

SAFETY ALERT

WHS-ALERT-006-2016

Date: 26 October 2016

Area of Concern: All JCU staff, Postgraduates and Students

Use of Gases in Labs

An electrostatic discharge between postdoctoral researcher and a compressed gas cylinder containing hydrogen, oxygen and carbon dioxide likely caused an explosion at the University of Hawaii, Manoa, in which the postdoctoral researcher lost one of their arms, according to a report by the University of California Centre for Laboratory Safety.



The remains of the steel tank at the site of the explosion.



The explosion shattered fume hood windows and knocked over equipment.



This steel tank ruptured during the explosion, which severed the researcher's arm.

It has been identified that the underlying cause of the accident was a failure to recognise and have controls for the hazards.

(Source: <http://cen.acs.org/articles/94/i28/University-Hawaii-lab-explosion-likely.html>)

Some of the violations that were identified

- The employer did not ensure that its safety practices were followed by employees and underscored through training, positive reinforcement, and a clearly defined and communicated disciplinary system;

- The employer did not ensure periodic in-house inspections were being performed in Hawaii Natural Energy Institute laboratories to determine new or previously missed hazards;
- Activities performed in the laboratory by researchers with the potential exposure to explosion and fire hazards were not assessed for appropriate controls, such as the use of intrinsically safe equipment, glove protection to guard against static discharge and flame-retardant laboratory coats to guard against fire.

(Source: Hawaii Occupational Safety & Health Division Citation and Notification of Penalty to the University of Hawaii, issued Sept. 16, 2016.)

Action Required:

The purpose of this safety alert is to maximize understanding of using explosive gases in laboratories. Specific controls are required for prevention of fire or explosion associated with hazardous chemicals which includes gases as per Section 355 of the Work Health and Safety Regulation 2011.

The Work Health and Safety Unit recommend that anyone working with compressed gases carry out a risk assessment to consider risk for the intended use and for emergency situations such as:

- Identify flammability/ explosion risk (e.g. Hydrogen);
- Identify oxygen enrichment risks (Oxygen depletion risks);
- Identify toxicity risks (e.g. CO₂).

(To find further information on potential dangers go to <https://www.worksafe.qld.gov.au/safety-and-prevention/hazards/hazardous-chemicals/specific-hazardous-chemicals/gases-in-cylinders>)

- Ensure you have access to the current Supplier/ Manufacturer Safety Data Sheet (SDS);
- Control the specific gas risk, for example:
 - Mounting cylinders external to buildings;
 - Having flow restrictions installed on gas lines;
 - Intrinsically safe equipment and hazardous area zoning for flammable gases (e.g. Hydrogen);
 - Gas monitoring systems (e.g. O₂, CO₂).
- Review emergency plans in place, looking at things like:
 - Adequacy of firefighting systems;
 - The need to notify neighbours;
 - Providing and testing alarms.

Resources

- [WHS-PRO-010 Hazardous Chemicals Procedure](#)

Read further about the lab explosion by following the links.

1. <http://cen.acs.org/articles/94/web/2016/09/University-Hawaii-fined-115500-lab.html>
2. <http://www.sciencemag.org/careers/2016/07/report-uh-lab-explosion-reveals-deep-systemic-safety-failures>
3. <http://www.hawaii.edu/news/wp-content/uploads/2016/07/Report-2-University-of-Hawaii.pdf>