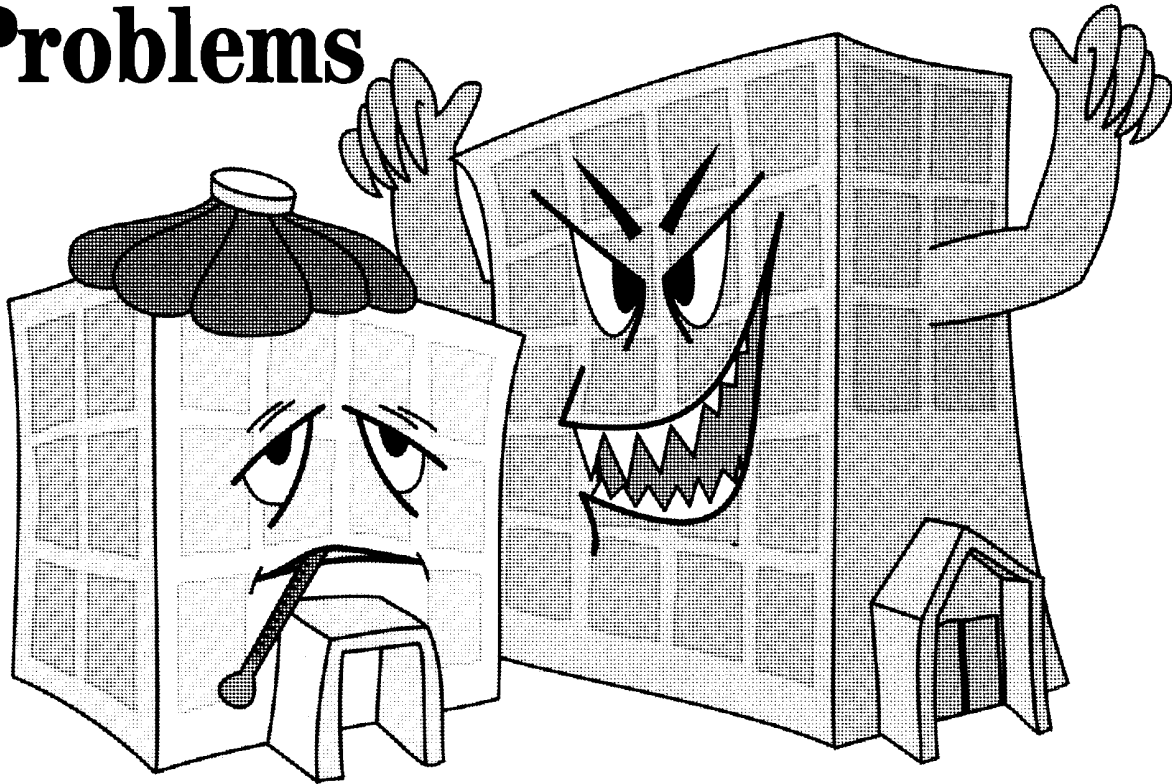


# Solving the Sick Building Syndrome and Building-Out-of-Control Problems



**By Albert P. Prior, P.E.**  
*Senior Vice President and  
 Chief Operating Officer  
 Erdman Anthony Consulting  
 Engineers*

“It gets so warm in the office area that we fall asleep by three o’clock in the afternoon,” one administrator reports. “Even on the coldest day, we roast out here in the atrium. You would expect it to be cool in the winter, but it isn’t,” comments the receptionist.

What they are discussing is an attractive multi-story building about five years old. With 100,000 square feet of space, it’s conveniently located adjacent to a major expressway in suburban Boston.

When new carpet was installed in the atrium reception area of this building, the company’s receptionist staff developed headaches and nausea and were unable to work in the area. The switchboard was relocated to another floor. One receptionist became so ill she took sick leave.

As it turns out, this is an example of both the sick building syndrome and a building out of control. Unfortunately for the tenants of this particular building, both conditions occurred simultaneously.

In a situation like this, it’s almost as if the building were haunted. Occupants act as if there is something so unusual going on in the building that it has a life of its own. In effect, it isn’t a pleasant work environment.

What caused the severe illness problem at the time the new carpet was installed? Although many months have passed, all the answers are still not in. Was the problem with the adhesive? Was the problem aggravated by the intense heat in the atrium? Were the manufacturer’s installation instructions followed? Was there a problem with the ventilation equipment since there may have been a difficulty with the system?

All of these questions need to be answered. It’s not easy sorting out the pieces and quickly coming up with the right solution while keeping disruption to a minimum.

The best way to find the answers is to take the correct steps.

**1. Stop tinkering.** Without ques-

tion, the most common approach to the sick building syndrome or one where the systems are out of control, is to use band-aid type solutions. It's understandable why everyone expects a quick fix. It is assumed that there's a simple solution to the problem, particularly with new buildings. But months may pass, the difficulties remain, and the tenants become increasingly unhappy.

No one wants to spend unnecessary money and this is certainly why the tinkering approach is taken so often. On the surface, it may seem the least expensive answer, although it usually turns out to be the most costly because it doesn't offer genuine solutions to what can be extremely serious problems.

**2. Make a thorough, systematic analysis.** Anything less than a thorough, systematic approach is generally futile, even though this approach takes longer initially and may be more expensive.

In the relatively new building, for example, heating was never adequate in some areas, while other parts of the same floors couldn't be cooled. Not only were the occupants upset, but the utility bills were shooting out of sight.

After several failed attempts to correct the problems, an engineering firm was called in to make a thorough assessment. The first step was to review the building plans, including the mechanical systems. Then individual areas of the building were tested to determine the exact nature of the problems.

When the records of the maintenance contracting company were reviewed, it became clear that basic preventive maintenance steps had not been taken in an effort to keep expenses to a minimum.

Because they had been ignored even over the relatively short life of the building, the heating and air conditioning controls had become frozen in the open positions. In those sections of the building that were either too cool or too warm, both heat and air conditioning were running simultaneously! It was too cool at the center of the building where there were no win-

dows and too hot where there was glass, and an air stratification condition persisted in the atrium.

**3. Follow the directions.** Following the directions may be the most difficult step of all. In fact, one computer manufacturer encloses a note with its equipment which reads, "After you have tried to do it yourself and failed, read this." Unfortunately, this is what happens with too many of today's buildings. People only read the instructions after there's trouble, a major reason why the sick building syndrome is experienced more and more often.

Modern construction techniques allow buildings to be "sealed" to the point where the only air movement occurs through the heating and air conditioning systems. Ironically, opening windows in such a building would only upset this delicate balance and distort the environment, thereby further reducing the efficiency of the systems.

When any noxious odors escape into the air, they are circulated instantly. The new carpet that caused a receptionist to become ill and forced the reception area to be relocated to another floor may well have been the result of carpet installers' failure to follow the manufacturer's instructions which called for the carpet to be unrolled in a well ventilated area for 72 hours before being installed.

In this particular situation, the carpet was installed as it was being unrolled without the 72 hour airing period. Not only was this a costly error for the building owner, but the experience has cast a semi-permanent pall over the entire building. Since the incident occurred, the number of occupant complaints has risen steadily.

At another building, the facilities maintenance people reduced the amount of outside fresh air flow in order to save energy. All of a sudden, a number of occupants began complaining of headaches. Some even became lethargic, while others experienced attacks of nausea.

With a reduction in outside fresh air, there is the possibility of an increase in contaminants. A lack of proper air flow may result in high lev-

els of CO<sub>2</sub>, which may cause headaches.

Installing improper filters or a failure to change filters on schedule can also be a source of a problem. All of which is another example of failing to follow directions.

Today's buildings are some of the most sophisticated environments that exist. Unfortunately, they are not nearly as forgiving as structures built many years ago. It is essential to learn to treat them with the same respect and care that we do all other types of highly sophisticated equipment.

Although buildings appear solid, permanent, and strong, they are actually far more fragile than we are willing to admit. Only by following a rather stringent approach for managing them internally can they serve the purposes for which they were built. ■



*Albert P. Prior, P.E., is senior vice president and chief operating officer of Erdman Anthony Consulting Engineers of Boston, MA. A professional engineer with more than 36 years of experience, Mr. Prior is a member of the National Society of Professional Engineers, Institute of Electrical and Electronic Engineers, Illuminating Engineering Society, Society for the Marketing of Professional Services, Society of American Military Engineers, and the Boston Society of Architects.*