Dr Hal @ ASE 2013

Exploding CO2 bottles

Risk Assessment

Please note that this risk assessment was written to cover the demonstration of this experiment at the ASE Conference in January 2013. For any other use, this risk assessment should be reviewed to see whether there is a need to modify or adapt it in any way to suit the particular conditions under which the experiment will be carried out.



Risk Assessment: Professor Hal Sosabowski

Written By: Professor Hal Sosabowski	Location: University of Reading

Date Of Assessment: 30th October 2012

ACTIVITY

HAZARD	DESCRIPTION OF ACTIVITY TO BE ASSESSED
CATEGORY	6 th Jan 2013
	Exploding CO2 bottles
Low	

HAZARDS

List hazards here. List only hazards which could reasonably be expected to result in significant harm under the conditions in your workplace.

Exploding lemonade bottle

Description: DR. Sosabowski/D.Campbell will between them place +/- 40g of solid carbon dioxide into a 2 L PET lemonade bottle. About 1 L of hot water will then be placed in the bottle by means of a funnel and white smoke will issue from the bottle. The lid will be placed upon the bottle and the bottle placed on platform (or on floor) with blast shields. **Hazards:**

- 1. Percussive bang;
- 2. CO₂ shrapnel;
- 3. Frostburn from CO₂;
- 4. Bottle fails to explode.
- 5. boiling water
- 6. shield falling off platform

WHO MAY BE HARMED

List here groups of people who are especially at hazard from the hazards that you have identified. You may list individuals but think of groups of people doing similar work

1. All operatives in vicinity of experiment/audience.

RISK ASSESSMENT

List existing precautions & controls here or note where information can be found General:

(i) Sosabowski/Campbell will have carried out demonstration previously and will be sole presenters carrying out the experiment;

(ii) Experiment demonstrated and explained by Dr.Sosabowski to satisfaction of all;

(iii) Hal/Co-presenter to wear safety glasses, ear defenders, Hal and Co-presenter to wear laboratory coats at all times during demonstration, and gloves when handling CO₂, any other on-stage operatives to wear safety glasses and ear defenders.

(iv) Audience clearly warned not to attempt to emulate the experiment in any form (audience are unlikely to be able to obtain solid CO_2 since is not widely available and where it is various restrictions carried out on its sale).

1. Percussive bang;

> Audience warned to put their fingers in their ears. Warned of loud bang.

2. CO₂ shrapnel:

Due to size and shape and volume of bottle (and pre-testing), only small amount of CO2 pellets will egress from bottle - upwards. Distance of audience from stage will eliminate risk of pellet hazard. Side shields and top diffuser to be used.

3. CO₂ burns:

- Gloves to be worn by operators
- 4. Bottle fails to explode:

SOP for diffusing the bottle – bottle removed from stage and out of auditorium. Either removed with a litter picker, covered with blanket and smashed with hammer or a lighted taper on a long stick placed against the bottle which causes a small hole though which the pressure escapes.

- 5. Boiling water long gauntlet gloves worn by operator as boiling water is poured into plastic bottle.
- 6. Shield falls off platform safety screens fixed and positioned to let some blast out but contain any solid (plastic/dry ice). All involved in demo to be at safe distance as directed by main demonstrator.

WHAT FURTHER ACTION IS NECESSARY

List all hazards that are not adequately controlled and the action that you will take, where it is practicable, to do more

None

Have all necessary precautions and procedures been included in the assessment?

Yes

RESULT - T=Trivial Hazard /A=Adequately controlled

Dr M H Sosabowski B.Sc. Ph.D. MBA MA C.Chem MRSC D.Campbell