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Bulletin #53, The Sick Building (Part 2) (February 8, 2002)

In The Sick Building (Part I), ZZZ Sheet Metal had installed a design/build HVAC system in the headquarters of DoughDot, a high–tech firm. The building was to be a showplace of corporate innovation. Only the best materials and system components were used, and the building owner displayed an almost fanatical obsession with energy efficiency. By the end of Contracts Bulletin #52, ZZZ had found itself one of the defendants in a multi–plaintiff lawsuit based upon "sick building syndrome." This Bulletin will further explore "sick building syndrome," and its particular impact upon the HVAC contractor/subcontractor. Of course, the outcome for ZZZ Sheet Metal will also be revealed.

In the 1960s, any reference to a "sick building" would have brought forth only a puzzled look in response. Today there are over 50,000 Web sites dealing with indoor air quality issues and resulting health problems. National and local news stories on air quality related illnesses are common. Major disease manifestations, such as the Legionnaire's Disease outbreak in Philadelphia in 1976, have heightened public awareness and concern about indoor environmental risks. Materials once considered benign (i.e., lead) or beneficial (i.e., asbestos) are now considered potential hazards to health. As the construction professional primarily responsible for heating and cooling systems and air distribution, the HVAC subcontractor has particular reason to be concerned about both the perception and reality of "sick building syndrome."

There were clearly far fewer concerns with indoor air quality prior to the mid–1970s, notwithstanding the prevalence of cigarette and other smoke in the typical workplace. In the early to mid–1900s, building ventilation standards called for approximately 15 cubic feet per minute (CFM) of outside air for each building occupant. However, in the mid to late 1970s, energy prices skyrocketed. Driven by economic realities and an emphasis on conservation, architects, engineers and owners recognized that successful buildings would have to be highly energy efficient. Building materials changed. Insulation levels were dramatically increased. Reflective glass, often with two or three panes, came to replace the single–pane, clear window. Air leaks were hunted down and eliminated. Intake of outside air was carefully monitored, particularly when the external temperature was much higher or lower than the optimal indoor conditions. National energy conservation measures called for a reduction in the amount of outside air to five CFM per occupant. Doorway systems were designed specifically to minimize the entry of outside air. The "tightness" of a building became synonymous with a quality, energy–efficient design.

Even before the move toward energy efficiency, new commercial buildings had begun incorporating heating, ventilating and air conditioning systems based primarily upon forced air distribution. These air–handling systems were not only generally more energy efficient than the earlier boiler/radiator systems; they were also more flexible and adjustable. The use of the same ductwork for heating and air conditioning was obviously a major cost advantage. With electronic monitoring and balancing systems, the heating and cooling functions could be precisely balanced by floor and even by small zones within each floor. A well–designed, properly balanced HVAC system became one of the most critical components in the pursuit

of energy efficiency. Obviously, part of this efficiency derived from re−circulation of inside air (along with whatever else might be in the ductwork or the plenum).

Yet another movement was gaining momentum in the 1970s and 1980s: “mass tort” litigation. Whether the particular cases involved breast implants, tobacco, pollution, or asbestos, large classes of plaintiffs were being certified to pursue claims against entire industries. Such lawsuits became front page news throughout the country. Huge settlements and verdicts were heavily promoted by the media and plaintiffs’ attorneys. Some came to refer to this as the “litigation lottery” through which ordinary people might strike it rich by simply being in the right place at the right time. Movies and television often promoted a predatory image of business and an “us against them” mentality. Employees were increasingly willing to sue their employers based upon discrimination, harassment, working conditions or other actual or perceived wrongs.

All of these trends come together within the context of the “sick building syndrome.” There is no question that faulty design, construction or maintenance of buildings has triggered health problems. For example, it was concluded that the Legionnaire’s Disease outbreak in 1976 resulted from inhalation of mist from cooling towers. Subsequent outbreaks of the disease have occurred around the world, notwithstanding general recognition of the need for testing, water treatment, cleaning and disinfecting of such towers. Inhalation of asbestos fibers from deteriorating pipe wrap and fireproofing has been suspected as a cause of lung disease. In one newly constructed Massachusetts government building, the passage of return air over poor quality ceiling tiles actually caused the ceiling tiles to “ferment,” releasing butyric acid and other materials into the air. Ultimately, 80% of the people in the building developed symptoms of illness and the building was evacuated.

Issues have also arisen when HVAC systems have been poorly designed or maintained resulting in a build up of stagnant water within ducts, humidifiers or drain pans or where water has collected on ceiling tiles or in insulation. Such a build up of water can result in the growth of bacteria and molds that can produce very serious, and even fatal, health effects. (Leaky roofs, windows and curtain walls can result in the same type of condition, particularly if ventilation is inadequate).

Improperly located air intakes can also affect the quality of indoor air. For example, an intake too close to a parking ramp may draw motor vehicle exhaust into the building air supply. Materials used in the manufacture of furniture, carpeting, upholstery and even the chemicals used in office equipment have triggered symptoms of illness, particularly where there is a limited exchange of outside air.

Over and above legitimate health issues associated with indoor air quality, the mind−set of much of the public and evolving trends in the legal system have created the danger that the “sick building syndrome” could gain sufficient momentum to become a significant threat to the construction industry (and particularly the HVAC subcontractor). Following each replay by PBS of its NOVA presentation on sick building syndrome, people around the country may find themselves wondering whether their fatigue or frequent colds are being caused by their workplace, rather than the presence in their home of small children possessing a constant case of the sniffles.

In the case of ZZZ Sheet Metal, the nightmare had become a reality. The subcontractor had undertaken design responsibility for the HVAC system, and the system was installed substantially as the subcontractor had designed it. Changes in other components of the building to increase energy efficiency (which also impacted air circulation) might have been partially to blame for whatever air quality issues existed. Subsequent construction of a parking ramp near the air intakes was an obvious potential source of air quality problems. Above all, there was a very real issue as to whether any condition existed that posed a legitimate health risk to employees or whether a panic−like phenomenon had been created based upon rumor, innuendo, and other employee agendas (i.e., “There’s no way they can fire me now, given my health complaints.”). Ultimately, the inability to pinpoint any cause of the wide variety of employee symptoms, along with the continuing costs of litigation for all parties, compelled them to reach a settlement. As a result of the settlement, the air intakes were moved, filtration systems were installed in the HVAC system, and additional outside air ventilation was provided. ZZZ and its insurer paid into the settlement fund, and ZZZ performed some of the retrofitting work at no charge. The HVAC subcontractor survived, but not without

major expense and distraction.

For the HVAC subcontractor, indoor air quality will pose an ongoing challenge. Knowledge of ventilation standards (i.e., system design standards, ASHRAE standards, etc.) will be essential. Considering air quality (particularly in the design/build scenario), and offering filtration options would certainly be advisable from the standpoint of the subcontractor, even if the owner or general contractor elected not to install the filtration systems. (This is particularly true given the current emphasis on security and the impact of terrorism.) Obviously, any system design has to be implemented to avoid the collection of stagnant water within the ductwork or other components of the system. Perhaps most importantly, the HVAC subcontractor must make certain that clear system maintenance requirements are specified.

As always when the subcontractor assumes design responsibility, there is also the need to obtain competent engineering advice, confirm the availability of insurance coverage for design liability, and confirm that the consultant/engineer has applicable insurance coverage. Finally, this is an area where allowing “consequential damage” provisions to remain in your contract could pose enormous risks. In the case of ZZZ, the subcontractor could well have found itself responsible for financial consequences as extensive as the shut down of the entire DoughDot company.

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