Ozone: Indoors may offer little protection

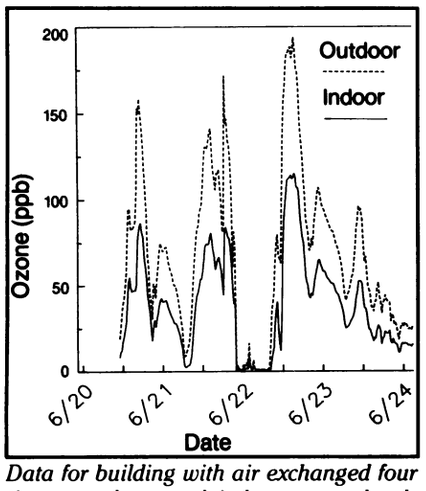
Premature cracking of rubber — from seals and gaskets to microscope eyepieces — plagued Bell Communications Research Inc. (Bellcore) facilities in Red Bank, N.J. A rubber band, once stretched, could break in a week. The rubber casing on an appliance power-cord, when bent, would start cracking within months. Bellcore chemists eventually identified the culprit: smog ozone sucked indoors through ventilation. "That surprised us," says Charles J. Weschler, a senior scientist there, because most air pollution researchers have assumed indoor levels of smog ozone stand next to negligible.

Weschler's new data, reported last week at the American Chemical Society's fall national meeting in Miami Beach, show that indoor concentrations of this respiratory irritant can exceed 70 percent of outdoor levels.

For 150 days last summer, Weschler and his colleagues collected continuous ozone measurements both in and outside three Bellcore buildings differing only in the amount of outdoor air flushed through each hour. In one building used primarily for offices, air was replaced completely every 100 minutes. In the two that housed research labs, indoor air was exchanged with fresh outdoor air four to eight times per hour. The higher the air-exchange rate, the greater the indoor ozone level, according to Weschler's data.

Indoor sources, such as photocopiers and laser printers for computers, contributed little ozone, he found. However, even small, brief changes in outdoor ozone levels prompted indoor levels to rise and fall in lockstep.

Because most people spend the bulk of their time inside, the new findings indicate they may inhale more ozone indoors than out, Weschler says. And mechanically ventilated buildings aren't the only ones posing a risk: Homes with open windows can exceed five air exchanges per hour. That's worrisome, Weschler says, because more than half of U.S. residents live in areas that don't meet the national air-quality standard for ozone of 120 parts per billion. Though many technologies, such as activated charcoal, can filter ozone from indoor air, Weschler says "people won't use them if they don't realize indoor levels can be high."



Data for building with air exchanged four times per hour and indoor ozone levels averaging 54 percent of outdoor levels.

While nobody thought indoor levels were zero, "most of us had believed they were not very significant," says William F. McDonnell, an Environmental Protection Agency ozone toxicologist in Research Triangle Park, N.C. It now appears indoor ozone could add greatly to a person's lifetime cumulative dose, he adds, noting that researchers have observed adverse lung changes in chronically exposed animals.

Michael D. Lebowitz, an ozone epidemiologist at the University of Arizona in Tucson, doubts indoor exposures will frequently exceed those outdoors. He reasons that people tend to be more active outdoors, and notes that exercise increases the breathing rate — including ozone inhalation. But Lebowitz says Weschler's data do suggest that certain people may face a special risk during acute smog episodes: children exercising strenuously in homes and schools that lack air conditioning, and laborers who work up a sweat in well-ventilated buildings.

— J. Raloff

Sizing up SADness according to latitude

For eight years, psychiatrists have studied small groups of people suffering from depressions that recur in either winter or summer. It now appears that at least 4 percent of the population living at middle latitudes suffers from seasonal depression.

"This is a much more common problem than we thought several years ago," says Norman E. Rosenthal of the National Institute of Mental Health in Bethesda, Md., a coauthor of the report in the September Archives of General Psychiatry.

In a random sample of 416 adults contacted by telephone in Montgomery County, Md. (just outside Washington, D.C.), 18 people reported symptoms of recurring winter depression and three fulfilled criteria for summer depression. Personal interviews with 40 of the respondents yielded four cases of winter depression. Psychiatrists refer to these depressions as seasonal affective disorder, or SAD.

If the prevalence estimate accurately reflects Montgomery County's population, more than 22,000 of its residents contend with SAD.

Some investigators say winter SAD can occur from fall through winter. The new study focuses on people who feel the worst in January and February. Symptoms include a marked drop in mood, lack of energy, oversleeping, overeating and carbohydrate craving. Summer SAD peaks in July and August. Its characteristic symptoms include agitation, insomnia and appetite loss.

There were significantly more cases of SAD among women 21 to 40 years of age than in any other group, the researchers note, a finding consistent with the higher prevalence of nonseasonal depression among young women.

Another 56 respondents reported milder but noticeable symptoms of winter and summer SAD. The scientists, led by Siegfried Kasper of the University of Bonn, West Germany, conclude that SAD represents the extreme end of a spectrum of seasonal mood and behavior changes affecting a substantial minority of the population.

According to the researchers, nearly half the respondents in Montgomery County had heard or read about SAD, which may have led to an overreporting of seasonal symptoms in this well-educated community. But further studies tend to support the prevalence estimate, Rosenthal asserts.

"There is an increase in the prevalence of SAD with increases in latitude," he adds.

In an unpublished study, Rosenthal and his co-workers evaluated about 1,400 questionnaires filled out by patients visiting physicians' offices in Florida, Maryland, New York and New Hampshire. SAD symptoms were reported by 1.4 percent of the Floridians, 6.3 percent of those living in Maryland, about 8 percent of the New Yorkers and nearly 10 percent of New Hampshire residents.

The prevalence of mild SAD symptoms ranged from 2.6 percent in Florida to 11 percent in New Hampshire.

Preliminary results from a study conducted by another researcher suggest 9 percent of the population in Alaska has winter SAD, and as many as one out of five Alaskans suffers from milder symptoms of the disorder.

Some psychiatrists claim that SAD is not a discrete disorder, but rather a collection of symptoms seen in people with other types of depression.

"It's valid to ask to what degree SAD is separable from other psychiatric syndromes," Rosenthal says. But clear cases of recurring, seasonal depression have emerged in the last eight years of research, he maintains. Long-term studies of SAD patients, who often feel better after sitting in front of bright lights (SN: 5/21/88, p.331), are now being planned.

— B. Bower