over half — 56% — said they notice dust or odors coming from the ventilation system and 39% claimed they have seen air supply vents blocked in their workplace.

Odors or Fumes

Many respondents said fumes and odors affected them in the workplace. Among the chief complaints were cleaning compounds, reported by 70% of the respondents.

Flooring, paneling, and carpeting formed a group that was the second most common complaint, cited by 53% of the respondents, while 52% said fumes from equipment or machinery affected them at various times. Large numbers of respondents reported odors from paint (49%), pesticides (41%), and vehicle exhaust (38%).

Other sources of fumes and odors mentioned include dust, bathrooms, sewage, cooking or food, and perfumes.

Management Response

While over two-thirds of the respondents — 68% — claimed they had reported their problems to their supervisors, only 34% said the agency or building management attempted to find the cause or tried to remedy the situation, and only 6% said the problems have been corrected.

This has led the union — AFGE — to call for action on the part of the government to deal with the situation. Dave Mack, president of AFGE Local 1122 — the local at the office where the Legionnaire's Disease outbreak occurred — said the survey results have been forwarded to both the US Occupational Safety and Health Administration and to the General Services Administration.

Mack commented, "When 5% of workers who are ill identify poor indoor air quality as a source of their illness, we need to take notice. But when 95% believe that poor indoor air quality leads to health problems, we need to take action."

For more information, contact: Dave Mack, AFGE Local 1122, P.O. Box 2662, Richmond, CA 94802, USA; (510) 970-1175. For more information on the survey, contact: Frederick/ Schneider Inc., 1818 N Street NW, Washington, DC 20036, USA; (202) 785-3535.

THE YEAR IN REVIEW

Public Awareness Leads IAQ Developments in 1992

Looking back over 1992, the one thing that seems to emerge as the dominant development in indoor air quality (IAQ) is a growing public awareness of the problem and, at least in some quarters, a growing official recognition of that awareness.

While many individuals, particularly in the US, had heard or used the phrase "sick building syndrome (SBS)," many people had used it only in a loose sense and were unsure of what it was, how it affected them, or what they could do about it.

Several factors — the persistence of IAQ professionals and researchers, some notable sick building cases, and the glare of mass media publicity — have combined to raise the public consciousness, in the US and elsewhere, that IAQ is a serious problem.

IAQU staff members have taken a look over the past year and have selected 10 stories that represent the developments in the field. These are not necessarily the most important stories for the long term. Obviously, research that may someday help define or resolve the problem cases would be the most important. Our selections are important now, because they are the ones that have brought about — or have been brought about by — growing public awareness.

1. Carpets and IAQ

Carpets did not become a new IAQ problem during 1992, but then neither did they cease to be problematic. While the US Environmental Protection Agency's (EPA) Carpet Dialogue ended in late 1991, enough developments surfaced in the last year to make sure this is a topic of ongoing concern.

Close on the heels of the EPA's acceptance of the memoranda of understanding from various groups involved in the dialogue, the Carpet and Rug Institute began what it calls its "Green Tag Testing," which allows carpet manufacturers to have product samples tested in research labs for carpet emissions. Carpets that successfully pass muster may bear special tags telling consumers that the emissions are below currently accepted standards.

However, this hopeful news for the industry was immediately overshadowed by reports out of Anderson Laboratories of Dedham, Massachusetts, which showed that so-called "problem carpet" samples that had been sent to the lab provoked dramatic responses in the mice used in mouse bioassay tests (see ***IAQU***, September 1992).

All the mice that were exposed to the problem carpets demonstrated neurological impairment and many of them died. The study was immediately called into question by the carpet industry, but so far no one has been able to explain away the results. Anderson Labs, in reporting the results to ***IAQU***, didn't make any claims based on the study, other than to suggest that whatever affected the mice may also have been what affected the people who claimed they had reactions to the carpets.

The upshot of the story was more intense media coverage, both at the network news level and on local stations. Also, the attention has prompted one member of the US Congress, Rep. Bernie Sanders of Vermont, to ask for a congressional investigation.

2. Workplace Surveys

Two rather substantial workplace surveys (both reported elsewhere in this issue) have documented that workers, both in Europe and in the US, experience health-related problems at work, and, in both cases, respondents feel that these problems are connected to IAQ.

The Netherlands study surveyed over 7,000 workers in 61 office buildings (see related story on page 9). The results show that respiratory and other IAQ complaints are higher in air-conditioned buildings than they are in naturally ventilated buildings.

The study also shows a correlation between IAQ complaints and job dissatisfaction, although it's still not clear whether job stress causes some health complaints, results from an unacceptable indoor environment, or, as some suggest, is part of a cyclical mechanism, whereby job stress causes a greater sensitivity to substandard environmental conditions and the reaction to those conditions creates more job stress.

The US research (see related story on page 1) may have more repercussions. Of over 5,000 Social Security Administration workers who responded to a mail survey, nearly two-thirds said they suffer various health problems while at work, and most blame poor IAQ for the symptoms.

Officials of the union representing the workers — and other government employees — vowed to pursue the matter and take the IAQ issue to the US Occupational Safety and Health Administration.

One union official said, "When 5% of workers who are ill identify poor indoor air quality as a source of their illness, we need to take notice. But when 95% believe that poor indoor air quality leads to health problems, we need to take action."

Earlier in the year, results from a survey of 11,000 members of the International Facility Management Association showed that IAQ was high on their list of concerns. About 24% of those questioned responded on IAQ issues and most said they had taken some direct action to improve conditions in their facilities.

3. Public Reaction

When a network news program in the US carried a story about a sick building problem in the Chicago, Illinois, area, it also carried the telephone number of the US National Institute of Occupational Safety and Health (NIOSH). The show told viewers that if they called this number, NIOSH would investigate IAQ problems in their buildings.

Within hours, the telephone lines into NIOSH were jammed with workers' complaints. The number of calls that were unable to get through was several times higher than the number that did get through. NIOSH reported that in the two weeks following the broadcast, it received nearly 20 times as many calls as it usually receives in an entire year (see ***IAQU***, November 1992).

At year's end, the calls were still coming in, although at a slower rate. As of mid-December, more than 5,000 callers cited the network news story as the motivation for their call. Also, a similar story on one local station, also with the NIOSH number, prompted another 700 calls. The agency normally receives about 150 calls a year. NIOSH officials told ***IAQU*** that, while they can't ignore the workers' complaints, the agency's ability to deal with this number of cases is severely limited.

This reaction demonstrates at least a public perception of a problem affecting many office buildings in the US. It also shows that many workers feel that building owners and managers aren't doing anything to resolve the problem.

The story that spurred this flood of calls was about the DuPage County courthouse in Illinois, which had to be evacuated because of IAQ problems. The year-old building had cost the county over $53 million, but because of serious design and operation problems, nearly all of the 700 occupants experienced SBS symptoms, some of them severe enough to require emergency medical attention (see ***IAQU***, October 1992).

All the occupants were removed from the building after an industrial hygienist who investigated the case found chemical contamination, as well as numerous flaws in HVAC design and operation, and recommended a $1.5-million redesign and renovation of the building and its ventilation systems.

4. European Ventilation Guidelines

The Commission of the European Community (CEC) issued new ventilation guidelines that go well beyond the ASHRAE 62-1989 Method 1 standard of 20 cubic feet per minute (cfm) per person, which has become the *de facto* standard in the US.

The CEC guidelines, a precursor to a more complete standard due out late next year, take into account pollution sources — both from occupants and from the building and its furnishings. Through a series of formulas that factor in both these pollution loads and the desired air quality — expressed in terms of the percentage of people dissatisfied — the guidelines help designers arrive at a ventilation rate.

While ASHRAE 62-1989 has similar formulas in its Method 2, many IAQ professionals say the formulas are difficult to use and many practitioners simply revert to the 20 cfm/person standard. However, ASHRAE officials involved in the revision of Standard 62 say they are in contact with people on the CEC committee and are looking toward a revision that will bring the two efforts closer together.

Some people have criticized the European guideline for being equally difficult to use, principally because it relies on the estimation of pollution loads and because of the wide range in the definition of air quality acceptability. The guideline gives formulas for IAQ levels in which 10%, 20%, and 30% of the occupants are dissatisfied.

One IAQ professional told ***IAQU*** that in a litigious climate such as in the US, building operators would find it difficult to defend a decision to ventilate a building to the least desirable level of air quality.

The CEC guidelines also give different formulas for health and for comfort and tell designers to calculate each and then specify the higher of the two ventilation rates. In practice, according to the guideline, the comfort level will most often determine the overall ventilation rate.

5. The Resurgence of Tuberculosis

Tuberculosis (TB) — a destructive lung disease — once plagued industrialized nations. With the advent of effective drugs a few decades ago, TB nearly disappeared, at least in developed nations, but a combination of factors has brought it back to levels sufficient to cause concern to public health officials.

The prevalence of Acquired Immune Deficiency Syndrome (AIDS), the use of intravenous drugs, and the emergence of drug-resistant TB strains

have once again made the disease a concern to public health officials.

Because this is an airborne disease, anyone who deals with IAQ issues in at-risk situations needs to be concerned also. Fortunately for most building managers, the risk is greatest in facilities that house at-risk populations on an ongoing basis. This includes prisons, homeless shelters, and hospitals.

While occupants of other buildings — such as office buildings — could be infected from a person with TB who spent a lot of time in the building, there is little building managers can do from a practical point of view beyond making sure that ventilation is adequate for comfort (see ***IAQU***, December 1992). Beyond that, the decrease in risk is negligible and generally not worth the cost and inconvenience.

TB experts tell ***IAQU*** the best way to deal with the situation, as with many other threats within the building environment, is to identify and remove the source.

6. Environmental Tobacco Smoke

Environmental tobacco smoke (ETS) has long been a controversial topic. It didn't become any less controversial in 1992, even after the EPA's Science Advisory Board approved a report that classed ETS as a "known human carcinogen." The report was finally approved in the first week of 1993 (see related story on page 13.)

Tobacco industry representatives point to other scientific studies that don't purport to show that ETS is safe, but that the link between ETS and respiratory disease is not strong enough to ban smoking or that the ETS-health link exists only in home situations and not in the workplace. The fact that many of these studies are conducted by researchers who work or have worked for the tobacco industry has created a controversy in itself.

Others contend that tobacco smoke as an irritant in the indoor environment is a symptom of poor indoor air quality, rather than a cause of it. Many of these studies contend that ETS in the workplace can be dealt with through proper ventilation. The tobacco industry, with its very deep pockets, has managed to launch major media and lobbying campaigns whenever there is a threat of restrictive rules or legislation.

One interesting study from California (see ***IAQU***, September 1992) showed that half measures don't work for ETS control in offices. The study revealed that employees in offices with partial smoking bans were exposed to ETS nearly as often as employees in offices with no ban at all. The study concluded that the only effective measure is a total smoking ban.

IAQU addressed the topic in the September 1992 issue and recommended that the burden of proof be shifted in the debate, and that those who advocate smoking or resist smoking bans be required to prove that ETS is either safe or that the cost of controlling it can be justified in the face of other demands.

7. IAQ Legislation

In the US, despite several years of effort, laws on IAQ issues remain fragmented and inconsistent.

Federal IAQ legislation stalled in Congress again last year and all hopes for it died when representatives adjourned in the fall. Its poor showing seems more related to lack of enthusiasm, rather than outright opposition, although the calls to NIOSH cited above may spur more legislators to become concerned.

Some states have put laws on the books. New Jersey and Washington implemented IAQ rules, but the effort in many states seems to be based more on current industrial standards than on the more rigorous requirements for nonindustrial buildings.

In October 1992, the Model Law Task Force unveiled the results of its efforts, proposing a framework for legislation that states could adopt to regulate IAQ issues (see ***IAQU***, November 1992).

The proposed law would have four sections, dealing with:

- An IAQ management plan;
- A state IAQ report and response process;
- The designation of an IAQ office and representative; and
- Creation of a temporary state commission on IAQ.

8. OSHA and Rulemaking

The US Occupational Safety and Health Administration (OSHA) dealt with two major rulemaking issues during the year.

In response to a request for information (RFI) about whether to enact IAQ standards or guidelines, OSHA received more than 1,200 responses and over 17,000 pages of comments. However, the political situation in Washington,

DC, especially the change in administrations, has left in limbo the decision on whether to enact rules and the type of rules they would be.

Decisions such as these are made at, or close to, the cabinet level, and with a new administration, it remains to be seen what the feeling on IAQ will be and whether it will be a priority issue.

In another development, OSHA suffered a serious setback when an appeals court threw out workplace air quality rules that were scheduled to go into effect at the end of 1992 (see ***IAQU***, August 1992).

The Air Contaminants Standard, issued in January 1989, lowered the permissible exposure limits (PELs) on 212 substances, established new PELs for 164 previously unregulated substances, and left 52 others unchanged.

The court took exception to OSHA's attempt to set limits for hundreds of substances without providing the required scientific evidence for each one. OSHA, in appealing the ruling, said it would be virtually impossible for the agency to deal with hundreds of chemicals in the way it has in the past.

The ruling stalled OSHA's work on other PELs, including those for agriculture, construction, and maritime industries. Hearings on those rules had been scheduled for the fall, but were delayed pending the outcome of OSHA's appeal.

9. Multiple Chemical Sensitivity Debate

It was a mixed year for advocates of those who claim to suffer from multiple chemical sensitivities (MCS). First, in an attempt to counter an opinion in the *Annals of Internal Medicine* that MCS has not been proven to exist, the National Center for Environmental Health Strategies (NCEHS) asked the American College of Physicians (ACP) to rescind its position. The ACP took the request under advisement.

Later in the year, the US Congress voted $250,000 to further study MCS and to establish a registry of those affected by it. This move was hailed by NCEHS as a victory for those espousing the MCS cause.

At year's end, the American Medical Association's Council on Scientific Affairs recommended that further study is needed to clarify the MCS issue. The council noted the number of people reporting MCS symptoms and said they can't be classified as hypochondriacs, but also said the studies completed to date had not offered adequate scientific proof of MCS as a disease syndrome.

10. IAQ Resources

As the IAQ issue heats up — in many countries — the resources available to those concerned with IAQ seem to be keeping pace.

While one international organization — Indoor Air International — marked the end of its third year in 1992, another group began recruiting members. The International Society of Indoor Air Quality and Climate has held a number of organization meetings and has enrolled several hundred members already.

In the US, the National Coalition on Indoor Air Quality sponsored the first *Annual IAQ Conference and Exposition* in Tampa, Florida, attracting nearly 900 people. The success of the first event has prompted organizers to plan another for this spring.

The American Industrial Hygiene Association has recognized indoor environmental work as a subspecialty and announced in 1992 that the group would hold certification exams for the subspecialty beginning in 1993.

As 1992 ended, plans were well underway for *Indoor Air '93*, the triennial conference, which will be held in Helsinki, Finland, this July.

PRACTICAL RESEARCH BRIEFS

Carpets and Ozone: Study Finds a New Wrinkle on an Old Problem

Ozone may play a leading role in carpet problems, reacting with compounds in the carpet fibers and backing, and changing the mix of chemicals that affect IAQ.

Researchers at Lawrence Berkeley Laboratory at the University of California at Berkeley, California, USA, tested four carpet samples in an environmental chamber and found dramatic results when they subjected the carpets to ozone levels that could occur indoors under certain conditions.