

IAQ News



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“This is the first time I ever spoke into a microphone.”

Megan Sarver

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An electronic newsletter for school Indoor Air Quality exclusively for Northwest schools

Reviving “Wet Dog” Carpeting

By Rich Prill

Carpet in schools is universal. What isn't universal is the amount of carpet in any particular school, and the type, maintenance history, and age of the carpets. Experience in hundreds of Northwest schools indicates several common issues:

- Lots of old carpet.
- Carpet on concrete.
- Carpet care has included severe wetting and delayed drying (especially on concrete and with open, woven (flow-through) and jute-back carpet.
- Carpet care has included shampooing with a variety of chemicals (“chemical soup” residues are always left behind after shampooing).
- Carpet is old and highly soiled, especially where it has been glued to asbestos tiles.

Concerns about old, contaminated carpet are to be expected. Various remedies are tried, often with little success. For example, carpet that is extracted with liquid solutions – chemical solutions or hot water only

– can produce a “wet dog” odor. Experts point to the presence of bacteria as the leading cause of this odor, in addition to the always-present fungi (molds). Both bacteria and mold exposure are potent allergens and asthma triggers. Allergies are the number one chronic disease. “When you get an odor like this,

you know the carpet is contaminated” according to Harriet Ammann, PhD, former Senior Toxicologist with the Washington State Department



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Formaldehyde Concerns Raised

Concerns continue to be raised regarding formaldehyde exposures in new schools, and especially in new modular buildings. Exposure to elevated levels of formaldehyde should be avoided. Airborne formaldehyde acts as an irritant to the conjunctiva and upper and lower respiratory tract. Symptoms are temporary, and depending upon the level and length of exposure, may range from burning or tingling sensations in eyes, nose, and throat to chest tightness and wheezing. Acute, severe reactions to formaldehyde vapor – which has a distinctive, pungent odor – may be associated with hypersensitivity. It is estimated that 10 to 20 percent of the U.S. population, including asthmatics, may have hyper-reactive airways that may make them more susceptible to formaldehyde's effects.

Schools should check to ensure their indoor environments are below the "action level" of a concentration of 0.5 part formaldehyde per million parts of air (0.5 ppm) calculated as an eight-hour time-weighted average (TWA) concentration.

Schools can quickly and easily conduct a five-day passive test for formaldehyde levels in modular classrooms and other buildings. The sample kits consist of basically a test tube that is opened for about five days and then resealed and mailed to a laboratory for analysis. Cost for each sample tube is around \$40. 📧

IAQ News

A quarterly electronic newsletter exclusively for Northwest schools.

Please circulate this subscription opportunity throughout the Northwest to those who may be interested.

There are two ways to subscribe:

1) To view *IAQ News*, click here:

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The newsletter contains a link for subscription information.

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You will receive a confirmation message. When you reply to that message you will be subscribed and will receive all future postings. You can easily unsubscribe at any time.

This broadcast email list not only provides automatic delivery of the quarterly *IAQ News*, but includes announcements about news of interest, training events, grant opportunities, and other information useful to school districts, agencies, and stakeholders involved in school IAQ and operations and maintenance.

IAQ News is an opportunity for all interested parties to communicate, and add to the collective wisdom.

Note: Starting with this issue, *Indoor Air Quality in Northwest Schools* is now named *IAQ News*.

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Preventing Molds in Schools

Just add water to “mold food” and molds will grow. While there are lots of “mold food” materials in schools, one of the most visible and common is ceiling tile. It seems all roofs leak, not just the flat ones, so water management is everyone’s concern. The keys to reducing mold growth and exposure (and to reducing concerns among school occupants) are to contain water intrusion, dry wetted materials within a day, and prevent mold food materials from getting wet.

Many water leaks are not easily and rapidly repaired, so the focus needs to be on removing the

mold food from the affected area. Buckets work, but another product is worth considering – the ceiling tile “funnel” – metal or plastic funnels with drain tubes that are temporarily placed in the 2x2 or 2x4 ceiling frames to divert and capture water. These products reduce the need for someone to climb ladders and lift down buckets. The drain tube can be routed many feet away to a drain or a large container on wheels. 🚚

*Left photo: Getting a reading on the mold.
Right: Ceiling tile funnel with bucket.*

School Air Flow: Should be From "Clean" to "Dirty"

There's the story of the marketing executive who, when asked about her advertising budget, lamented that *only about half* of their advertising was effective. She said she would love to save the wasted money, "but you just don't know *which half* is wasted." Knowing which of the myriad of possible air pollutants in a school are the leading causes of exposures and subsequent health or irritant reactions is a similar problem. The obvious first step is to control the obvious sources of air contaminants.

One of the most common IAQ deficiencies found in schools is the lack of vigilance in maintaining proper air flow direction. Zones containing air pollutants should be maintained at a lower pressure compared to surrounding occupied zones. The principle is "air should move from clean to dirty." Keeping known pollutants contained is just common sense. Obvious examples of zones with contaminants are science labs and storage, under-floor crawlspaces and tunnels, toilets, locker rooms, custodial closets, boiler rooms, and so on.

Maintaining these zones under a modest negative pressure in the range of -10 to -25 pascals (249 pascals = one inch water column pressure) is generally sufficient. Pressure gauges (\$400 and up) and chemical tracer smoke (\$5 each for one-time use or about \$50 for long-lasting multiple use bottles) are

the preferred way to check the air flow on a routine basis. The tracer smoke is easy, and the pressure gauge provides a number (magnitude of the pressure) for documentation.



The proper pressure regime can be easily maintained with appropriately sized exhaust fans and reliable controls. For restrooms where the exhaust fan is controlled with the light switch, a solid-state delay timer is useful to enable the fan to run for a period of time after the light is turned off. Easily adjustable from a 5- to 60-minutes delay, these switches simply replace the existing light switch and cost around \$30. You can search the internet for fan delay timers. 🚽

Photo: Wall-mounted instrument measuring air pressure.

NW Stakeholders Participate in National Symposium

In December a number of NW school IAQ stakeholders participated in one of the most successful, energetic, and productive events that the *IAQ Tools for Schools* Program has held to date. In Washington DC these NW representatives joined more than 500 other attendees from around the U.S. to learn and share actions we can all take to improve student, teacher and staff health in our nation's schools.

EPA hosts the annual *Indoor Air Quality Tools for Schools (IAQ TFS) National Symposium* that brings together teachers, school nurses, maintenance and custodial staff, school decision makers, school administrators, parents, school and health association members, and community leaders from across the country. The symposium addresses the importance of developing effective IAQ management practices and how the indoor environment relates to teaching and learning. Attendees learn about available resources and materials, including the *IAQ Tools for Schools Action Kit* (www.epa.gov/iaq/schools/actionkit.html), that will enable them to support and implement good IAQ practices in schools.

For the benefit of those not able to attend, the following resources will prove useful in improving your indoor air quality programs:

- **Envisioning Excellence** – the essential roadmap to six key drivers identified as fundamental to any school district's IAQ program success. *Updated!*

- **Envisioning Excellence Change Package** – a matrix of the six key drivers, active strategies, and real world examples of the strategies in action exemplified by some of the most successful school IAQ programs in the nation. *New!*
- **Envisioning Excellence Snapshot** – seven 'profiles in excellence' of award-winning school districts showcasing their IAQ programs' key action steps and results. *New!*
- **HealthySEAT 2.0** – customizable, easy-to-use EPA software that enables school districts to assess and track their facilities' health, safety, and environmental conditions. *Updated!*

The Envisioning Excellence suite of materials, along with additional symposium faculty resources and presentations, is available at www.iaqsymposium.com.

The HealthySEAT software can be downloaded from www.epa.gov/schools/healthyseat/index.html.

And, visit www.epa.gov/iaq/schools/awards.html to learn more about the 2007 *IAQ Tools for Schools* National Award winners and how you, too, can become an award winner. 🚌





motivated, poised, and charming) and her work inspired them to get going on similar efforts. Megan's work is covered in past issues of this newsletter (www.energy.wsu.edu/projects/building/iaq_nl.cfm).

Do you have students that might take on IAQ projects? EPA Headquarters is eager to hear of more student involvement – our next frontier for progress in school IAQ.

South Whidbey High's Megan Sarver a Hit at the TfS Symposium

High school senior **Megan Sarver** stepped to the microphone at the Grand Hyatt Ballroom in Washington, DC to share her school IAQ project with over 500 teachers, administrators, maintenance and design personnel, nurses, health professionals and others assembled for the *8th Annual EPA IAQ Tools for Schools National Symposium*.

"This is the first time I ever spoke into a microphone," said Megan, winning over the audience immediately by just being herself.

She gave a 15-minute slide presentation detailing the project she completed with science teacher Jay Freundlich who led off the show with an entertaining orientation piece about Whidbey Island and life in the PNW. Megan finished to a well-deserved standing ovation and later served

on a panel, taking questions from the audience.

The symposium evaluations gave high marks to this presentation and many commented that we need more of this type of involvement from students nationwide. Teachers wrote that they have students like Megan (they must mean smart, enthusiastic,

Not a bad year for Megan. She won the Washington Education Association's statewide student environmental activism award. Then the National Education Association recognized her with their national student award. Finally, the EPA called and invited her to DC with her teacher and Mom. Megan's IAQ work at school continues with her senior project, diagnosing ventilation problems uncovered by her classroom surveys. We will report on her results in future issues. Congratulations, Megan!



Jay Freundlich, South Whidbey High School science teacher (center), with Megan Sarver (right) enjoying their networking opportunities – and the excellent food and refreshments – at the TfS Symposium in Washington, DC.



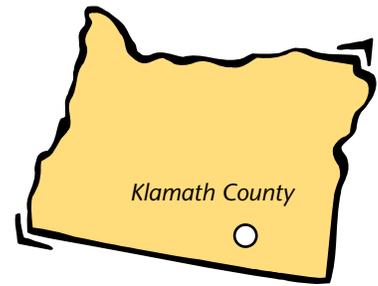
One Step Back... Two Steps Forward

By Darin Martins and Gary Worden
Klamath County School District

As Klamath County (Oregon) School District maintenance employees, we attended the IAQ seminar in Eugene the spring of 2006. We wanted to start an IAQ program as a result of an IAQ issue in one of our elementary schools. We had started renovation of Henley Elementary due to concerns of water intrusion and possible mold issues. The work included a complete cleaning of the duct system, crawl space cleaning and vapor barrier installation, pest removal, planned fresh air make-up system, and a new roof. The district also consulted with an environmental engineering company. Before the roof was complete, we had a freak wind and heavy rainstorm hit the building, flooding the attic space and causing water intrusion into the classrooms. Some of the old roof demo material had fallen into the attic space and was washed into the classrooms during the storm. The old roof had asbestos-containing material. The school was then professionally abated and final clearance was given. But the board decided the best thing to do was permanently close the building in light of continued health concerns.

We wanted to become more pro-active in our IAQ program, for the health of our kids and staff. After some research, the EPA "Tools for Schools" program seemed to fit our needs and was something we wanted to learn more about. We attended the seminar, met Rich Prill, and got the ball rolling.

Rich recently came to our district for a couple of days to help us get our program off the ground, giving us some valuable hands-on training in what to look



for during our future "walk throughs," and more importantly, what to do with the findings. He met with our Superintendent, Greg Thede, and our



Darin Martins and Gary Worden check on the air quality in one of the classrooms.

Maintenance Director, Larry Hanson. Both gave us full support in getting an IAQ program started. We hope to present our IAQ program to the principals during the next administrators' meeting and to the school board in the near future.

While we're still crossing our "t's" and dotting our "i's," we are well on our way to a great IAQ program! Superintendent Thede stated, "We plan on having a district IAQ program in place this fall." 🚐

Report Abstract: “Effects of mould remediation on school teachers’ health”

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The follow-up study of the health of teachers (n = 56) of three mould damage schools were done with self-administered symptom questionnaire before and 1 year after the remediation of school buildings. Technical and microbiological investigations were done parallel at the same time. In the beginning of the study symptoms of allergic rhinitis, sinusitis, conjunctivitis and fatigue were high compared to normal population and 1 year after the intervention a decrease in fatigue (OR = 0.4) and headache (OR = 0.2)

was observed. An association between female gender and sinusitis was found before the remediation (OR = 8.1). Age over 40 years was a risk factor for voice problems and more than 10 working years at the same school were associated with increased risk for conjunctivitis (OR = 8.5) and headache (OR = 5.4). Other exposure situations such as mould problems at home and mould exposure during leisure time also have an effect on teachers’ health. Significant reduction was found in symptoms of fatigue and headache after the cessation of exposure, while respiratory symptoms need much longer time to relieve after the remediation. Age, female gender, atopy, long-term exposure time and other exposure situations might be the risk factors for prolonged symptoms among mould exposed teachers. 🚗

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Wet Dog

Continued from page 1

of Health. “Exposure to these allergens not only produces reactions among individuals with allergies and asthma, but can cause other individuals to become allergic.” Harriet recommends that schools not apply biocides in an attempt to clean or disinfect the carpets – the safest and best approach is to just remove the contaminated material!

Careful and aggressive carpet cleaning can reduce exposures, but this cleaning must include rapid drying to prevent further bacteria and fungi growth, and thorough and routine vacuuming with HEPA equipment.

There seems to be no consensus among cleaning professionals or school maintenance staff on the best method for reducing the odor or exposures. Everyone agrees, however, that once carpet is contaminated, the only true solution is to remove the carpet from the building. Of course, it takes money and resources to remove old, soiled, and contaminated carpet, so do your best to clean it and keep it dry. 🚗