

Case Report

Rose Flower Petal Showering: Explosion Brings Sorrows at Auspicious Marriage Ceremony

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Abstract

As a part of custom and tradition, rose flower petals are showered at guests of auspicious ceremony. At one of such ceremony nitrogen gas cylinder (part of equipment used for showering flower petals) exploded; lead to massive explosion injury to the young male operating the compressed gas cylinder of Nitrogen. At about 08:30pm, 30 May 2013, deceased, who was assisting his father in operating above said machine opened the valve accidentally and the compressor filled with Nitrogen gas blasted causing massive disruption of the abdominal area of the deceased who was closer to that machine. His father who was away sustained minor injuries. He died on the spot due to massive blast injury of the abdomen. His spot death made the ceremony tragic to the extent that host changed the venue to continue. As such Nitrogen gas is non inflammable and its non industrial explosions are very far and few of off. Due to rarity of its kind and having potential of being a preventable accident the case is presented in detail.

Key Words: Rose flower petal showering, Blasting machine, Compressed nitrogen gas cylinder, Explosion injury

Introduction:

Nitrogen is a non toxic odorless colorless in liquid or gaseous form. Nitrogen constitutes 78 percent of Earth's atmosphere and is a constituent of all living tissues. It is non-inflammable compressed gas stored in cylinders at high pressure. It is sold as a pure product 99%. It is simple asphyxiant and can cause rapid suffocation when concentrations are sufficient to reduce oxygen levels below 19.5% by displacing oxygen in air.

In growing edge of advancements in almost each and every field; use of compressed gas like oxygen, carbon dioxide, argon, acetylene, nitrogen has been very common.

Precautions in form of check list having many dos and don'ts can definitely check safety in industries dealing with compressed gas cylinders. However, accidental explosions off compressed gas cylinders still finds place in lay press.

"Three persons were killed and one suffered injury after an oxygen cylinder blast at job site" [1], "two people died and one sustained serious thermal injury following explosion of cylinder" [2] and "One person has died while three others have suffered critical injuries in what is reportedly a freak nitrogen cylinder blast at an Aluminium dye casting unit a private Aluminium casting unit manufacturing smaller components of nozzles and spares used in automobile components.." [3] are some examples of lay press.

Bio medical literature of recent past has mention of few cases in details. Rani M et al [4] reported case of a death due to explosion of acetylene gas cylinder used for welding. Gupta and Jani [5] also reported a case of oxygen cylinder blast claiming three lives.

Case History:

On 30 May 2013 a male aged 16 years along with his father attended a marriage at Hyderabad, Telanagana with a "Rose petal flower blasting machine" of their own. (Fig. 1) They used that instrument to sprinkle rose petals in marriage functions etc. to earn livelihood.

At about 08:30pm he was assisting his father in operating above said machine; opened the valve accidentally and the cylinder filled with Nitrogen gas blasted. He bore brunt of the explosion since he stood closer to cylinder as operator. His father who was away sustained only minor injuries. [6]

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DOR: 31.01.2015 DOA: 08.04.2015

DOI: 10.5958/0974-0848.2015.00083.4

Post-mortem was conducted and extensive disruption of the lower abdomen and pelvic regions was found with multiple intestinal perforations and contusions and lacerations of pelvic tissues with fragmentation of pelvic bones and upper third of the right femur. The skin over the left thigh is avulsed with contusions and lacerations of the upper and middle third of the left thigh. The liver was lacerated, both the lungs were disrupted with interstitial hemorrhages and external genitals lacerated. (Fig. 2)

Discussion:

Nitrogen as a gas is simple asphyxiant can cause rapid suffocation when concentrations are sufficient to reduce oxygen

S N	Precaution	Status in the case
1	To be stored upright;	OK
2	Storage below 52°C	OK (Time of blast 08:30 Pm- can't be 52°!)
3	Valve protection caps and valve outlet seals shall be proper	OK
4	Don't drag, roll or slide the cylinder	OK
5	Pressure reducing regulator or valve shall be used	OK
6	Wrench, screw driver, pry bar etc not to be inserted into valve cap openings	NO: Cylinder blasted when operator tried to handle the valve for releasing gas under pressure.

Keeping in mind the history given by eye witnesses, police report and autopsy findings We attribute "Rapid crack propagation theory" responsible for the blast. The operator tried to handle the valve for release of gas under pressure in a controlled way, but sudden and rapid release of gas might have crossed the safe limits of 2200 psi and sudden release of stored energy transformed into kinetic energy producing a blast effect.

We feel that operators of such compressed cylinders must be properly trained and educated so as to prevent accidents. Entire incident not only claimed life of young male and injured another but the shocked family of the bride and bridegroom shifted the ceremony to some other nearby place.

Careful and meticulous articulation of different facts of case of such type can explain the cause of blast in a scientific manner and help all concerned to advise steps for prevention.

Conclusion:

We feel that such accidental deaths while handling compressed gas cylinders are preventable ones. Educating the individuals dealing with cylinders about handling, transportation and storage with high degree of care and caution; wherever used in medical and other fields can ensure the safety of operators and even the public.

References:

1. The Tribune News Services. Jalandhar edition. Chandigarh, India: 2008. Jul 22.
2. The Times of India. Bangalore edition. 2008; Nov 15.

levels below 19.5% and to overcome that; self contained breathing apparatus (SCBA) may be required. However, present case does deal with toxicity of nitrogen gas but explosion effects due to accidental blast while handling compressed gas cylinder having nitrogen.

As it is noninflammable and does not support combustion; in the present case thermal injuries were significantly absent and only "disruptive" effect on the victim's body was found.

Material safety data sheet [7] mentions many steps to avoid accidental blast which includes certain suggestions which we applied in our case to determine the reason of blast:

3. The Times of India. Coimture edition. 2014; Mar 5.
4. Rani M, Gupta A, Dikshit PC, Aggrawl A, Sethi P, Dhanikar V. Accidental Death Resulting from Acetylene Cylinder Impact. Am J Forensic Med Pathol. 2005; 26(2):170-173. [PubMed]
5. Gupta S and Jani C B. Oxygen Cylinders: "Life" or "Death"? African Health Sciences.2009;9(1) 57-60.
6. The Hindu. Hyderabad Edition. 2013; May 31.
7. Material Safety Data Sheet (Nitrogen)- Air Products. Allen town PA - 18195-1501. USA.

Fig. 1: Part of "Rose Petal Flower Blasting Machine" attached to Nitrogen Gas Cylinder



Fig. 2: Dead Body of Victim at Scene: Massive Disruptive Injuries to Trunk & Extremities

