

# *TerranearPMC Safety Share*

## **Week of December 10, 2012 – Drum Handling**

What would you do if you noticed that a 55-gallon drum was leaking? Would you position it in such a way so that the breached area would be facing upward to prevent material from being spilled? What about a rusted drum or a drum that was deformed?

There are many regulations from a safety perspective as well as environmental and transportation that are designed to minimize risks when handling drums. Most notably is the OSHA Hazardous Waste Operations and Emergency Response regulation, 29 CFR 1910.120, better known as HAZWOPER. Within this regulation there is a paragraph, “j,” titled, “Handling drums and containers.” The Environmental Protection Agency (EPA) has regulatory requirements for containers under 40 CFR, Parts 264 and 265 and the US Department of Transportation regulates containers during transportation through 49 CFR, Parts 171 through 178.

The fact is, accidents involving drums and other containers have occurred under a variety of scenarios. There are ergonomic concerns, injuries occurring while drum maneuvering, chemical reactions as well as accidental exposures to chemicals. Another type of concern is of a physical nature, known as “boiling liquid expanding vapor explosion” or BLEVE. This type of incident is caused by the rupture of a vessel containing a pressurized liquid above its boiling point. If a liquid in a sealed container is boiled, the pressure inside the container increases. As the liquid changes to a gas it expands. In a sealed container expansion is limited and so the pressure rises. This can occur with 55-gallon drums when left outside, exposed to sunlight. It is not unusual for drums/containers to be painted black or a dark color. This allows for energy from the sun (or surrounding surfaces) to be absorbed. This absorbed energy is converted into heat, and therefore, causes the temperature of the drum and its contents to rise, which then leads to increased pressure. The results can be devastating. Look out for deformation of drums and containers. If you notice such a condition...STAY AWAY and notify the emergency contacts as documented in the project Health and Safety Plans.....IMMEDIATELY! Always look for signs of deterioration such as corrosion, rust, and leaks as well as bulging or other indications that the drum is under pressure.

From an ergonomic point-of-view, when drums need to be moved, they need to be moved properly. While 55-gallon drums typically weigh between 400 to 800 lbs, a full 55-gallon steel drum can weigh over 2,000 pounds. Incorrect handling of something weighting that much can cause a severe body strain or sprain; not to mention the harm should one of these fall on someone. Common injuries include crushed fingers or hands, and foot trauma. Incidents of dropped drums, or drums rolling out of control, can also cause spills and damage.

When being moved, the contents of your drum may shift inside, making the drum difficult to control or even dangerous. There are also special considerations when handling a plastic drum or a fiber drum. Conditions such as restricted spaces and slippery or uneven floors can entail greater risks.

Prior to handling, drums should be inspected visually to identify their contents. This would involve noting symbols, words, or other marks on the drum indicating that its contents are hazardous. Many times when coming across drums, especially those associated with HAZWOPER tasks, identifying features are either illegible or non-existent (deteriorated over time). In such cases, the person-in-charge needs to be notified BEFORE any additional work is performed on that particular container.

Note the configuration of the drum head. If the whole lid of the drum can be removed, the drum was designed to contain solid material. If the lid has a bung, the drum was designed for liquids. If the drumhead contains a liner, the drum may likely contain highly corrosive or otherwise hazardous materials.

Note the type of drum. Polyethylene or PVC-lined drums *often* contain strong acids or bases, which can corrode the drum if the liner is punctured. Exotic metal drums (e.g., aluminum, nickel, stainless steel) are very strong and expensive, and are often used to store extremely dangerous materials. Single-walled drums used as a pressure vessel have fittings for both the storage product and for an inert gas; these drums often contain reactive, flammable, or explosive substances.

Laboratory packs are used for disposal of expired chemicals and process samples from university laboratories, hospitals, and similar institutions. They may contain incompatible materials, radioisotopes, or shock-sensitive, highly volatile, highly corrosive, or highly toxic exotic chemicals and are a potential ignition source for fires at hazardous waste sites.

While each project that has identified the potential of encountering drums should have specific steps outlined in Health and Safety documents, here is a brief list of some important work practices that should be used for opening drums and containers.

- When approaching a drum with unknown contents, airline respirators are typically used. This type of PPE uses an air source such as an air compressor that feeds air to the respirator user. Therefore, the connection to the source of air supply must be protected from contamination (away from vehicle exhaust) and the entire system must be protected from physical damage (such as vehicles or heavy equipment rolling over the air hose).
- Employees not actually involved in opening drums or containers must be kept at a safe distance from the drums or containers being opened.
- If employees must work near or adjacent to drums or containers being opened, a suitable shield that does not interfere with the work operation must be placed between the employee and the drums or containers being opened to protect the employee in case of accidental explosion.
- Controls for drum or container opening equipment, monitoring equipment, and fire suppression equipment must be located behind the explosion-resistant barrier.
- When there is a reasonable possibility of flammable atmospheres being present, material handling equipment and hand tools must be of the type to prevent sources of ignition.
- Drums and containers must be opened in such a manner that excess interior pressure will be safely relieved. If pressure cannot be relieved from a remote location, appropriate shielding must be placed between the employee and the drums or containers to reduce the risk of employee injury.
- Employees must not stand upon or work from drums or containers.

When drums and containers containing or suspected of containing shock-sensitive wastes are handled non-essential employees must be evacuated from the area of transfer while the use of proper communications need to be established (remembering that some types of communication devices may cause shock sensitive materials to explode!).

**You can only enter half way into the dark forest before you begin to  
come out the other side**

Chinese Proverb