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From: Kim Gates <kim.gates@stonybrook.edu>

To: undisclosed-recipients;;

Sent: Wed, Nov 5, 2014 8:06 am

Subject: Lessons Learned: Chemistry Demo safety - stricter controls for educational demos needed

Lessons Learned: Safety must be part of all work with hazardous materials, whether its in a research lab, academic setting K-12 and above, or a science outreach event.

Please share this with everyone you know who may be working with hazardous materials.

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CSB recommends stricter controls for educational demos

<http://cenblog.org/the-safety-zone/2014/11/csb-recommends-stricter-controls-for-educational-demos/>

Posted By Jyllian Kemsley on Nov 4, 2014

The U.S. Chemical Safety & Hazard Investigation Board released a report last week with “Key Lessons for Preventing Incidents from Flammable Chemicals in Educational Demonstrations.” When C&EN posted my story about the report on Friday, we said that 20 children and two adults had been injured in fires from educational demos since the start of September.

As we posted the story, there was another incident, at a high school in Chicago: “The students were mixing chemicals in the chemistry lab to create a green flame when something went wrong and there was an explosion, police said.” That incident brings the injury count to 22 children and two adults.

CSB Chairman Rafael Moure-Eraso would like educators to reconsider whether it is necessary to do demonstrations involving hazardous materials, he said at a press conference on Oct. 30. Here are a couple of papers that address that question (h/t Ralph Stuart, Keene State College chemical hygiene officer and ACS Division of Chemical Health & Safety secretary):

“Chemical demonstrations: Learning theories suggest caution,” Michael Roadruck, *J. Chem. Educ.* 1993, DOI: 10.1021/ed070p1025

“The science and art of science demonstrations,” Thomas O’Brien, *J. Chem. Educ.* 1991, DOI: 10.1021/ed068p933

If demonstrations really are necessary, then CSB recommends:

Implement strict safety controls—written procedures, training, and personal protective equipment—when lab demonstrators are handling hazardous materials.

- Conduct a thorough hazard review before performing any activity with flammable chemicals.

- Avoid using bulk containers of flammable liquids in education demonstrations—separately dispense only the amount needed.

- Provide a safety barrier between any activity involving flammable chemicals and the audience.

Although that doesn't go far enough for Calais Weber, who was injured in a chemistry demo fire in 2006. "It is my belief that until there exists a standard mandatory protocol for training all science teachers, there is no reason for methanol to be used in classrooms. My education and love for chemistry was not fostered by seeing a demonstration in person, and it would not have been hindered by simply watching a video of it being performed in a controlled setting by trained chemists," she said at the CSB press conference.

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Demonstrations and Good Pedagogy

<http://www.teachchemistry.org/content/aact/en/periodical/issues/november-2014/demonstrations-and-good-pedagogy.html>

It includes references to literature (primarily around physics demonstrations) that address the question of what makes a demonstration a good educational experience.

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WHEN 'FIRE TORNADO' RUNS WILD

Tags: us\_CO, education, follow-up, injury, flammables, methanol

DENVER – Science teachers need more safety training before running dazzling chemical experiments that can result in dangerous flash fires, according to a recommendation from a federal board charged with investigating such accidents.

The U.S. Chemical Safety Board reviewed three fires stemming from science demonstrations during the last two months. The incidents in Nevada, Colorado and Illinois inflicted burns on students and adults when methanol caught fire while an educator was attempting a demonstration.

Federal investigators say the fires had common problems: The demonstrators lacked proper safety training, and they used flammable chemicals in greater quantities than necessary. No safety barriers such as a clear shield were used between the experiment and the audience.

The fires caused painful injuries but no deaths.