ACTS FACTS
THE MONTHLY NEWSLETTER FROM
ARTS, CRAFTS AND THEATER SAFETY (ACTS)
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ACTS wishes you a healthy, happy 2017.

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ACTS FACTS BEGINS ITS 31ST YEAR OF PUBLICATION
Hard to believe, isn’t it? Thanks to you we are still publishing this strange combination of artistic and technical information. I hope we all continue to pursue this interest for many more years.

NEW STANDARD FOR PLANNING “GREEN” BUILDINGS

LEED. Many people have heard of LEED (Leadership in Energy and Environmental Design), the most popular green building certification program used worldwide. LEED was developed by the Green Building Council (USGBC). From 1994 to 2016, LEED grew from one standard for new construction to a comprehensive system of interrelated standards covering aspects from the design and construction to the maintenance and operation of buildings.

WELL. Now there is a new standard that is getting a lot of attention. The WELL Building Standard® (WELL) is administered by the International WELL Building Institute™ (IWBI), a public benefit corporation whose mission is to improve human health and well-being through the built environment. IWBI was launched in 2013, following a Clinton Global Initiative commitment.

WHY DO WE CARE? These are the standards that are being applied to new and renovated building projects around the country including the university art and theater facilities your Editor frequently is hired to do the industrial hygiene for. And I have many criticisms of both standards. However, in this article, I will only look at ventilation and safety issues that directly impact safe design of art studios, scene shops, and other chemical-use departments in school building projects.

AIR QUALITY. Both LEED and WELL reference the standards of the American Society of Heating, Refrigerating and Air-conditioning Engineers (ASHRAE) for ventilation. This standard should only be applied to non-chemical use rooms such as general class and lecture rooms, the photo studios where pictures are taken, costume dressing rooms and the like. And in my opinion, the newer ASHRAE standards (2004, 2007, 2010, 2013) do not provide enough fresh air as determined by some recent studies.
The standard method for determining sufficient fresh air in buildings is to measure the carbon dioxide (CO₂) levels in the room. Since each person in the room exhales some CO₂ with each breath, the amount of CO₂ is kept under control only by the ventilation system's ability to add fresh air to the room. When CO₂ levels are sufficiently above the levels of CO₂ in outdoor air, people in the room will report discomfort. It was assumed that the levels of CO₂ did not cause this effect. Instead, CO₂ was thought to be a marker for poor ventilation and the discomfort was due to the build-up of volatile organic chemicals (VOCs) off gassing from people and from building materials such as formaldehyde and plasticizers.

**CO₂ STUDIES.** There are studies confirming that VOCs can cause such discomfort. However, beginning in early 2000, studies began to show that CO₂ alone can cause toxic effects. In particular, slightly elevated levels of CO₂ can cause a measurable decrease in mental acuity in both children and adults. The most recent of these studies used tests designed to assess complex cognitive executive level functioning to detect changes in the mental acuity of the occupants. The CO₂ levels were altered by adding it to the air rather than by restricting ventilation which would also raise the VOCs. In this way, the effects of CO₂ could be isolated from those of the VOCs. The study found measurable effects at the ASHRAE lower CO₂ limit:

\[ \text{We found statistically significant declines in cognitive function scores when CO}_2 \text{ concentrations were increased to levels that are common in indoor spaces (approximately 950 ppm). In fact, this level of CO}_2 \text{ is considered acceptable because it would satisfy ASHRAE's ventilation rate guidance for acceptable indoor air quality. Larger differences were seen when CO}_2 \text{ was raised to 1400 ppm.} \]

The ASHRAE standard, Ventilation for Acceptable Indoor Air Quality (ASHRAE 62.1), recommends maintaining CO₂ levels at 700 ppm, or less, above outdoor CO₂ levels. Depending on local conditions, acceptable outdoor air usually contains 350-500 ppm CO₂. An ASHRAE-compliant system, then, should limit CO₂ levels indoors to between 1,050 and 1,200 ppm. The studies show this is not sufficient. And it is likely to be increasingly insufficient as CO₂ levels increase worldwide. (It is helpful to understand that CO₂ levels were 280 ppm in pre-industrial times and 315 ppm in 1960, are now average just under 400 ppm globally. Industrial city levels can be over 500 ppm.)

Both LEED and WELL reference the ASHRAE standard. And both standards require better standards for high density areas (<25 people/1000 ft²). LEED requires alarms when levels are 530 ppm above outdoor levels, which should keep CO₂ between 930 and 1,030 ppm. However, WELL has raised the bar by also recommending other types of ventilation systems, including ones that use demand controlled ventilation systems that maintain CO₂ levels below 800 ppm. And WELL requires these systems in high density areas.

**OTHER AIR CONTAMINANT LIMITS.** Both LEED and WELL use air quality standards for certain indoor air pollutants, some of which are Environmental Protection Agency (EPA) National Ambient Air Quality Standards (NAAQS). ACTS has used these outdoor standards for indoor purposes before either of these agencies were formed and is glad to see them being used this way formally. While detractors will say this is a misuse of the NAAQSs, clearly, if an 8-hour exposure to a contaminant above a certain level is harmful outdoors, it stands to reason that exposure to this same level for 8 hours indoors would have the same effect.
The WELL and LEED target limits for various contaminants are below those of the American Conference of Governmental Industrial Hygienists (ACGIH) threshold limit values (TLVs) for healthy adult workers. The table below compares them and identifies those that are NAAQS.

<table>
<thead>
<tr>
<th>SUBSTANCE</th>
<th>LEED &amp; WELL TARGETS</th>
<th>ACGIH TLVs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total VOCs (volatile organic compounds)</td>
<td>&lt;500 µg/m³</td>
<td>no standard</td>
</tr>
<tr>
<td>*Carbon monoxide (CO)</td>
<td>&lt;9 ppm</td>
<td>25 ppm</td>
</tr>
<tr>
<td>*Particulates (PM) 2.5 microns and under</td>
<td>&lt;15 µg/m³ (0.015 mg/m³)</td>
<td>3 mg/m³</td>
</tr>
<tr>
<td>*Particulates (PM) 10 microns and under</td>
<td>&lt;50 µg/m³ (0.050 mg/m³)</td>
<td>3 mg/m³</td>
</tr>
<tr>
<td>*Formaldehyde</td>
<td>&lt;27 ppm (0.027 ppm)</td>
<td>0.3 ppm Ceiling</td>
</tr>
<tr>
<td>*ozone</td>
<td>&lt;51 ppb (0.051 ppm)</td>
<td>0.1 ppm light work</td>
</tr>
<tr>
<td>radon</td>
<td>&lt; 4 picocuries</td>
<td>see TLV standards for ionizing radiation</td>
</tr>
<tr>
<td>Carbon Dioxide (CO2)</td>
<td>Meet ASHRAE 62.1 2013 (or WELL below 800 ppm)</td>
<td>5,000 ppm</td>
</tr>
</tbody>
</table>

* These are NAAQS 8-hour standards which makes them comparable to the 8-hour time weighted average (TWA) ACGIH threshold limit values (TLVs). Units: µg/m³ = micrograms/cubic meter; mg/m³ = milligrams/cubic meter; ppm = parts per million.

The fact that both LEED and WELL use these safer EPA standards make it easier to support our recommending these safer levels be used for school art and theater studios and shops. These NAAQSs are designed for the general population including people of all ages and most physical conditions including pregnancy. The ACGIH standards are applicable to healthy adult workers only, not to students who are not technically workers and who may have health issues or may include pregnant women. The NAAQSs are more appropriate for students.

**VOLATILE ORGANIC COMPOUNDS (VOCs).** Both LEED and WELL fall short in their guidelines for VOCs. They do not seem to consider that the EPA-listed VOCs are only those chemicals that will react in the atmosphere with sunlight to create smog. Many highly toxic solvents do not react with sunlight and are not on the EPA’s VOC list. These solvents can be in products used in building in any level, without being included in the total VOCs reported on the label.

For example, one of the LEED standards has limits for air-borne concentrations of a number of glycol ether-class solvents. None of the glycol ethers they list are very common in paints and building materials. Instead, the most common VOC is one that industry successfully petitioned the EPA to take off their list of VOCs. This solvent is called 2-butoxyethanol (CAS # 111-72-6). And while industry has argued successfully that 2-butoxyethanol is not a very strong smog-agent, it is very toxic. And it is not required to be included in the total VOCs computed on product labels.

**PROBLEMS WITH BOTH STANDARDS.** In general, both LEED and WELL standards can be a problem for planners of an art or theater building. They both give points to designers for providing windows that open which can confound a well-planned industrial ventilation system. They both recommend energy-saving by fresh air reduction and heat-recovering devices which are not usually compatible with industrial systems that exhaust 100 percent to the outside. And most important, neither has standards for all of the areas in the building in which toxic chemical use must occur, such as art and theater studios and shops. And neither LEED nor WELL incorporate by reference the ACGIH ventilation design standards which are vital to the proper design of these spaces.
However, WELL’s addition of systems to control CO₂ levels to under 800 parts per million is an important and welcome change. And both LEED and WELL’s use of the EPA outdoor air quality standards is a crucial common sense approach to indoor air quality issues.

Footnotes:

1. Four states (Alabama, Georgia, Maine, and Mississippi) have effectively banned the use of LEED in new public buildings, preferring other industry standards that the USGBC considers too lax.


ACMI SAYS: SAFETY DATA SHEETS ARE NOT OUR PROB

SOURCE: Personal communications

Our October 2016 ACTS FACTS published a letter from Nicole Shoshenskiy, an expert on safety data sheets (SDSs). The letter was written to Certifications Program Director, Debbie Munroe, of the Arts and Creative Materials Institute (ACMI). Nicole pointed out to Ms. Munroe that schools are required to provide the SDSs to teachers, custodians and other employees exposed to art materials.

But in her work of providing SDSs to schools, Nicole found that many manufacturers of ACMI certified products do not provide the required SDSs. And many other manufacturers provide seriously outdated, or inadequate SDSs.

The letter points out that ACMI appears to support the manufacturer’s noncompliance with the Occupational Safety and Health (OSHA) requirement to provide SDSs. Nicole quoted a paragraph from ACMI’s website FAQ page which discourages people from obtaining SDSs. It tells them instead that they should rely on the ACMI label alone. ACMI says that the SDSs are “quite complex and highly technical and may be difficult for someone who does not have a scientific background to understand, and may not be useful or appropriate for a consumer.” Schools are also consumers of art materials for which SDSs are not only appropriate, they are required to meet regulations.

THE REPLY. On October 14, Nicole received a reply from Ms. Munroe. The paragraph in that e-mail that refers to Nicole’s question reads as follows:

As you are probably aware, ACMI is a trade association – not a manufacturer – so the association has no role in the creation of Safety Data Sheets. It is up to individual manufacturers to determine the need for an SDS based on known uses of the product. If you have an inquiry about a specific art material, you should check the manufacturer’s website for the SDS for that art material.

.....

Debbie Munroe, Certification Program Director
The Art & Creative Materials Institute, Inc. (ACMI)

ACMI’S PURPOSE. Saying they have “no role in the creation of” SDSs is confusing since for many years in the past I have seen the signature of ACMI’s senior toxicologist, Dr. Woodhall Stopford, as the preparer of many art product material safety data sheets. And I have complained for years about these material safety data sheets which usually provide no ingredient information or hazard data and refer people again to the limited information on the label. For a discussion of these many issues, readers can contact ACTS at actsnyc@cs.com and ask for our data sheet, “Labels: Reading between the Lies.” (This title is not spelled wrong.)

Debbie Munroe’s answer is unresponsive to Nicole’s letter. She refers Nicole back to the manufacturer website to download an SDS which Nicole explained does not work as a strategy.
This is doubly disturbing in the light of ACMI’s nonprofit trade association’s purpose as stated in their charter in Section 1. Two provisions in particular indicate ACMI should be interested in assisting manufacturers and customers in resolving this safety problem:

- To promote safety in art, craft and other creative materials.

- To cooperate with other professional, governmental, consumer or business organizations on issues affecting art, craft and other creative materials.

If ACMI’s purpose is to promote safety, encouraging their clients to meet OSHA safety regulations that apply to their art material manufacturer-clients is certainly within their scope. And since their charter already permits them to work with governmental organizations, they certainly could work with OSHA to help their clients meet the SDS rules.

Instead, Ms. Munroe refuses to address the problem. It is likely that Ms. Munroe and ACMI will not raise the issue with their clients since ACMI’s income is primarily from the fees paid by art material manufacturers for their label certification.

OSHA POWERPOINTS: HOW TO MAKE THEM BETTER?

Editorial

Mind numbing PowerPoints: you’ve all seen them. The only person who learns anything is the person who outlined the information into this format designed to torture. And then there are the PowerPoints that hold your attention because pictures explode, symbols zip across the screen and cartoons pop up. But just what did you learn?

I use PowerPoints only because there are no more slide projectors. But I try never to lose sight of the fact that the purpose of a slide is to illustrate what you are talking about to make the subject clearer to the viewer. The words on some of my slides are meant to make sure I don’t miss any important issues. But if I see people staring at the screen instead of listening to what I’m saying, I know there are too many words up there.

For in-depth coverage of chemical or physical concepts, experience tells me to step away from the screen to a white board. Then the trainees and I can watch each other. I can tell from their demeanor who is getting it and who needs another explanation or a bit more time. And it is crucial to encourage questions and respond immediately, since this is the time the trainee will be most receptive to the answer.

ON-LINE. Obviously, none of this can work on-line. Yet unions and schools that don’t have access to trainers want and need PowerPoints on various topics for on-line training. Sadly, most people who score best on these modules are those who can spit back the exact words in a definition or principle without actually understanding the definition or principle.

POWERPOINTS FOR NOVICE TRAINERS. I have also helped unions develop PowerPoints for face-to-face training session in which the trainer is not an expert. These trainers rely on the notes under each slide to explain the slide and to answer questions. I personally think this strategy will not work well, but I’m committed to help with these presentations.

I also think the training cannot be only about the technical facts and figures. I firmly believe it is vital to include the following in these novice PowerPoints and any others on OSHA regulations:
1. PROVIDE POLITICAL CONTEXT. No occupational safety regulation or occupational hazard exists as a fact alone. The regulations and the discovery and recognition of the hazards they address are all related to the political climate and culture of the time. Behind every rule there is a dramatic battle over many years and through many courts. Pointing this out only adds only a line or two to the slide, but it informs trainees how the real world works.

For example, no Globally Harmonized System (GHS) training should be done without explaining how the European Union’s adoption of the United Nation’s GHS, the subsequent adoption of this system by over 160 other countries, and a deadline set by the E.U. for refusing to accept our exports unless they were accompanies by GHS labels and SDSs, forced the U.S. to adopt the GHS. And that this massive OSHA GHS rule update was adopted because U.S. industries had no other option.

No trainees should leave training without knowing how difficult (yea, verily impossible) it is for OSHA to institute a new or updated rule and why.

2. COVER THE INADEQUACIES OF SOME REGULATIONS. The battle to institute regulations also results in imperfect rules. Present the regulations fairly. Discuss both their advantages and short comings. For example, explain that the OSHA air-quality standards have not been updated since 1971 and why. Or explain that we had a good Ergonomic Standard but an incoming president rescinded it. There are plenty of interesting and relevant stories to tell.

3. DEVELOP HEALTHY SKEPTICISM. Trainees need to learn not to believe everything they read including manufacturer’s claims, labels and SDSs. I use slides showing both accurate and inaccurate labels and SDSs. For example, I use slides or handouts of two SDS toxicity sections (Section 11), one meeting the U.S. OSHA rules and the other meeting the European standard. The difference in accuracy and clarity can be seen at a glance and is memorable.

Healthy skepticism is crucial to worker safety.

4. TEACH STRATEGIES FOR GETTING RELIABLE SECOND OPINIONS. While no source is perfect, trainees should leave knowing that it is far more likely to get the truth from major governmental research institutions such as the National Institute for Occupational Safety and Health (NIOSH) and the Agency for Toxic Substances and Disease Registry (ATSDR), than from regulatory agencies, manufacturers and trade associations. That scientific opinions found in peer reviewed journals are better sources than internet websites that also sell things. Learning to find sources without conflicts of interest is crucial.

5. PRESENT SOLUTIONS. When OSHA standards are weak, find stronger standards. For example, since the OSHA air-quality standards are outdated and unprotective, the air quality standards of other US and European agencies can be used as alternatives voluntarily. Refer to OSHA’s own statement supporting this strategy at: https://www.osha.gov/dsg/annotated-pels/.

Explain that there are best practice standards such as those from the American National Standards Institute (ANSI), the International Standards Organization (ISO), and others. Find those agencies that provide best practice standards for the particular trainees. For example, I use the ANSI standards that apply specifically to theater for trainees in the theater, film or television production.

6. PROVIDE REAL ADVICE ON ASSERTING RIGHTS. Yes, the trainees have the right to complain, to demand safety equipment from employers, to file formal complaints with OSHA, Workers Compensation, or squeal to EPA. But in the real world, we all know the dangers involved with being identified as the complainer.
Be honest. Cover a real case in which a worker successfully asserted her/his rights and tell them how many years it took. Give trainees practical strategies to optimize their chances of winning. And here, I need to thank the union I work for,* for instituting the best program I have seen for workers' rights, a program that I advise all unions to emulate. Our workers do not confront employers, but bring in the union experts to define the problem and negotiate the solution. This way the worker who started the action usually is not known to the employer or even to fellow workers.

SUMMARY. It is important to cover the mechanics of the regulations. But trainees can always look up this information. They can’t look up the way the regulatory world actually works. OSHA training in the absence of politics and cultural context will lead trainees to make highly incorrect assumptions—assumptions that can lead them to make serious errors.

* The United Scenic Artists, Local USA829 of the International Alliance of Theatrical Stage Employees.

NO MORE POWDERED SURGEON'S GLOVES


Effective January 18, 2017, The Food and Drug Administration (FDA) is banning the following devices: 1) powdered surgeon's gloves; 2) powdered patient examination gloves; and 3) absorbable powder for lubricating a surgeon's glove. The reasons for the ban in the Final Rule's Executive Summary was that “the use of powder on medical gloves presents numerous risks to patients and health care workers, including inflammation, granulomas, and respiratory allergic reactions.

COMMENT. Some of the reading on this subject was interesting. It seems the first powder used for this purpose in the late 19th century was the spores of Lycopodium, an evergreen herb also known as club moss. (Lycopodium is also used in stage special effects because it easily flashes into fire on ignition.) By the 1930s, Lycopodium powder was recognized to cause wound granulomas and adhesion formation and was replaced by talcum powder. By the 1940s, talcum powder (talc) was also recognized to be a cause of postoperative adhesions and granuloma formation.

Talc was replaced by modified corn starch which was also soon found to have adverse effects in open wounds and to cause allergies. Now it was clear that dumping powders of any kind into open wounds is a bad idea. As usual, we have taken decades longer than other countries to recognize this. As early as 1997 and 2000, Germany and England respectively banned powdered gloves.

ACTS FACTS sources: the Federal Register (FR), the Mortality and Morbidity Weekly Report (MMWR), Environmental Health Perspectives (EHP), and many other publications. Call for further information on sources. Editor: Monona Rossol; Research: Tobi Zausner, Sharon Campbell, Robert Pearl, Brian Lee, Pamela Dale, Kathy Halce, Pat F. Sheffield, Janet Sellery; Staff: Kathy Frost, John Fairlie, OES.

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HOLD THE DATES: JULY 1 TO AUGUST 4, 2017

The first class in the Art Safety program at the University of Massachusetts - Amherst is scheduled for July 1st to August 4th. Enrollment is now open and the details are at:

http://www.umassulearn.net/classes/summer-2017/noncredit?view=class&clid=16764

The website describes the course as follows:

This is the very first course in a brand new program designed to teach the health, safety and regulatory information needed to work safely in all disciplines in the arts from historic processes to 3D printing. Covered will be safety requirements for professional studios and classroom for all student populations including children, college age, seniors and art therapy patients. The course is designed for both students planning to be artists or teachers and for safety professionals with an interest in arts.

The teacher, Monona Rossol, has degrees in Chemistry and Art and has been an Industrial Hygienist with an art specialty for 40 years. She has worked in all but two states in the U.S., every state and territory in Australia, in Canada, England, the Netherlands, Portugal, Mexico, and the United Arab Emirates. Her work has included ventilation and regulatory compliance planning for art buildings, lectures, OSHA/EPA training, and writing nine books on safety and technical issues. One of these books, The Artist’s Complete Health & Safety Guide, is being revised and the new 4th edition will be available for students as a text.

The objective of the course is to provide students with the tools to assess the risks and to provide appropriate precautions and strategies that will enable them to work a lifetime safely. Monona also hopes that a few of these first students will also find a career path in art safety. Schools and art businesses need people who can consult or train in these fields.

APPEAL TO READERS. Getting this program up and running and training more people to do this work is dear to my heart. My will provides a $600,000 endowment specifically keep this program running after I’m gone. The training is designed to provide art teachers and professional artists without a heavy science background with enough information to design safer art classes and do basic OSHA training in hazard communication, personal protective equipment and other rules. At the same time, industrial hygienists and safety professionals taking the class should be able to learn enough about art processes to specialize in the art area. There is a great need in the arts for OSHA compliance consulting or building planning.

Any help readers can provide to publicize this course or help us reach people who could benefit from the course is appreciated.
SHAKE UP IN THE GLASS WORLD

SOURCES: Each glass company’s websites and blogs.

Our March, 2016 ACTS FACTS covered a study of tree moss in Portland that revealed high levels of arsenic, cadmium, nickel and lead had been absorbed by the moss from the air surrounding Bullseye and Uroboros glass companies. Subsequent air testing found that these companies were emitting amounts of various toxic metals at levels that could affect the long-term health of residents. This event has changed the art glass world in the following ways:

* **Bullseye** has rallied its customers, reorganized production, added millions of dollars of pollution controls and plans to stay in their Portland location.

* **Uroboros Glass** sold its name, equipment, technology and formulas to Oceanside Glasstile and will move to Mexico. Glass production at the Tijuana plant will be owned by Carlsbad, California-based Oceanside Glasstile and is projected to begin the first week of May, 2017.

* **Spectrum Glass** in Woodinville, WA, will close its operations and has sold their System 96 brands and glass formulas to Glasstile.

* **Olympic Color Rods** bought Spectrum’s inventory and there is no mention of any environmental issues on the Olympic website. This may be because they are in the state of Washington rather than Oregon where this issue is being actively addressed.

* Based on Portland air quality data, the EPA ordered a nationwide review of art glass makers. The preliminary information released by the EPA reveals that **Kokomo Opalescent Glass** in Indiana and **Paul Wissmach Glass** in West Virginia use cadmium and neither operation has the technology to filter the cadmium fume that rises from their furnaces.

There are some gaps in the EPA regulations that may allow small companies to continue to periodically emit large amounts of toxic metals into their neighborhoods. Even in Portland, officials and citizen groups are working to lower the limits for some of these air pollutants.

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SHAKE UP IN THE GLASS STUDIO

Editorial

It is abundantly clear from the air pollution studies in Portland that the glass companies were emitting arsenic, lead, cadmium and chromium. A few air tests also found manganese, nickel and other metals. But regulators could have looked for and found almost every metal known, including some of the rare earth metals about which little is known except that they can provide interesting colors when added to glass. There is even a tiny bit of uranium in some types of dichroic glass.

While lead is often in the body of the glass, some of colorants also contain lead such as lead-chromate greens and yellows. Arsenic is commonly used to color glass opaque white. Cadmium yellows, oranges and reds are also well-known. These metals and others are present in the dust and mist created during glass cutting and grinding, in the fume from glass furnaces and fusing kilns, and in the grit from abrasive blasters used to modify glass surfaces.

Most of these metals are also regulated in the workplace by the Occupational Safety and Health Administration (OSHA). And four of the metals, arsenic cadmium, chromium, and lead have their own separate OSHA standards. These are 29 CFR 1910.1018 (inorganic arsenic), 1910.1025 (lead), 1910.1026 (chromium VI) and 1910.1027 (cadmium).
These OSHA standards require schools that teach glass and glass art businesses to write separate OSHA programs for each of the four metals and provide an exposure risk assessment usually done by personal monitoring of employees during each of the tasks which could get the metals airborne such as grinding and polishing, attending the kilns or cleaning up the studio.

Yet most school glass programs that I see simply do not comply with these OSHA regulations. Instead, I see this highly toxic dust on the floor of cold glass shops being tracked all over the school, layers of dried glass dust on the walls behind wet polishers and spindle grinders, students with the highly toxic dust on their clothing and more. Schools simply must begin to deal with this hazard.

One way to make the compliance easier is to restrict the types of glass used to those that don’t contain these four metals. Bullseye, for example, has a list of glasses that don’t contain arsenic, cadmium or lead. In order to assist a school who wants to try eliminating these metals, I prevailed on their Sales Supervisor, Susan Green, to also indicate which of these products contained chromium. Susan provided me with a list on which she had crossed off those containing chromium. However, she wanted to make sure I explain to the school that this list is valid only at this moment in time. Bullseye is working on changing more formulas to avoid these metals.

The list of soda lime glasses that Bullseye claims is arsenic-, lead- and cadmium-free totaled 163 products. And 63 of them were identified by Susan Green as chromium-containing. This leaves 100 colors and types of glass to use for stained glass, slumping and fusing.

I only have the word of Bullseye’s Susan Green that these 100 glass products are free of the four metals. But since schools must collect this glass grinding waste for disposal and have it tested by the Toxicity Characteristic Leaching Procedure (TCLP) before disposal, the test should make it clear if these metals are indeed absent. However, the waste is still regulated by EPA if it contains barium, mercury, selenium or silver. And local waste regulators may have limits on many other metals.

And even if the glass used in the shop does not contain arsenic, cadmium, chromium or lead, the colorants still contain metals for which there are OSHA standards such as cobalt, manganese, nickel, antimony, copper and vanadium. School environmental health and safety departments must get involved and provide these programs and the monitoring.

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**A CLEANING LESSON FROM UNIVERSAL STUDIOS**


I monitor a list of chemical accident reports from all over the country. Imagine my surprise on January 27, when I read the following transcription from Channel 8 in Orlando Florida:

**Cleaning chemical mishap sends Universal Studios workers to hospital**

Orlando Fire Department [Hazmat] crews responded to an employee-only area at Universal Studios around 4 a.m. “Some team members were in a laundry area where a couple of basic cleaning chemicals may have been mixed together,” said a Universal Studios spokesperson.

The employees were sent to the hospital as a precaution. It is unclear how many people were taken to the hospital, or the extent of their injuries.

THE MIXING PROBLEM. The details probably will not be released by Universal but the lesson is clear: don’t mix cleaning products. We all know that ammonia and bleach should not be mixed. But how many people know that cleansers and powdered cleaning and laundry products may contain dry chemical bleaches that will react with ammonia?
And just as bleaches are not all in a liquid form that smell like chlorine, so also many compounds, which react like ammonia, are not liquids that smell like ammonia. These are the many amine compounds, including the quaternary amines that are common in cleaning products.

Never mix cleaning products – or any other products – unless you have actual knowledge that ALL of the chemicals in BOTH products are compatible with each other.

This applies to the many paints, adhesives, resins and other products we use. For example, most acrylic latex paints have a stabilizing chemical in them that releases ammonia. This became significant when people cleaning brushes at a sink began to experience throat and respiratory irritation. It was found that the ammonia stabilizer was reacting in the sink’s drain trap with a dry bleach from the powdered cleanser that had been used to clean the sink.

In addition, deliberately mixing two products together is considered using the two products in ways other than the label directs. This means that the manufacturers of both products are no longer liable for damages caused by mixing them. **Instead, YOU may be!**

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**DYES IN YOUR HOUSE DUST**


The title of a study in *Environmental Science & Technology* tells the whole story: “Mutagenic Azo Dyes, Rather Than Flame Retardants, Are the Predominant Brominated Compounds in House Dust.”

The seven researchers led by Hui Peng used a new method of analysis to determine that the brominated fire retardants, that are known to be in house dust, have been joined by even larger numbers of brominated azo dyes. Of the 140 high-abundance brominated compounds found in the dust, only 24 (17%) were previously known flame retardants. Most of the rest (56%) were determined to be novel brominated azo dyes. One of these dyes was tested and found to be mutagenic at environmentally relevant concentrations. So both types of compounds pose a threat to us.

ACTS is most interested in the identity of those dyes that come from the many fabrics and plastics in our homes. There are literally hundreds, maybe thousands, of new dyes for which there is no Colour Index International identification and structural information available. It can be assumed that these brominated azo dyes have not been studied for toxicological effects. And it is only logical to assume that some of them are in our craft dye products.

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*ACTS FACTS* sources: the Federal Register (FR), the Mortality and Morbidity Weekly Report (MMWR), Environmental Health Perspectives (EHP), and many other publications. Call for further information on sources. Editor: Monona Rossol; Research: Tobi Zausner, Sharon Campbell, Robert Pearl, Brian Lee, Pamela Dale, Kathy Hulce, Pat F. Sheffield, Janet Sellery; Staff: Kathy Frost, John Fairlie, OES.

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HOMEMADE SLIME CAUSED CHEMICAL BURNS

On March 27, 2017, CBS News carried the first of many stories about Kathleen Quinn, an 11-year-old in Massachusetts, who developed second- and third-degree chemical burns on her hands after playing with "slime" her mother made from Elmers glue and 20 Mule Team Borax detergent booster. This article will only consider the do-it-yourself slime projects in general. Here’s one of the typical slime recipes floating about the Internet.

*School glue
*Borax (Sodium tetraborate)
*Food coloring (optional)
*Water

It should be immediately apparent that there are dozens of glues to use. And there are dozens of household products containing sodium tetraborate. So mistakes can be made by buying products with additives and other chemicals in them.

And there are legal issues associated with following an internet recipe. To start with, it is unlikely that the labels on the glue and borax products include making slime as a directed use. Instead, parents and teachers are using the products in ways other than the manufacturers direct. This means that the manufacturers of these products bear no responsibility for any injury caused by this off-label use. The only exception I have seen to this rule is when manufacturers have endorsed a publication or website that recommends the use of their product for these projects.

ACTS especially objects to mixing of household products in school science or art classes. These teachers are promoting the dangerous, amateurish, erroneous and unscientific notion that household products are safe to mix with one another and to use in ways other than the manufacturer directs.

Worse, teachers are inspiring their students to do similar projects at home. And in this case, I would argue that the school is liable for any harm caused by a student repeating a project learned in school that the teacher demonstrated and endorsed as safe. And I would further argue that all of the craft magazines, books, and web sites that suggest these off-label used to parents and teachers bear some liability unless they clearly provide warnings in print. For example, the slime experiment warnings might include the following:

* provide the exact brands of each of the products that are being recommended for use.
* explain that the manufacturers of these product have the right to change their formulas at will and there may be new ingredients that make these products unsuitable for this use.
* a warning that adverse reactions could occur in some children or adults from exposure to any of the products singly or when combined in the final mixture.
* a statement that adult supervision is needed to watch for and respond immediately to any signs of adverse reactions in participants during all stages of the project.
* if the project is being done in a school or business, obtain the Safety Data Sheets on the products and comply with OSHA hazard communication regulations.
SARAH JONES STORY FINALLY ENDS: OSHA FINE UPHELD

11th Cir. Affirms OSHA Fine Over Film Worker Killed On Set, By Kat Sieniuc,

Our April, 2014 ACTS FACTS covered the death of camerawoman Sarah Jones on a railroad trestle in Georgia where Midnight Rider, an Allman Brother Band biopic, was being filmed. In addition to killing Sarah Jones, seven other crew members were also hurt, one seriously, in the accident. Three years later, all the facts are in and the story now is complete.

LEGAL SUMMARY. Randall Miller and Jody Savin (producers), executive producer Jay Sedrish, and first assistant director Hillary Schwartz were charged with involuntary manslaughter and criminal trespass and their company was cited by OSHA for “serious” and “willful” safety violations and a $70,000 fine was proposed. Miller pled guilty to felony involuntary manslaughter and criminal trespassing and received a ten-year sentence of which he is expected to serve two years in jail followed by probation. Sedrish was also convicted of felony involuntary manslaughter and criminal trespassing and sentenced to ten years of probation. The charges against Savin were dropped as part of the plea agreement with her husband/business partner Randall Miller. Schwartz pled guilty to felony involuntary manslaughter and criminal trespass, and was also sentenced to 10 years probation.

THE OSHA FINE. The $70,000 OSHA fine was not paid because the film company contested it and took their case to the Occupational Safety and Health Review Commission. The Commission affirmed that the fine was appropriate because Film Allman [the production company] willfully violated OSHA regulations and “failed at every opportunity to ensure the safety of its employees” on set the day of the accident. They said, Film Allman “knew the railroad tracks were live tracks, in active use by CSX [Transportation], and that CSX had refused permission to film on the tracks.” The panel added that five Film Allman supervisors “were aware no CSX representatives were present at the site to control train traffic while the employees were on the trestle.”

Film Allman then appealed the commission’s decision to the Eleventh Circuit Court, claiming the Commission issued an excessive fine without sufficient evidence indicating the OSHA violation was willful. But on March 20, 2017, the Eleventh Circuit ruled that Film Allman knew it was putting employees in harm’s way and that “the commission did not abuse its discretion in imposing the statutory maximum penalty against Film Allman.” The OSHA fine will stand.

This should be the end of this ridiculous legal battle brought by people who never had any defense for their actions and apparently have no conscience.

TRAINS KILL AGAIN AND YET AGAIN


ACTS FACTS February 2015 issue covered the death of Calvin Klein model and fitness expert Greg Plitt. Two people were filming a body building commercial for Plitt in which he was running down a track in Burbank. Plitt fell in front of the Metrolink train.

Then on March 13, 2017, aspiring model, Fredzania Thompson, who would have been 20 in a few days, was posing for pictures on a railroad track in Navasota, Texas. She moved away from one train only to be hit by another and killed. So many beautiful, talented people are gone for no reason.
COMMENT. It is becoming clear that stealing shots on railroad tracks is a common industry practice. An indication of how common it is was found in some of the newspaper accounts of Gregg Plitt’s death. These articles included a quote from Arthur J. Miller, the System Director of Safety and Regulatory Compliance for the Western Group, a consortium of western railroad companies. Miller noted that, “Reliable reports of shot-stealing have become quite numerous.” Miller also explained that some of the stolen shots are spur of the moment decisions, while other cases of film company trespass are premeditated and planned.

Perhaps the frequency of stolen railroad track shots explains why Film Allman executives still don’t see that their offense merits the maximum OSHA fine. Perhaps film companies believe that they have a right to do anything that is common and accepted practice for others in their industry even if it puts their workers at risk. That premise would explain a lot of the film industry accidents ACTS FACTS has covered over the years.

SWEET NEW TEST FOR SWIMMING POOL WATER QUALITY
Sweetened Swimming Pools and Hot Tubs, Lindsay, K., et al., Environmental Science & Technology, letters, accepted February 17, 2017.

Several ACTS FACTS articles have pointed out that the “chlorine smell” of swimming pools is really not chlorine at all. Instead it is the pungent odor of chloramine chemicals created by the reaction of chlorine and nitrogen-containing compounds such as the urea excreted in human urine.

The pool water quality problems in the 2016 Olympic pools in Rio highlighted the need for better tests to monitor swimming pool water quality. These tests would need to rely on an easily quantified marker chemical. Xing-Fang Li and coworkers at the University of Alberta proposed that the marker could be the artificial sweetener acesulfame potassium used in products such as beverages and baked goods, often in combination with other sweeteners. The paper’s abstract explains the rationale for the test this way:

.... The widespread consumption of acesulfame-K (ACE), a stable synthetic sweetener, and its complete excretion in urine, makes it an ideal urinary marker. Here we report the occurrence of ACE and its potential application in swimming pools and hot tubs. First, we developed a new method for achieving high-throughput analysis of ACE without preconcentration or large-volume injection. Analysis of more than 250 samples from 31 pools and tubs from two Canadian cities showed ACE in all samples. Concentrations ranged from 30 to 7110 ng/L [nanograms per liter], up to 570-fold greater than in the input tap water. The level of dissolved organic carbon was significantly greater in all pools and tubs than in the input water. Finally, we determined the levels of ACE over 3 weeks in two pools (110000 and 220000 U.S. gallons) and used the average ACE level to estimate the urine contribution as 30 and 75 L [liters]. This study clearly shows the human impact in pools and tubs. This work is useful for future studies of the human contribution to DBP formation, epidemiological assessment of exposure, and adverse health effects in recreational facilities.

Excellent concept. These researchers have developed a potentially better test for checking pool water quality. But there are other implications from the study data that are worth examining:

1. The study says the ACE sweetener is in so many foods worldwide that the average person’s urine contains around 4000 nanograms per milliliter of the stuff. Who knew? I noticed this was one of
ingredients in the artificial sweeteners on table in my favorite restaurant. And I’ve begun to take notice of how often it is listed on food product labels.

2. The studies seem to indicate that the percentage of pool users who pee in the pool is consistently about the same from Canada to Rio. That’s hard to believe. I would like to see this study done in Japan where I have personally seen a more hygienic approach to pool and hot tub use.

3. The study even documents that the average amount of pee contributed to the pool per person is 70 milliliters (ml). Since you and I clearly don’t pee in pools, who are these people who are contributing both their own 70 ml and our 70 ml? Lord, 140 ml is just about 2/3 of a cup! Might it actually be possible to convince these people to pee elsewhere?

4. The study shows that ACE is an incredibly biopersistent chemical. All of the acids, bases, enzymes and bacteria in our gut are not able to change or metabolize it. The bacteria in waste water treatment plants are equally ineffective. It is also highly resistant to degradation by heat and strong acid. While it doesn’t appear to be causing ill effects in people or the environment, it clearly remains in the environment indefinitely and can be expected to increase in amount steadily worldwide.

5. The study also looked at the amount of ACE present in the tap water used to fill the pools and hot tubs. The levels were in the range of 15 nanograms per liter. The presence of ACE in tapwater proves it is incredible biopersistence. And the level will certainly increase since nothing seems to break the chemical down or metabolize it. Finding ACE in tap water also demonstrates that we are drinking what we pee after our waste water has been treated, released to the environment, and taken up again by water supply systems.

6. The next time you are asked what you think about the state of the environment, you can say with authority that it is definitely getting sweeter.

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ACTS FACTS

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HOW TO READ A LEAD PAINT ABATEMENT REPORT

ACTS regularly is asked to explain the meaning of reports on the condition, or abatement, of lead paint older workplaces or homes. The report is full of lab data and technical terms. It is particularly important for artists in old lofts and commercial buildings and workers in the film industry who commonly work on location in old or even abandoned buildings to be able to interpret these reports.

This article will provide information on how artists, film crews and householders in older homes or buildings should interpret these reports.

DEFINING LEAD PAINT. The first thing we need to know is how much lead in a paint makes it a “lead-paint.” There are a number of different legal definitions including the following:

<table>
<thead>
<tr>
<th>% OF LEAD</th>
<th>AGENCY AND DETAILS</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.05 %</td>
<td>CPSC. In 1978, the U.S. Consumer Product Safety Commission banned the use of paints containing more than 0.05% (by weight of dried product) for residential use (see 16 Code of Federal Regulations CFR 1303).</td>
</tr>
<tr>
<td>0.001%</td>
<td>CPSIA. In 2008, the Consumer Product Safety Improvement Act, enforced by the CPSC, set limits for painted objects children would use at 0.001% or one part per million (1 ppm).</td>
</tr>
<tr>
<td>0.005%</td>
<td>EPA. The Environmental Protection Agency limit for lead in solid waste, including paint waste, is 5 mg/L (5 ppm = 0.005%). There are exemptions for lead in paint waste from activities such as demolition of old buildings since the amount of waste in this case is too great to easily address under current rules. (See Resource Conservation and Recovery Act, Title 40 CFR 239-282.)</td>
</tr>
<tr>
<td>0.5%</td>
<td>HUD. The U.S. Department of Housing and Urban Development defines lead paint as containing more than 0.5% by dry weight. Lead Abatement Reports use this least restrictive definition. It provides a convenient level below which abatement may not be required if that paint is documented to be in good condition and tests show floor dust does not contain lead above certain limits.</td>
</tr>
</tbody>
</table>

OSHA DEFINITION OF LEAD PAINT. The Occupational Safety and Health Administration (OSHA) does not define lead paint in terms of percentage. In fact, it doesn’t define it at all. OSHA simply wants a risk assessment done anytime lead is expected to be made airborne to see if the amount of lead in the air exceeds their airborne action limit of 0.03 milligrams per meter (mg/m³). When airborne lead is above this limit, a written program and many precautions must be instituted.
HUD vs. OSHA. The objectives and methods used by these two agencies are very different:

a) The HUD standards are designed to protect occupants, including children, living in residences. The HUD standards require paint to be tested and found “lead-free,” removed or encapsulated (painted or wall-boarded over) and for the dust on the floors to meet their wipe test. This test is done by wiping a foot-square area of the floor with damp filter paper and sending the filter paper to a lab for analysis. The test should find less than 40 microgram/square foot (μg/ft²) of lead to prove that the cleanup was effective and any remaining “lead-free” paint is not deteriorating into dust. The standard does not protect workers or residents who disturb this paint.

b) The OSHA Lead Standard only protects workers. It requires a written program and risk assessment whenever there is a reasonable expectation that significant amounts of lead will be made airborne in the workplace. The risk assessment often is done by personal monitoring of the workers while they are doing their assigned jobs during an 8-hour day. At least one employee in each job title is monitored and the results of these tests are used to determine the protective gear and precautions each worker needs to keep their exposures below certain limits.

The conflicting purposes and methods of these two standards, one for protection of residents (HUD) and one designed for workers (OSHA), must be kept in mind when reading abatement reports.

HUD LEAD-FREE PAINT CAN BE HAZARDOUS. If a film crew enters a location in which the paint is “lead-free” under the HUD rules, meaning that it contains less than 0.5% lead, they will not be safe if their purpose is to redecorate or disturb that paint. Neither would an artist or householder be safe removing such paint. To demonstrate why this is so, imagine the following:

- One tiny gram of paint HUD defines as “lead-free” which contains only 0.3% lead is sanded off of a wall and blown around a room. A gram is a very small amount. For example, one paper clip, a pinch of salt, or a one dollar bill each weigh about a gram.
- This one gram of 0.3% lead paint contains 0.003 grams or 3 milligrams (mg) of lead.
- Since the OSHA Lead Standard action limit is 0.03 milligrams per cubic meter (mg/m³) of air, then this one gram of 0.3% “lead-free” paint could theoretically contaminate 100 meters of air to this limit. The 100 meters is equivalent to 3531 cubic feet of air or an area larger than the inside volume of a 15 by 15 by 15 foot room!

If this is true for only a gram of this paint, imagine sanding or scraping large amounts! Calculations like those above can be used as part of a written risk assessment showing that OSHA monitoring of workers is required under the Lead Standard. For example, calculations could show that a large amount of paint dust at only 0.01% lead could be a significant hazard under certain conditions.

The occupants also are not safe if chips of “lead-free” paint are falling from walls or ceilings. For example, stepping on and crushing a one square centimeter chip (one gram) containing 0.5% lead will cause that one square foot of floor to test at 1000 μg/ft² rather than the 40 μg/ft² HUD limit. Once powdered by foot traffic, that 1000 micrograms of lead also is free to be blown about the room.

AIR TESTING DATA. The HUD standard works for residences because it requires the paint to be either lead-free or in good condition plus proof in the form of wipe samples to insure that the paint is not deteriorating and releasing lead dust. HUD does not require air sampling and there are good reasons why air sampling is not compatible with the HUD method.*
For example, if the air testing is done when the air is still, it is completely misleading. Even a venue chock-full of lead dust will appear clean if the tests are done when the dust is settled.

A better test is one called an “aggressive” air sample where a leaf blower is repeatedly aimed in all surfaces in the room during the air test. That test is more likely to be fair if it is run long enough to insure that the dust in the room is consistently airborne. But a report that shows this test was a “snap shot” air sample taken at a single instant, or if the conditions at the time the test was taken don’t reflect the activities that the workers will be doing when they are on site, those air tests results should be considered irrelevant.

OSHA AIR TESTING RULES. OSHA’s strategy to require personal monitoring of the workers doing the jobs that might stir up the dust is a good one. On a film location, for example, workers in various job categories may be doing jobs such as:

- scraping and redecorating walls and ceilings
- dragging lighting cable over the floor, through dropped ceilings, and over beams
- building set elements, removing doors, removed parts of walls, etc.
- working where the air is stirred by air conditioning, fans or heating equipment
- coordinating dozens of people milling about in the crew or acting
- blowing special effects fog or smoke, or using fans for wind effects that blow vigorously

In other words, it is not possible to predict all of the conditions that will exists during the shoot. And knowing which of these activities will disturb significant amounts of paint or lead dust can only be determined by monitoring individual workers under these conditions.

Instead, workers or householders planning to work in, or renovate, a home or building in which there is old paint should interpret lead abatement reports by using the following rules:

RULES FOR READING THE LEAD ABATEMENT REPORT:

If the report says:
- that the paint is “lead-free,” but
- analyses show there are low levels of lead in the paints (e.g., 0.01% to 0.5%), and
- the floor wipe samples are below the level of concern (<40 μg/ft²)

Then the location:
- is safe for ordinary work that does not disturb building materials, but
- is NOT safe to disturb the low-lead paint without an OSHA risk assessment, and
- is NOT safe if low-lead paint chips are falling and tracked underfoot. (Immediate clean up with a high efficiency particulate air (HEPA) filtered vacuum is needed.)

Ignore any air sampling tests if the report:
- does not also provide floor wipe data,
- does not provide a complete description of where, when and how the tests were done, AND
- does not show that the air testing was done under the same or worse conditions than those the workers will create when doing their various jobs.

* Footnote: Abatement contractors hire firms to do air monitoring to ensure lead does not escape plastic enclosures and to determine the type of protective equipment workers need. These tests are only valid for the abatement workers.
LESSONS FROM A TENNESSEE ALUMINUM FIRE

A newspaper account from Morristown, TN, about fire fighters using a dry chemical to extinguish a ferocious, white-hot fire that was fueled by a large quantity of aluminum dust outside a Kawasaki plant used some very scientifically accurate and descriptive phrases. They said:

The fire started at ... an end point of the ventilation and filtration system. Firefighters used a pike to loosen the super-heated metal dust, which ignited as soon as it was exposed to oxygen...

The fire, ... burned with the intensity of a sparkler....

"We had to dig (the aluminum dust) out of the bottom," the deputy fire chief said. "The (dust) would fall out in globs. They had to poke it and run." ... the metal would have easily burned through firefighters' turnout gear.

The fire was so intense that most of the aluminum dust burned before it splashed onto the ground. ... the metal burned a hole approximately 4 feet in diameter in the ground.

... firefighters were rotated in and out of the hot zone. While one crew was engaged, another crew stood by in case a firefighter required rescue...

ALUMINUM FIRES. Aluminum burns easily when in a flake or dust form. And the fire does burn with the same intensity of a 4th of July sparkler because they are made with aluminum, iron, steel, zinc or magnesium dust or flakes. Mixing aluminum with other metals increases the fire hazard.

The dry fire extinguisher isn't very effective and the aluminum simply will burn until it is exhausted. Water can't be used since it reacts with aluminum to create hydrogen gas which fuels a fire. The fire is so hot, it truly will burn through firefighters' protective gear and chew a hole in the dirt.

COMMENT. Why then, it is so hard for me to get school art departments to recognize that machining and casting aluminum in their metal or sculpture departments is big a risk? Aluminum requires a dedicated area and dedicated dust collectors and machines to cut and grind it. While the amounts of aluminum used in a school are smaller than those in the Kawasaki fire, the fires that can start in even a small amounts of dust are intense. All fires of undetermined cause in a theater or sculpture shop should be investigated for evidence of aluminum cutting, welding or machining.

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PRIMARY SCHOOL KIDS TO USE UNVENTED 3D PRINTERS

ACTS has been watching and collecting the limited research on emissions from 3D printers. ACTS FACTS (August, 2013) published a summary of two of the better studies. And our July 2016 issue reprinted advice from a National Institute of Occupational Safety and Health (NIOSH) asserting that 3D printers should be enclosed and exhausted to the outside.

We now know that all of the plastic-extruding 3D printers emit nanoparticles and VOCs — even the printers that extrude polymers made from corn and other natural substances. So it was with sadness that I read about a General Electric (GE) grant designed to put these 3D devices into primary and secondary schools without even a word of warning.

THE GRANTS. One of the announcements for grants was on the January 6, 2017 Cincinnati Business Wire. It was titled: “GE Additive Education Program Accepting Applications from Schools for 3D Printers.” It explained that the GE Additive Education Program (AEP) is investing “$10 million over the next five years in two educational programs, to develop pipelines of future talent in additive manufacturing. Enabling educational institutions to provide access to 3D printers will help accelerate the adoption of additive manufacturing, worldwide.”

Since they were accepting applications, I email for further information. I asked if there were any ventilation or safety requirements schools would need to provide. The representative of GE, David Wilson from GE’s aviation division, replied the following:

The polymer-based printers for primary/secondary schools just need a table for it to sit on, power and Internet access. The metal printers for colleges/universities do have a much longer list of safety/logistical requirements.

It was good to hear that the metal printers will require safety requirements. The fine metal powders these use can not only be inhaled, but they can also catch fire and burn fiercely. The GE plastic-extruding 3D printers were not going to be vented in grade schools, so my next e-mail to Dave Wilson did not get a response:

Dave, Thanks. But scary. There obviously are no ventilation requirements for the printers in the primary and secondary schools. We now require polymer printers to be enclosed and attached to a flexible duct exhaust to the outside. Have you seen the statements about these printers in NIOSH Research Rounds monthly bulletin, Volume 1, Number 12 (June 2016) -- Control Measures Critical for 3D Printers? This confirmed our own concern about the nanoparticle and VOCs emissions.

I think my readers will be interested in the disparity between the research we’ve been reporting on the emissions from the PLA and ABS printers and the lack of safety requirements in this project. And these are children.
GRANT STATUS. The final selections for the grants to primary schools were scheduled to be notified by April 28, 2017 and the grants to secondary schools closed May 30, 2017. So the deadlines have passed.

The schools who were lucky enough to receive a grant probably are not concerned about the safety issue. But at the very least, parents should be informed about the status of the research indicating that there are emissions that NIOSH and other agencies and researchers think have a potential for causing harm.

COMMENT. Currently, there are no regulations requiring ventilation for this equipment. But it is clear to NIOSH and other experts that there should be precautions. And years from now, will we see illnesses that can be traced back to these exposures? The ACTS FACTS story below involves just such a scenario at a Canadian GE plant where workers used chemicals now known to be associated with their illnesses.

STUDY SHOWS ILLNESSES AMONG FORMER GE WORKERS


A comprehensive study of chemical exposures at GE’s plant in Peterborough, Ontario, shows workers routinely handled more than 3,000 highly toxic substances in their work between 1945 and 2000. And the study concludes these exposures played a significant role in an “epidemic” or work-related illnesses among employees and retirees.

The 173-page report confirms what people in the community have been saying for years about the plant. The report will be used to support occupational disease claims previously denied by Ontario’s Workplace Safety and Insurance Board, say the workers and Unifor, Canada’s largest private sector union, which sponsored the report.

Researchers for the report interviewed 75 former workers to learn about plant conditions. These conditions were then confirmed by a data base of Ministry of Labour inspection reports, joint health and safety committee minutes, company memos, industrial hygiene literature and other documents, compiled by the union. The new report is an effort to provide evidence for GE workers and others impacted by workplaces with similar histories.

Plant workers built everything from household appliances to diesel locomotive engines and fuel cells for nuclear reactors. At least 40 of the chemicals they were exposed to were at levels known today to be excessive also are known or suspected to cause cancer. The chemicals were often handled with bare hands and little or no protective gear. However, GE representatives say that the precautions used were appropriate for the time period.
COMMENT. Perhaps the precautions used were those required or thought by GE to be appropriate for the time. But there were studies that clearly showed asbestos was a danger even in the 1920s. There were studies showing beryllium and uranium were hazardous well before there were regulations requiring they be controlled in the workplace. And it looks like we are in the same position now with the nanoparticles and other chemicals being released from the 3D printers.

ACTS believes it is time for employers and product manufacturers to use common sense rather than waiting for our weak and defective regulatory system to pass laws requiring precautions. And this goes double when children are the recipients of the new technology as they are in the GE grants to put 3D printers in primary and secondary schools.


ACTS FACTS September 2014 issue covered a high school science project called the “rainbow experiment” in which 13 people were injured. Back in 2014, we picked this particular accident to report of dozens of similar accidents that had occurred in schools that year. It is distressing to see that more of these same accidents have just kept happening.

WHAT’S THE RAINBOW? The rainbow experiment or demonstration involves dissolving compounds containing metals such as sodium, lithium, strontium, calcium, copper, potassium, boron, manganese and barium in methanol. Methanol is a highly flammable and toxic alcohol. When the metal compounds are present in the methanol and the mixture is set on fire, each metal causes the flame to be a different color.

This color is created because the metal in the compounds becomes an ion when dissolved. When the methanol is burned and the metal ions are heated, their electrons are excited and jump to higher energy levels (orbits) in their atoms. Each of these metals creates a different color as the electrons release their different amounts of energy as they fall back to their original energy levels. Understanding this principle is part of every chemist’s early education. We learn to identify metals by color with a simple test that involves flame. But the test is usually done with a speck of the dissolved metal put briefly in a flame. And we do it when we are old enough to do this safely.

THE PROBLEM. The reason that the rainbow demonstration is dangerous is the objective is not metal identification and teaching a chemical principle. Instead, it is to create a dramatic spectacle with large flames arising from bowls of flammable methanol and large colored flames. And often it is done to impress children before they are old enough to understand either the safety issues or the chemical principle involved.

ANOTHER ACCIDENT. We decided to cover another of these accidents because it was the most egregious we have seen. The accident happened at the Yellow School, a religious preschool in Houston, TX. According to the local Fire Department, preschool students were conducting a science experiment outdoors when a flash blast occurred. Of the 12 students who were injured, 11 of them suffered burns, one student was trampled and six of them were taken to the hospital. According to a fire official, all of the injured students were 3 years old.

However, the ABC news report included comments from a 5-year-old girl, Kate Earnest, who said she was part of the group that participated in the experiment. She said, the “Fire was changing colors
and the last one wasn't working, so we put in a little bit more, and then it exploded. That's how the other kids got burned, and they were crying.” Another report says it was the school science teacher who did this. But in either case, it is an outrage to see this experiment done for 3 to 5 year olds.

WHAT IS THE YELLOW SCHOOL? The Yellow School is a religious early childhood day care for children 3 years old through kindergarten. According to the school’s website, the “curricula are developed using guidelines set forth by the Texas Education Agency (TEA) and the findings of the latest brain research.”

WHAT ARE THE TEA RULES? I scanned the 156 pages of TEA rules for preschools and concentrated on Section VI, Science Domain where the only mention of anything even slightly hazardous was under “sources of energy” where it expects the teacher:

- models appropriate vocabulary for sources of energy such as “on/off” for light (electricity).
- discusses and models safety issues associated with heat and electricity.
- models and discusses how to investigate the children’s predictions.
- provides opportunities for children to feel heat from different sources.
- provides opportunities for children to see the result of light and heat (boil water, play shadow games).
- provides opportunities for students to manipulate the power on a safe electric object (on/off switch on a toy connected to a battery students can see)

Instead, this rainbow experiment illustrates an advanced scientific principle and utilizes:

- a solvent that is highly flammable and toxic by both inhalation of the vapors and by skin-absorption. It targets the nervous system and can cause blindness.
- metal compounds some of which are also highly toxic.

COMMENT. Bob Giles, the church business administrator told the ABC TV reporter: “It was an experiment that went wrong. There was a brief moment of flame and it was put out fairly quickly.” “We love these children. This is our church. We're praying for them,” Giles said.

If this accident were anywhere other than Texas and in a religious school, I would expect there to be outrage, lawsuits and new regulations making it clear that projects like this are totally inappropriate. But my advice is: save this copy of ACTS FACTS because it is probably the last you will hear of it until it happens again at some other Texas school. If I’m wrong, I will gleefully publish a follow up.

ACTS FACTS sources: the Federal Register (FR), the Mortality and Morbidity Weekly Report (MMWR), Environmental Health Perspectives (EHP), and many other publications. Call for further information on sources. Editor: Monona Rossol; Research: Tobi Zausner, Sharon Campbell, Robert Pearl, Brian Lee, Pamela Dale, Kathy Huilce, Pat F. Sheffield, Janet Sellery; Staff: Kathy Frost, John Fairlie, OES.

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ASKING FOR HELP FROM READERS

The last time we asked for help from readers we were looking for an existing stock of a particular brand of paint from a particular time period. And one of our readers came through with exactly what was needed for testing and investigation. So, we are trying it again with another product.

This time we need pictures of old NYTAL, Ceramitec, or Pfizer talc bags and, if possible, a full or partly full bag of one or more of these talcs with enough talc left in it to test.

PICTURES: if you have an old picture of a classroom, studio or supply store with one of these bags clearly in it somewhere, that would be wonderful. Pictures of the bags from an old catalog would be just as grand, especially if the date of the catalog is known.

BAGS. Actually, I hope all of my readers will have disposed of all of this hazardous talc long ago. But if you know of anyone who has some left in the original bag and is willing to have it taken off their hands, please contact me by e-mail at actsnyc@cs.com. You will be doing a good thing.

ALUMINUM CLADDING AT FAULT?

Thanks to Brian C. Lee, other ACTS’ advisors and the many people I contacted about this issue.

Investigators of the deadly fire at London’s 24-story Grenfell Tower revealed that the fire was probably exacerbated by the aluminum cladding on the outside of the building. While most people, especially those who answer questions on various internet forums, are absolutely certain that aluminum doesn’t burn; it actually does, of course. And it burns hot.

WAYS ALUMINUM CAN BURN. Burning is an exothermic reaction between an oxidant (something that supplies oxygen) and a fuel (in this case aluminum). For this reason, aluminum powders are “fuels” in many pyrotechnics and fireworks. All metals will burn (oxidize rapidly) if they are heated to the right temperature. The oxidant for the reaction could be oxygen from the air, or any substance containing oxygen such as iron oxide or silicon dioxide (sand). Once ignited by high heat, most metals will continue burning to completion.

Aluminum metal is an “active” metal that is especially likely to burn in air or when mixed with a chemical containing oxygen (an oxidant). Aluminum mixed with iron oxide is called “thermite.” This thermite mixture burns at over 4000 degrees Fahrenheit. In general, the smaller the aluminum shavings, dusts, or powders, the easier it is to ignite and the faster it burns. Aluminum dusts have caused many industrial explosions and fires.

Water also contains oxygen and can be a source of oxygen for a burning metal. Usually metal fires are only made worse by spraying water on them because after the water’s oxygen (the O in H₂O) is used up by the aluminum, hydrogen gas (H₂) is left over and will also will burn!
SHOP FIRE ISSUES. Teachers and artists should reconsider using aluminum in any form, such as stock aluminum sheet, T-bar, channel, or tube. Sculptors should reconsider casting aluminum. These activities create aluminum dust from cutting, polishing, and grinding. This dust is highly incompatible with the dusts from other metals or combustible dusts, such as wood and plastic dusts. Aluminum cuttings or dust must NOT go to a wood dust collector or ordinary vacuum.

If schools or studios want to work with aluminum, an isolated area must be provided with a non-water fire suppression system and an explosion-rated dust collection system or a vacuum cleaner that is certified as approved for aluminum particles or dusts. Good training and clean up procedures need to be in place and enforced.

ALUMINUM LAMINATES. That brings us back to the aluminum cladding on the Grenfell tower. It is now known that this cladding was Reynobond PE, an aluminum/plastic laminate. This cladding and other plastic laminates such as Dibond are also finding their way into art, architecture, and theater schools and studios. It is a popular material because the sculpture, set or gallery environment made from aluminum laminates look heavy, metallic, and strong. But they actually are light-weight and can be quickly and easily fabricated using chop or table saws.

These constructions, however, have fire issues when installed on stages or in galleries. Even more important, we need to look at where the dust from cutting these laminates is going.

While there are dust collection systems and vacuums that are manufacturer-approved for collection of aluminum dust, I talked to an engineer at a company that supplies these systems and he said he doesn’t think any manufacturer would extend their guarantee to a mixture of aluminum and an electrostatic plastic dust. While this single conversation with an engineer is not a scientific survey, I leave it to the schools and artists using these laminates to conduct their risk assessments with their dust collection suppliers before continuing to cut these products.

GUARDING ISSUES. The inventor of SawStop, Stephen Gass, told me that the aluminum-surfaced laminates also are conductive and would trigger the SawStop guard. This guard must be bypassed if the laminates are cut on a SawStop.

FIRE RETARDANT STANDARDS. The fire-rating of building products involves flame spread tests done in accordance with the American Society of Testing and Materials standard ASTM E 84. This test is not done with the bonded material in a vertical position as they are in building cladding. On the outside of a building, the flame would rise up progressively heating the panels above. The ASTM 84 test tries to simulate this in a horizontal tunnel chamber that draws air, but this is not the same. Regulators and scientists need to reexamine these tests.

COMMENT. Currently, it is my opinion that aluminum/foam plastic laminates such as Dibond and Reynobond PE have no place on stage, in a gallery, or public building installations until a lot more is known. Fabricating such projects in school and professional shops and studios using table or chop saws is also a hazard due to the aluminum/plastic-containing dust. Without written assurance from manufacturers that their dust collection systems are safe for this purpose, the work should cease.

And all aluminum dust and particle producing processes should also cease unless they are isolated in rooms with fire suppression, training, and clean up procedures appropriate for the work.
HEADS UP ON NEW CLASSIFICATION FOR WELDING FUME
The Synergist, AIHA, June/July 2017, page 12

In 1989, the International Agency for Research on Cancer (IARC) classified welding fumes as Group 2B, “possibly carcinogenic to humans.” At the time, the IARC classification was based on “limited evidence in human beings” and “inadequate evidence” in experimental animals.

Now IARC has upgraded welding fumes to Group 1, Carcinogenic to Humans, based on substantial new evidence from observational and experimental studies. IARC’s assessments will be published later in Volume 118 of the IARC Monographs.

COMMENT. Welders using any kind of metal should be protected by flexible duct exhaust. Mild steel welding fume has the additional hazard of exposing workers to manganese, which is now known to be causing neurological damage in welders (see ACTS FACTS, September 2012).

SOLUBILITY, ONCE AGAIN, NO PREDICTOR OF TOXICITY

http://cen.acs.org/articles/95/web/2017/06/Sunlight-surprise-raises-cadmium-pollution-risk.html,

Chemical & Engineering News is one of my favorite magazines. So it is not often that a C&EN article leaves me frustrated and angry. But this one did. The article began this way:

Even though cadmium is considered a probable human carcinogen by the U.S. Environmental Protection Agency, it is still used to give some plastics and ceramics red, orange, or yellow hues. That’s because organic pigments are unstable at the high temperatures used to make these products, and [inorganic] pigments like cadmium red are thought to be relatively inert in the environment on account of their reportedly low solubility in water.

That belief has been turned on its head by a new study showing that in sunlight, a commercially available cadmium red pigment rapidly dissolves in water, releasing the toxic metal.

SOLUBILITY MYTH. The idea that water-insoluble chemicals are going to remain unchanged in the environment and in the human gut or lung is a myth that has been perpetrated on U.S. regulators and consumers for decades. But I would have thought that chemists working for C&EN would be a bit more sophisticated. Instead, the author of the article refers to this solubility myth as “conventional wisdom.” Conventional maybe, but “wisdom” it surely ain’t.

This is the same myth that toxicologists certifying ceramic glazes as “nontoxic” foisted on consumers until it was shown that acid-insoluble lead frits release lead in the gut with enough ease to have resulted in the deaths to two nursing home patients who accidentally ingested some, thinking it was medication. After two trials settled favorably for plaintiffs who claimed their children were brain damaged in utero from the “nontoxic” lead frit glazes their mothers used during pregnancy, certifiers stopped using acid solubility tests for ceramic materials. But those same certifiers continued to use the acid tests for paint pigments. Go figure.

The only way to know if a chemical will be soluble in the environment is to place the chemical, as this cadmium pigment study did, in various environmental conditions and monitor it. In this case, it was not acid that dissolved the cadmium, it was exposure to sunlight that was the critical factor. How about acid and sunlight? Acid, sunlight, and microorganisms? Sea v. lake water? And so on.

FACTORS AFFECTING SOLUBILITY. While sunlight triggers this particularly pigment, other insoluble pigments or substances may unexpectedly solubilize due to the actions of a particular strain
of bacteria in the environment or the human colon. Or the trigger for solubilization may be enzymes in the gut or lung, microphages in the alveoli, alkaline conditions in the lower gut, or even interaction with common foods or medicines in the stomach. The possibilities are legion.

Solubility should NEVER be relied on as an assurance that the chemical will not mobilize in the environment or in the body. All of the chemicals allowed in our consumer products should be studied for their environmental fates and their behavior in the body under real conditions.

TRULY INSOLUBLE SUBSTANCES. Those substances that actually are found to be stable in the environment or in the body under all conditions, should then be studied in the lung. Since these chemical are “inert,” small particles of these chemicals will remain in the lung’s alveoli for life. The substance may have other toxic effects there. For example, insoluble titanium dioxide pigments are now known to be lung carcinogens.

CADMIUM IN CONSUMER PRODUCTS. The C&EN article says that two chemists who study

... hazardous metals in consumer plastics and packaging at Iowa State’s Polymer and Food Protection Consortium, say this phenomenon would be unlikely to enhance leaching of cadmium from intact plastics or ceramics colored with the pigment, because the pigment is locked into the solid polymer or ceramic. (Underlining mine – editor)

Unlikely? The pigments are “locked into the solid polymer or ceramic” glaze? What happens when the polymer degrades as it ages? And “solid” ceramic glazes are known to slowly dissolve over time. Will sunlight speed this up? Fortunately, some of the people who did the original cadmium solubility study are planning to test various cadmium-containing products when exposed to sunlight.

COMPUTERIZED TOXICITY TESTING. And watch out for the “conventional wisdom” solubility myth to be included as a parameter in the new computer (in silico) programs industry and the EPA want to use to predict toxicity without having to actually test the chemicals. The equation that “insolubility equals nontoxicity” is going to be one of the big hunks of “garbage” science that will be enshrined in those in silico programs that will generate more “garbage” in their predictions.

We do not know enough to set up in silico programs. We do not know enough to continue to color our plastics with highly toxic substances and let children play with them. It’s time to put away our toxicity theory toys and generate some real data.

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ART SAFETY COURSE REPORT

Your editor just returned from teaching the first art safety course in a new program at the University of Massachusetts-Amherst. The 5-day, 40-hour course, held July 31 to August 4 will hopefully continue to be offered every summer. To help make this possible, my will provides a $600,000 endowment for this course. If you couldn’t make it this year, plan attending on next year!

GUEST LECTURER. World-renowned scientist and asbestos expert, Barry Castleman just happened to have a free day during this week. He arrived at the perfect time to provide additional perspective to our discussion of workplace air quality standards. Barry discussed his research on the effects of corporate influence on air quality standards. He also spent an hour answering questions on this presentation and many other workplace health and safety issues.

OBJECTIVES. The course is designed to provide two objectives simultaneously. The first is to give art and theater studio technicians, artists, and teachers, who do not have a science background, enough information to be able to improve the safety features and practices in their studios, schools, and classrooms. The course attempts to provide students with enough information about their materials, processes, equipment, and about the OSHA regulations that apply to them, to enable these students to inform or teach others.

The second objective is to acquaint the science-savvy participants, such as industrial hygienists and safety professionals, with artists’ unique safety needs. For example, the PowerPoints are designed to show professionals ways of explaining regulatory and safety concepts to artists using language and examples relevant to the arts. The course also covers information that usually is not covered in regular science training such as the Colour Index pigment identification system and the special labeling law that applies to only art materials sold in the United States.

MEETING A NEED. In general, the course is needed because the standard OSHA training currently provided by schools and industrial hygiene services is not appropriate for artists. For example, the OSHA 10 courses are designed to teach 10 hours of basic information on either the rules for General Industry or Construction. But artists need a combination of General Industry and Construction regulations since they do various tasks that will come under both of these rules.

However, the best example of inappropriate training for artists is the standard OSHA Globally Harmonized System (GHS) hazard communication training. Most OSHA trainers teach participants to interpret the pictograms and terminology on the new GHS labels – a label most art and theater workers will never see in their working lifetimes. Instead, artists will see three other labels that OSHA accepts as valid from three other agencies: the Consumer Product Safety Commission, the
EPA, and the FDA. The symbols and terms used on these labels don’t mean the same things that those same words and similar symbols mean on GHS labels. This is a major reason that artists have misconceptions about the toxicity of their art materials.

And the worst source of artist’s misconceptions about their materials is due to a regulation that applies only to art materials in the United States. This label is, in my opinion, seriously misleading. The history of the development of this labeling law and its inherent flaws must be covered in any course provided to users of either children’s or adult’s art materials.

In addition, artists (and most consumers) do not understand EPA terminology on the labels and advertising for consumer and industrial products such as VOCs and biodegradable. Artists need to know why these and other terms are completely unrelated to the safety or health of the user of the product and apply only to EPA’s long-term environmental objectives. Many of these low VOC and biodegradable products are more toxic to users than products they are meant to replace.

FIELD TRIP. The class was treated to a walk-through of the Studio Arts building in which the course was held. Here we could see examples of well-designed ventilation systems, proper waste management, and some new equipment. And since no art department is perfect, they also saw some typical art department problems in labeling, chemical storage, older equipment, and the like. Class discussions were held to explore ways to address these problems.

GROUP DISCUSSIONS. The verbal interaction between the students was incredibly productive. Everyone learned, including the teacher. For example, the morning after we discussed the material handling issues associated with heavy items, such as 50-pound bags of clay and lithography stones, a student brought in a prototype design solution he worked on after class. It was for a vertical chain-driven industrial shelving system that could save space by storing all the way to ceiling and which would operate with a key pad to bring the desired heavy object to any height required for off-loading.

Another student then did an iPhone search and found the product was already invented. One unit made by this manufacturer would already meet our clay and litho stone needs. But even more importantly, this company designs units to the space, ceiling heights, and weight requirements of their clients. This means that this equipment can be designed for specific uses in shops and studios. (As soon as I was back in New York, I told two of my building planning clients that I would be recommending this storage solution. And I talked to an art material and equipment supplier who may want to include this equipment in his product line.)

Strategies for addressing many other safety and administrative issues were also developed in these open discussions. I hope we will continue problem solving by keeping in touch after the class.

COURSE MATERIALS. The text for the course was an unedited version of the up-coming 4th Edition of the Artist’s Complete Health & Safety Guide which is scheduled for publication in early 2018. The book covers traditional and historic processes from alternate photography processes to 3D printing. And the OSHA and EPA requirements for studios and classrooms for all ages are covered from children to the elderly.

As we worked through this text, the students’ comments and observations were noted and I have made changes based on them. In fact, the development of all the course materials can be considered a joint venture. Comments during PowerPoint presentations resulted in improvements in wording and diagrams. Even the final exam has now been changed in response to student comments.
THE STUDENTS. The students demonstrated proficiency on our 50-question, 162-possible error, test. In my opinion, everyone in the class should be able use the SDS data sheet provided to them to interpret most of the information on Globally Harmonized System safety data sheets (SDSs) and to correctly interpret the terms found on all four types of labels we covered. The PowerPoint on ventilation and our walk-through of the building should help them recognize local ventilation system hoods that are properly designed for a particular process. And they should have a general knowledge of applicable OSHA safety rules for studios and shops. I think the safety professionals in the class are also capable of writing or consulting in this field. I’m so proud of them all that here they are:

Joe Allgeier, Technician, Rochester Institute of Technology, NY
Lisa Bennett, Environmental Health & Safety Assistant, Rhode Island School of Design, RI
Dan Bethune, 3D Studio Technician, Sam Houston State University, Huntsville, TX
Barbara Boyle, Director, Environmental Health & Safety, State University of New York System, NY
Marc Guilbault, Technician II/Safety, Old Dominion University, Fine Art Department, Norfolk, VA
Benjamin Hunt, Instructional Support Technician III, California State University, Sacramento, CA
Diane Inman, Studio Art Manager, Framingham State University, Framingham, MA
Daniel Kelm, Artist and Independent Scholar, Easthampton, MA
Felicia Malachite, Costume Technician, Theater Department, University of Massachusetts, MA
Yung Morgan, Environmental Hygienist, Environmental Health & Safety, UM-A, MA
Karen Piegorsch, Artist and Environmental Advocate, Tucson, AZ
Glenda L. Pons, Hazardous Materials Tracking Manager, Environmental Health & Safety, UM-A, MA
Kevin Ptak, Instructional Support Technician III, California State University, Sacramento, CA
Eileen Reynolds, Senior Safety Specialist, Golden Artist Colors, New Berlin, NY
Evelyn Snyder, Potter and Technical Assistant, Florence, MA
Jean Testa, Lab. Safety Specialist, Office of Env. Safety, Indiana State University, Terre Haute, IN

SAWSTOP & FESTOOL: SOON TO BE A ONE-STOP-SHOP!
SawStop to be Acquired by TTS Tooltechnic Systems, 06.26.2017

For years I have been telling people that the only table saws they should consider are the SawStops and for other small and handheld machines, try Festool first. Now it looks like the two will be a under the same umbrella.

TTS Tooltechnic Systems, a company based in Germany which owns a family of companies including Festool, has acquired SawStop, according to a June 26, 2017 SawStop Press Release. The press release says:

“We are proud to join a company with a shared passion for customer safety, product quality and meticulous engineering,” said SawStop’s President, Dr. Stephen Gass. “Speaking for our entire team in Tualatin, Oregon and across North America, we are excited to join with TTS to bring safer woodworking to more people through new tools and in new markets around the world. With a family like TTS at our side, I can’t wait to see what we will accomplish together.”

The acquisition is expected to be completed in July 2017. SawStop’s current management team will continue to operate the company out of its Oregon headquarters.
GENIE LIFT RECALL

Check the model/serial number on your Genie lift. If you have any of the following models, download the safety notice and instructions at:


SX-150: SX15015H-101 to 161     SX15016H-162 to 228     SX150H-500 to 501
SX-180: SX18014-101 to 196     SX18015-197 to 313     SX18016-314 to 317
SX180H-318 to 360

Genie Industries has found that weld debris in the boom tubes could lead to premature and excessive wear of the upper wear pads. This excessive wear can lead to potential damage to the boom tubes and could cause the platform to drop.

UPDATE ON TALC

We now have pictures of bags of Ceramictalc and NYTAL 100 HR. But we still do not have an actual bag containing the talc which can be used in laboratory testing.

We again ask readers to keep on the lookout for these talc products.

Since I saw three of these products in 2015 and two this year in university potteries, I know they are out there. Check your old supplies and ask your friends if they have bags of this industrial talc product.

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EDITOR HONORED

In Washington, DC, on August 20, 2017, your editor was made a Fellow of the Division of Chemical Health and Safety of the American Chemical Society (ACS), and was given the Howard Fawcett Award for “outstanding contributions to Science, Technology, Education and Communication of Chemical Health and Safety.”

There is also a possibility that the ACS will publish the paper I presented as well. But I will understand if they don’t. As readers know, the chemistry I practice is a bit off the beaten track.

VEGAN BOOTS SAVE ANIMALS, BUT KILL PEOPLE?


Dr. Martens 1460 Vegan Cherry Red 8-eye boot were the subject of a joint recall by the United States Consumer Product Safety Commission (CPSC), Health Canada, and Dr. Martens AirWair USA, LLC. The boots, sold in all sizes, have a golden heel loop pull tab with “AirWair” printed on it. Product Code 14585 with Batch Numbers starting with “GV” and ending in “R” or “S” are printed on the inner tongue label.

The press release says that Dr. Martens AirWair USA, LLC has become aware that the dye used to colour the tongue lining of the Dr. Martens “Vegan” boot model contains traces of the chemical benzidine. Prolonged and direct contact with the boot tongue lining could expose the wearer to the chemical. Benzidine is a skin-absorbing carcinogen.

An estimated 30,000 units were sold in the United States and approximately 898 units of the Vietnam-made products were sold in Canada from September 1, 2016 to June 29, 2017. Consumers should immediately stop using the product and contact Dr. Martens AirWair USA, LLC for instructions on how to obtain a full refund or a free replacement product. For more information, consumers may contact Dr. Martens AirWair USA, LLC by telephone at 1-800-460-3930.

BENZIDINE REGULATIONS. How very interesting. And for three reasons in particular.

1. The benzidine is probably not just a contaminant in the dye, the dye itself is probably one of the many dyes in the chemical class of “benzidine dyes.” In this case, the benzidine also can be generated by the degradation of the dye over time (fading) or from bacterial action on the dye.

2. The product was made in Viet Nam where the benzidine dyes are not restricted as they are in the United States, Canada, and many other countries. I think it is fair to say that there are probably millions of untested and undiscovered plastic, leather, and textile products that are dyed with benzidine dyes that have slipped through our poorly monitored ports.

3. The Vegan brand products are made from synthetic materials which do not involve killing or abusing animals. But consumers using the products and Viet Nam workers applying the benzidine
dyes to the plastic were clearly being abused. There are many studies showing high bladder cancer rates and other diseases among benzidine dye workers.

**HOW ARE WE EXPOSED.** Benzidine dyes are part of a larger class of dyes called “azo dyes.” Azo dyes have one or more “azo bonds” which are two nitrogen molecules bonded together (−N=N−). Benzidine dyes will release free benzidine when its azo bonds are broken. This is easily done by enzymes called “azoreductases” found in the liver, in gut bacteria, and in skin bacteria.

These skin bacteria are a major reason the dyes are potentially dangerous when used on textiles or wearing apparel. They release free benzidine which then absorbs through our skin.

**RECALL ISSUES.** In order to recall this product, either Health Canada or the U.S. Consumer Product Safety Commission (CPSC) had data showing that free benzidine was available for skin absorption on the tongue of this boot. There are no symptoms from absorbing benzidine, so someone had to have tested this imported boot.

I don’t see evidence on the CPSC’s or Health Canada’s websites that they are doing active surveillance of imports for free benzidine on textiles and wearing apparel. Both agencies only appear to be enforcing laws requiring importers to self-report and provide documentation that the products meet requirements (lots of luck with that).

It is a bit more likely that the confirming data came from the U.S. Environmental Protection Program (EPA). The U.S. EPA has a Benzidine Action Plan that says the following:

> If EPA determines that List 1 and/or 2 dyes [benzidine dyes] are currently coming into the U.S. on imported finished textiles, EPA intends to consider initiating regulatory action under TSCA section 6. In making such a consideration, EPA would evaluate whether those existing uses indicated the potential to present an unreasonable risk, in coordination with CPSC and/or other Agencies where appropriate.

**THE EPA BENZIDINE ACTION PLAN.** This 12-page plan, published in 2010, has two lists of dyes that it restricts. These are:

- List 1 - consisting of four particular benzidine-based dyes, and
- List 2 - consisting of 44 benzidine congener-based dyes.

The difference between these two types of dyes is that the first four have the ability to release free benzidine on metabolism or degradation. The second list consists of dyes known to release closely related benzidine congeners, compounds that also are carcinogens (e.g., 3-3'-dichlorobenzidine). Our skin bacteria can easily metabolize dyes to release both free benzidine and benzidine-congeners. Both types of compounds then can absorb through the skin.

**INADEQUACY OF EPA’S PLAN.** The Benzidine Action Plan has three big flaws:

1. **SMALL NUMBER OF COVERED DYES.** The lists of 4 and 44 dyes are grossly insufficient. There are vast numbers of these dyes. And new ones are always being invented and synthesized.

2. **BENZIDINE DYES ARE ALLOWED IN OTHER PRODUCTS.** The plan doesn’t prevent benzidine dyes from being used in products other than textiles and apparel. It ignores other products that may also contact the skin such as printing inks, paints and the like. This skin contact can be a significant problem for artists in particular.
3. BENZIDINE PIGMENTS ARE EXEMPTED. The pigments are exempt based on the fact that they are less soluble in water than the dyes. The wording in the standard is:

... In reviewing the benzidine congener-based pigments, EPA believes that the presence of pigments in such consumer products as printing inks, paints, plastics, and textiles was unlikely to present an exposure concern, because the pigments are not bioavailable and are not absorbed into the body (Environment Canada, 2009, Golka, et al, 2004, OECD, 2003,).

I personally am not impressed by the studies used to support this position. The studies are mostly short-term or they place the pigment in contact with blood or other tissues containing the azoreductase enzyme. But this is not the same as being in living organisms over years. Instead, these chemicals should be tested using the standard protocol to determine carcinogenicity, that is, a two-year exposure period in two species of animals (usually rats and mice).

Apologists for the chemical industry cite the cost of these tests as an impediment. But many of these benzidine pigments are high production volume chemicals. For example, Pigment Yellow 12 (PY12), a diarylide yellow, was reported to have been manufactured in amounts in the range of 600 tonnes (661 U.S. tons) in Sweden and Denmark alone. Certainly manufacturers should not have difficulty in finding the roughly $200,000 needed to actually test their product for cancer effects.

Instead, the world is unintentionally engaged in a human experiment on these dyes. Pigment Yellow 13, 14, 55, 83 and 87, and Pigment Orange 16, have been reported in European studies as tattoo pigments.* These benzidine pigments are not just on, but under the skin. In a few more decades there may be significant human data on these pigments.

THE E. U. HAS A FAR BETTER LAW. The European Union has a dye regulation that eliminates both the issue of a short list of restricted dyes and the exemption of benzidine pigments. This rule, called the "Dye Directive" (or more accurately, the Azocolourants and Azodyes rule in REACH,** Annex XVII), bans any colorant for use in products that have prolonged contact with the skin and which releases more than 30 parts per million of any one of 22 chemicals that can cause cancer or allergies. Benzidine is just one of these. And azo dyes other than benzidine dyes are included.

The Dye Directive doesn’t require expensive toxicity testing for any azo dye or colorant (pigment). The chemicals only have to be tested to determine if they can release significant amounts of one of the 22 known azo carcinogens or allergens. The Dye Directive also updates itself by automatically banning any new dye or colorant that comes to market based solely on its potential to release one of these chemicals. This law, combined with REACH’s requirement that by 2018 more long-term data be available on all high production volume chemicals, would make the law even better.

Footnote:
** REACH stands for "Registration, Evaluation and Authorisation of Chemicals."

BORIC ACID/BORAX: A HAZARD IN ART MATERIALS?

The April, 2017, ACTS FACTS carried an article about homemade slime causing skin burns on children who played with it. But none of the sources we looked at for information on the borax slime mentioned the toxic effects of borax and boric acid to children and pregnant women. And we
missed a release a year prior to this on July 22, 2016, from Health Canada that warned about boric acid’s potential to cause developmental and reproductive health effects. The release said:

Health Canada is advising Canadians to avoid using boric acid for arts and crafts projects, such as homemade slime, or modelling clay. Health Canada is also advising against making homemade pesticides with boric acid.

....

A recent draft risk assessment by Health Canada has found that overexposure to boric acid has the potential to cause developmental and reproductive health effects. Since Canadians are already exposed to boric acid naturally through their diets and water, Health Canada is advising that exposure from other sources should be reduced as much as possible, especially for children and pregnant women. The concern is not with any one product, but rather multiple exposures from a variety of sources.

Health Canada also cancelled the registration of several types of boron pesticides other than the enclosed bait stations and spot treatment gel formulations. And new labeling requirements will be developed for the remaining boron-containing pesticides. In addition they advise the following:

* Use recipes to make children’s arts and crafts at home (e.g., slimes) that do not contain boric acid. Do not use boric acid to make homemade pesticides.
* Check the product label for terms such as “borax” and “boron-containing”. You can also contact the manufacturer to find out if their products contain boric acid.
* Follow all directions on cleaning products. Store cleaning products out of sight and reach of children.
* Dispose of chemicals properly based on the manufacturer’s directions.
* Use health products that have a drug identification number (DIN), natural product number (NPN) or homeopathic medicines number (DIN-HM). These numbers mean the product is regulated under the Food and Drugs Act and has been reviewed by Health Canada.

COMMENT: Canada is such a nice place. But U.S. readers are pretty much on their own slogging through the swamps of homeopathy and natural cure claims. Want my advice? No data – No dice.
AGAIN: ANOTHER HONOR FOR YOUR EDITOR?

Last month the newsletter covered the award and fellowship I got from the American Chemical Society. This month, on September 6, 2017, Travis Irving, President of the Metro-New York local section of the American Industrial Hygienist Association presented me and Mitchel Konca, Assistant Area Director of OSHA’s Manhattan Office, their “Bull Moose Award.”

This presentation takes some explanation. As the confirming letter states, the Award is “Named for Bullwinkle, nature’s first industrial hygienist, who patrolled the woods with his faithful technician, Rocky, in search of recognizable hazards, keeping forest and glen safe for all, and waging a constant battle for prevention against Boris and Natasha, the twin Compliance Officers.”

The letter also lists the recipient’s many attributes. For example, it is duly noted that “Her 20/20 hindsight makes her able to spot a hazard after she steps in it.” A lot of good-natured kidding and a picture taken with antlers on one’s head goes along with the award. But the caliber of the long list of Bull Moose Award recipients, past and present, makes it obvious we are in damn good company.

NEVADA ENTERTAINMENT WORKERS NEED OSHA 10 CARDS


Nevada Gov. Brian Sandoval has signed Assembly Bill 190 that requires entertainment industry workers to complete one of two Occupational Safety and Health Administration (OSHA) safety courses through a certified instructor. Starting January 1, 2018, the State of Nevada will require specific workers in the entertainment industry to complete either an OSHA 10 hour non-supervisory employee course or an OSHA 30 hour supervisory employee course on the General Industry Standards. They must receive a completion card within 15 days of hire. The specific workers are ones whose primary occupation on site falls into one of these categories:

* Theatrical scenery, rigging, or props
* Wardrobe, hair, or makeup
* Audio, camera, projection, video, or lighting equipment
* Any other items or parts which are related to or components of the items described in 1, 2 or 3 and which are used for on in conjunction with the presentation or production of:
  * Live entertainment
  * Filmmaking or photography, including without limitation, motion pictures
  * Television programs, including, without limitation, live broadcasts, closed-circuit broadcasts, or videotape recordings and playback
  * Sporting Events
  * Theatrical performances
The fire started because a colored powder consisting of starch and various dyes was sprayed from a stage onto the audience to produce the effect of a giant Holi celebration. The cloud of potentially flammable dust created in this process contacted a source of ignition somewhere in the area. Looking at the several films being taken at the time, it appears most likely that the hot stage lights were this source, but it clearly could be almost anything – a cigarette, a sparking motor or even a static electrical discharge.

Then the suspended powders deflagrated, that is, the powders caught fire in air and the fire spread throughout the entire cloud of dust in seconds producing a fire ball. The air was filled with flame setting fire to everything including and the powder that had landed on people and their clothing. Nearly 500 people were hurt and 15 died.

A Taiwan judge determined that party organizer, Lu Chung-chi, failed to take precautions to prevent the explosion. Lu Chung-chi was sentenced to four years and ten months in prison. In addition, the National Health Insurance Administration sued him, seeking $14 million in compensation.

A year after the fire many people were still being treated including Alex Haas, the only U.S. citizen in the crowd. He had burns over 90 percent of his body on his hands, underarms, torso, knees, legs and feet. He first fought for his life in a Taiwan hospital where he was in a medically induced coma. He was later transferred to the States where he has had many operations and laser scar treatments. Haas says he remembers the fire vividly including stepping into the dust which kept re-igniting, his hair and beard catching on fire, and running away.

SPECIAL EFFECTS DUSTS. Dusts of many kinds are used in theatrical, sports, and community events. ACTS is firmly against ever putting any dust, flammable or not, deliberately in the air where it can be inhaled. In our opinion, it just makes no good sense for so many reasons.

But if dusts are used, the fire issues must be addressed. One aid might be to follow the advice in ANSI E1.40, Recommendations for the Planning of Theatrical Dust Effects. This standard has a section on precautions needed to prevent deflagration of natural plant- or animal-based dust effects.

LATEST STUDY ON TATTOO PIGMENT MIGRATION


In a study published online on September 12, 2017 (see source under the title), a team of scientists examined the skin and lymphatic tissues from human corpses of people who had tattoos using synchrotron X-ray fluorescence (XRF) techniques at both the micro (µ) and nano (ν) scale. Advanced mass spectrometry-based methodology also showed that the pigments in the lymph nodes were of the exact same composition and type as the pigments in the skin. This definitively proves that the pigments, heavy metals and titanium dioxide from tattoo inks had migrated to regional lymph nodes.

The researchers also showed that while most tattoo pigments range in size from <100 nm to >1 μm, it is the smallest sized particles that were more likely to reach the lymph nodes. The team’s evidence clearly provides additional strong evidence for both migration and long-term deposition of toxic elements and tattoo pigments.

In addition, this study shows alterations of biomolecules in the nodes that contribute to cutaneous inflammation (chronic enlargement) of the nodes and lifelong exposure to the pigments. This tissue
LEANSAFE™ LADDER LEANS LEGALLY!


According to their August 10, 2017 press release:

Werner, the global leader in the manufacturing of ladders with a full portfolio of climbing equipment, introduces the LEANSAFE™ Ladder, a step ladder that can safely be leaned against walls, corners, studs or a pole. Per OSHA regulations, traditional step ladders should never be leaned directly against a vertical surface because they are designed to be exclusively self-supporting. However, Werner’s new LEANSAFE™ Ladder introduces new innovative features allowing it to be leaned against a variety of surfaces while retaining its functionality as a traditional step ladder.

Warner says the new LEANSAFE™ Ladder is both OSHA and ANSI compliant and is available in a variety of sizes ranging from 4 feet to 12 feet in height. The new LEANSAFE™ Ladder is both a standard step ladder and leaning ladder all-in-one.

Standard features on the Werner LEANSAFE™ Ladder include a Type 1A Duty Rating and a load capacity of up to 300 pounds. The ladders are constructed of seven-layer fiberglass, making it safe to use when working around electricity. The ladders are now available online and in stores. For more information, visit www.wernerco.com/leansafe.

The pictures show that a standard A-frame can’t get close enough to a wall to safely paint or work on that wall. But when the Leansafe™ ladder is used in the leaning mode, it can provide access to the wall surface. The rubber bumper pads allow it to lean without slipping on a flat wall. Or the notch in the top can fit around a stud or on a corner. It looks pretty useful to us here at ACTS.
WALNUT SHELL ABRASIVE GRIT KILLS CANADIAN WORKER


On October 2, 2017, 33-year-old Justin Mathews went to the Rossdale fire station in Edmonton, Alberta, with a co-worker to test the air quality during a renovation project while the workers were sandblasting the old lead paint off the walls in the building. Mathews had only recently started this air-monitoring job with ESP HiTech Inc., an environmental engineering firm.

After about 20 minutes in the fire station, he started having trouble breathing and rushed outside where he collapsed. Edmonton fire crews responded, followed by an ambulance which took him to University of Alberta Hospital. When his parents arrived at the hospital, Mathew was unresponsive, on a breathing machine, and in a coma. Later, it was decided to take him off life-support, as doctors had suggested. He died about five days after being taken off the breathing machine.

THE CAUSE. Mathew died of anaphylactic shock. He had a known allergy to nuts and carried an Epipen auto-injector whenever he might be eating food that could accidentally contain nuts. But he didn’t have one with him when he went to work since he did not anticipate any exposures. He was unaware that the blasting grit being used at the fire house was ground walnut shells.

A company called Advanced Remediation Solutions did the blasting work. When the Canadian Broadcasting Company reporter asked if a manager at the company was available for comment, a man who only gave his name as Dean said it is not conclusive that walnut shells caused the death, since nut oils that cause allergic reactions are removed from shells during processing.

However, walnut oil is not the problem. It is the proteins in the nuts that provoke immune reactions. Since Mathew had a known severe allergy to nuts, it is almost surely the walnut shell dust that caused Mathew’s death. Trent Bancarz with Alberta Occupational Health and Safety said investigators do suspect the death was caused by a severe allergic reaction to walnut shells at the fire station, although it is still early in the review.

COMMENT. Unfortunately, most people still don’t seem to understand two important facts:

1) People function best when they breathe air. Add anything to the air, such as particulates, and a variety of defense mechanisms will be activated including irritation reactions, the mucociliary escalator, cough reflexes, and more. And in some people, these defense mechanisms trigger asthma or other adverse responses.

2) Plants and trees are jam-packed with the many, many chemicals they manufacture out of water, sunlight, and minerals from the earth. In addition to making a host of chemicals used to grow, they create their own pesticides, repellants, attractants, herbicides, hormones, and medicines. Plants make chemicals, in part, because they are engaged in intense chemical warfare to defend their little patch of dirt and bit of sky. And now studies are showing plants also communicate with each other by emitting even more chemicals.

Not one single green-plant chemical, in the billions of years plants have been on earth, was created because it would be good for man. Even our chimp ancestors knew that most plants and trees are inedible, sensitizing, toxic, or outright poisonous. It has taken many sick and dead chimps in the dim, dark past to determine which leaves to eat and which fruits are safe at which stage of ripeness. Even man learned the hard way to eat the rhubarb stem and leave the leaf the hell alone.
YEAR-END ODDS & ENDS

We are finishing our thirty-first year of publishing *ACTS FACTS*. Next month starts a whole new year. A quick look back revealed that there have been some additional bits of information and comments to add to some of our earlier stories.

**Walnut Shell Abrasive Grit Kills Canadian Worker – November 2017 Issue**

A long time friend and subscriber wrote after this story appeared:

I agree with everything you wrote in the latest ACTS/FACTS, but please inform your readers that anyone who is anaphylactic to ANYTHING should be carrying on themselves at ALL times an Epi-pen (or alternative) with 2 (two) doses, as they can never know when they will come in contact with their offending allergen; usually when/where they least suspect it.

The walnut-allergic individual [in this story] would be alive had he been carrying his Epi-pen!

Dr. Gabor Lantos P.Eng MBA MD
President: Occupational Health Management Services

Consider it done, Gabor!

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**Homemade Slime Caused Chemical Burns & Boric Acid/Borax: a Hazard in Art Materials? – April and September Issues**

The April article noted that people were advocating using “School Glue and Boric Acid” to make slime. We noted that using products in ways other than the manufacturer directs may make such users liable for the ill effects. But now, Elmer’s web site is recommending their product for this use. *Elmers.com/slime* has the following recipes:

**supplies needed**

- 4 fl oz Elmer’s White School Glue
- 1/2 tbsp of baking soda
- 1 tbsp of contact lens solution
- Your choice of food coloring

**instructions**

1. Pour out the entire bottle of a 4oz of Elmer’s School Glue into a bowl.
2. Add ½ tbsp of baking soda and mix thoroughly.
3. After mixing, add your choice of food coloring until you get the color you want.
4. Add 1 tbsp of contact lens solution.
5. Mix until mixture gets harder to mix and slime begins to form.
6. Take the slime out and begin kneading with both of your hands.
7. If needed, add ¼ tbsp of contact lens solution to make the slime less sticky.
Both California and the federal National Toxicology Program have classified acetaldehyde and formaldehyde as cancer-causing chemicals. Both chemicals, according to the National Institute for Occupational Safety and Health, also cause genetic damage, birth defects, and reduced fertility.

The lab performed the tests using standard smoking machines that accurately simulate the way consumers use the products. The tests showed that e-cigarettes expose users to significant amounts of the two cancer-causing gases. They measured formaldehyde exposures up to 473 times the Proposition 65 safety level and acetaldehyde exposures up to 254 times the safety level. Almost ninety percent (21 of 24) of the companies whose products were tested had one or more products that produced hazardous amounts of one or both chemicals, in violation of California law.

Despite the claims of industry and assumptions by many users, the tests found that vaping the nicotine-free e-liquids also produced high levels of both chemicals. For example, one nicotine-free product produced acetaldehyde exposures more than 13 times the Proposition 65 safety threshold and formaldehyde exposures more than 74 times the Proposition 65 threshold.

E-Cigarette Use Causes a Unique Innate Immune Response in the Lung, Involving Increased Neutrophilic Activation and Altered Mucin Secretion
American Journal of Respiratory and Critical Care Medicine © 2017 American Thoracic Society, Boris Reidell, et al., work funded by NIH/FDA Grant P50 HL120100

This very complicated title can be boiled down to mean that a comparison of the sputum of cigarette smokers, e-cigarette users, and non-smokers showed that the same oxidative stress-related proteins associated with cigarette smoking and which lead to chronic obstructive pulmonary disease (COPD) are present in both cigarette and e-cigarette smokers.

The study’s conclusion was: “Together, our results indicate that e-cigarette use alters the profile of innate defense proteins in airway secretions, inducing both similar and unique changes relative to cigarette smoking. These data challenge the concept that e-cigarettes are a healthier alternative to cigarettes.” This is a game changing study.

Dangers of the E-Cigarette refill liquids

Titled: “In vitro human epidermal permeation of nicotine from electronic cigarette refill liquids and implications for dermal exposure assessment,” this study looked at dermal exposure to nicotine and e-liquids that may occur among workers in mixing and filling of e-cigarettes in the manufacturing process, and inadvertent skin contact among consumers. Using human epidermis, the e-liquids, and the pure (neat) nicotine and aqueous liquid formulations were studied.

Three illustrative exposure scenarios demonstrated a significant uptake and plasma concentrations from dermal exposure indicating the potential for significant nicotine absorption through skin contact with e-cigarette refill solutions and the neat nicotine used to mix them.

Of interest to ACTS was the fact that in addition to propylene glycol, some of the commercial e-liquids contain limonene which is also toxic and a sensitizer.

There, you are now up to date on 2017. Look out, here comes 2018!