

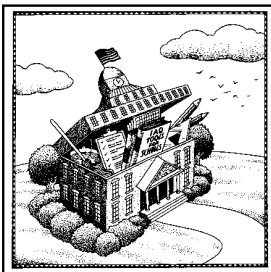


CASE STUDY

BURLINGTON HIGH SCHOOL

Burlington School District, Burlington, Massachusetts

Indoor Air Quality



Tools for Schools

Starting in the mid 1980s, the Burlington Board of Health routinely received complaints from parents and staff that the air in Burlington High School was “bad.” The reports of chemical odors and stale air, along with increased incidence of allergies, sinusitis, and asthma, did not seem to be affiliated with any specific area of the school. It was suspected that potential sources of the indoor air quality (IAQ) problems were kilns in the art room and the science lab’s ventilation hoods. However, despite numerous inspections and repairs by consultants, the air quality problems were not remediated. In the Fall of 1996, community members lost patience and filed complaints with the Massachusetts Department of Public Health and the EPA. In response to these complaints, the Board of Health took air samples from approximately 50 classrooms at the High School to measure carbon dioxide concentrations, humidity, and temperature. A general survey of potential allergens and other potential IAQ concerns was also conducted.

“Before you can initiate an effective air quality review you need to educate and inform all participants with regard to causes and effects of poor indoor air quality.”

*-Todd Dresser
Environmental
Engineer*

Approach—Project Description

School Description

Burlington High School with its populous of approximately 930 students and 70 faculty is located in Burlington, Massachusetts, a suburban community of 22,500 people, located fifteen miles west of Boston. The School, measuring 360,000 square feet, was constructed in 1971, with no major additions. The school is a single story, concrete structure that was designed to be mechanically ventilated, but passive ventilation via open doors and windows occasionally disrupted the heating and ventilation (HVAC) system.

IAQ Team

In February of 1997, the Board of Health convened a public hearing to discuss and gain a thorough understanding of the IAQ issues in the school. An IAQ Team, including parents and staff, was assembled to survey the school and interpret the results. Burlington also brought in outside consultants to aide in the completion of the assessment and the development of a response plan. These consultants included an architect, a heating and ventilation specialist, and a certified industrial hygienist.

Problem Identification

Evaluations performed by the IAQ Team identified numerous IAQ problems, including mold, mildew, musty odors, and rusted fixtures caused by widespread roof leaks throughout the school.

Underutilized science laboratory fume hoods contained design flaws. The exhaust was located near the intake so that emissions were reentering the building. This problem had not been previously identified, despite inspections by four different consultants.

The IAQ Team discovered that the kilns in the art room vented directly into the school, resulting in the release of carbon monoxide, volatile organic compounds, and metal fumes indoors. In addition, these kilns were being operated during school hours.

A comprehensive assessment of the HVAC system found it to be in a serious state of disrepair. Portions of the system were corroded or irreparably damaged. Fiberglass lining on some of the ductwork that was slowly degrading could have released fibers if not repaired or replaced. The IAQ Team also discovered that the HVAC system in newer sections of the building was either never connected to the ventilation system during renovation, or else the flexible ductwork used to connect these areas had collapsed. They also found a problem with the HVAC design—the positioning of air intakes and returns only allowed limited air circulation and often fresh air did not move completely across the classroom.

BURLINGTON HIGH SCHOOL

Burlington School District, Burlington, Massachusetts

“The availability of the Kit’s information helped to identify and explain potential IAQ problems while also providing legitimacy to the complaints submitted to the Board of Health.”

*-Todd Dresser
Environmental
Engineer*

The IAQ Team also located organic solvents and formaldehyde used by the science staff, as well as some pesticides and chemicals used by maintenance staff with labels that identified these compounds as carcinogenic, narcotic and flammable. These compounds were intended for outside use only.

Lessons Learned

Short-Term Solutions

Limited understanding of IAQ issues and a failure to detect a pattern to IAQ complaints led school officials to falsely believe that the initial complaints were psychological. To ensure that this doesn’t happen again, educational awareness initiatives will be conducted at the start of every air quality investigation.

The public hearing, convened by the Massachusetts Department of Public Health and the Board of Health in 1997, thrust IAQ issues into the public eye. This hearing served to: solidify community support for investigating and resolving IAQ problems; ensure that the School Board would address the issues in Burlington High School; and convince the school district to adopt and implement EPA’s *Indoor Air Quality Tools for Schools (IAQ Tfs)* Program and Kit.

This meeting was so effective in raising public awareness and prompting action that by March 1997, officials unanimously approved \$1.2 million to correct the IAQ problems that had been identified.

The IAQ Team, using the *IAQ Tfs* Kit as guidance, proved to be invaluable in thoroughly assessing IAQ issues and developing comprehensive response plans for IAQ problems.

Long-Term Practices and Policies

Burlington High School continues to implement the *IAQ Tfs* program, particularly the checklists and strategies laid out in the Kit, to identify, prevent, and correct IAQ problems and to maintain good IAQ throughout the school.

A chemical use review policy was established, requiring staff to evaluate chemicals being used for associated health hazards, potential impacts on air quality, necessary protective equipment or safety procedures, and the generation of hazardous waste. In addition, they are in the process of adopting an action plan for responding to the detection of chemical odors to avoid placing students and staff at risk. Staff were also trained to properly use the hoods to exhaust chemical fumes.

In 1997, the school began repairing the leaking roof. Affected areas were decontaminated and materials that were potentially impacted by biological contamination, such as mold and mildew growth, were removed. Roof repairs were completed in 1998.

The HVAC system was repaired and modified to eliminate areas of stagnant air. Fume hoods were repaired and re-calibrated, flexible ductwork were removed and replaced, and ventilation hoods were constructed in rooms which did not contain them previously. A phased approach for encapsulating and removing the fiberglass lining present in much of the ductwork has begun, focusing first on areas which pose the greatest health risk. Proper maintenance and calibration of the HVAC system has become a high priority, as it is critical to good IAQ. This work was also completed in 1998.

Burlington High School now has a formal process to record air quality complaints that tracks symptoms, time, date, building and room number and describes any recent activities in the building that may have prompted the complaint and other relevant information. The District is also working with school nurses to develop a system to track medical complaints in order to spot trends which identify potential IAQ problems. Presently, Burlington takes great pride that they no longer receive complaints regarding indoor air quality at the High School.

***For more information, contact:
Todd Dresser, Environmental Engineer
Burlington Board of Health, 29 Center Street, Burlington, MA 01803
tdresser@burlmass.org/Tel. 781-270-1956***

Or read more about Burlington’s IAQ success at: <http://www.epa.gov/region07/kids/dresser3.htm>.