

**Intermodal Movable Hard Lid Safety - Linde Formerly Utilized Sites Remedial Action Program (FUSRAP) Remediation Project - 10421**

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**ABSTRACT**

The U.S. Army Corps of Engineers – Buffalo District (USACE) is responsible for the remediation of Manhattan Engineer District (MED)-related radiologically contaminated materials at the former Linde site. This work is authorized under the Formerly Utilized Sites Remedial Action Program (FUSRAP), which was established to investigate, and cleanup or control sites previously used by the Atomic Energy Commission (AEC) and its predecessor, the MED. The primary objective of the Linde site remediation effort is the effective cleanup of the site in accordance with the Record of Decision (ROD 2000) [1].

Materials excavated from the Linde site when designated for off-site shipments are placed in intermodal containers (IMCs) and shipped by rail to a disposal facility. Most of the containers used at the Linde project are described as hard-lid containers. The hard lids are constructed of aluminum and are attached to the container by a set of rails, rollers and tie down mechanisms. The rails and rollers are designed similar to a drawer slide in a cabinet and allow for movement of the lid to the fully opened position within the designed limits.

Linde has shipped over 15,000 intermodal containers over an 8 year period without any mechanical problems that would be considered a safety issue. During the past 2 years of excavation, failure of the rail stops to function properly was experienced on a number of containers, enabling the lid to become dislodged and roll off one side of the container to the ground.

A solution providing for the continued safe use of hard-lid containers was found. New procedures were implemented by the Shaw project team with the addition of a lanyard and quick latch mechanism (designed and fabricated at the Linde Site) to keep the IMC lid from dislodging from the lid rail.

**INTRODUCTION**

The IMCs used by the Buffalo District (USACE), beginning with the Ashland 2 Project (1998), meeting the general design requirements of Department of Transportation 49 CFR (Code of Federal Regulation) 172.427(b)(4). Soft lids IMCs were the most common type container used during the Ashland 2 project. IP-1 (Industrial Package Type 1) meeting the general design requirements of 49 CFR 173.24, 173.24a and 173.410 containers with aluminum hard lids became the predominant design in recent years, during the Ashland 1 Project (1999) and Linde Project (2000) [3].

## INTERMODAL USE

Intermodal containers are transported by rail to and from the Linde project. When a rail shipment of empty containers is received at the site they are off-loaded from the 6 position railcars by a front-end loader equipped with a set of forks. The IMCs are transported to a staging area onsite where the containers are inspected. Before opening by personnel the lid hardware is inspected. The lid is then moved to the fully opened position to allow access to the inside of the container. Personnel enter the inside of the container and check for holes. After the inspection is complete, the containers are either taken out-of-service for repair or are lined with a 6-mil plastic liner and the lids are closed for use. Roll-off trucks transport each container to a designated excavation area where they are opened, filled and closed again.

The hard lid IMC has had an excellent track record for safety in the 8 years of use at the Linde site. However, in the past 2 years of the project as many as three lids have fallen to the ground while being opened at the site. This prompted an investigation into the root cause of the occurrences.

## INTERMODAL HARDWARE

The aluminum hard lid along with the truck assembly and lid track assembly is similar to a drawer slide in a cabinet and allows movement of the lid to the fully opened position within the designed limits. The truck assembly houses the wheels that allow the lid to move back and forth. The truck assembly is tightened down to the container by four (4) lid track binders. It is also attached to the center of the lid where it pivots.

To completely open a hard lid container the following actions are required:

1. The lid track binders are loosened to a fully opened position.
2. The lid is slid horizontally to the rail stops.
3. The lid is then pivoted to the vertical position.
4. The retention chain is wrapped around the lid handle to secure lid against the side of the container [2].

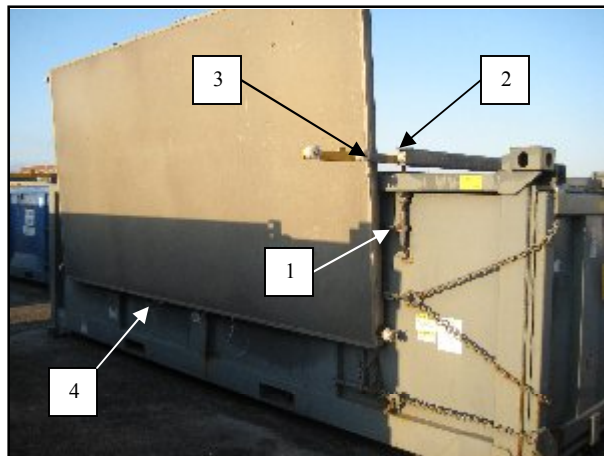


Fig.1. IMC with lid in “Fully open” position.

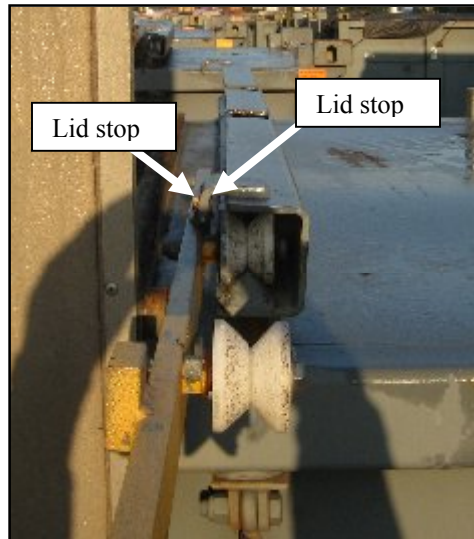


Fig.2. Lid rail assembly showing stops.

Figure 2 above shows the rail stops aligned so that the hard lid can not move any further, this allows the safe pivoting of the lid to the fully opened position. This figure also shows the mechanics of the lid working the way it was designed.

When lids were opened and rail stops did not meet, the hard lid continued to move forward, became dislodged and fell to the ground. The Shaw Environmental Team went to work troubleshooting the cause of the rail stops to be out of alignment.

An inspection of the container hardware was performed. The containers did not visually show a mechanical flaw when inspecting the rail stops. After closer inspection of the process to open the hard lid containers, it was revealed that the lid stops were not working properly during the pivoting of the container lid to the fully opened position. The lid track binding mechanisms were found to have excessive play in the fully opened position, allowing the possibility of the rail stops becoming misaligned and malfunctioning.

The method of opening the lid was changed by two (2) additional steps:

1. The first step after loosening the lid track binders and before sliding the lid open was the connection of a lanyard to the container and lid. The lanyard limits the movement of the lid if the rail stops fail to function properly.
2. The second step was to ratchet down both sides of the lid rails to the container. After the lid was slid open, one person holds the lid in the horizontal position,

allowing the other person to tighten the lid track binders. This secured the lid from further horizontal movement and allowed for the safe pivoting of the lid to the fully opened position.



Fig.3. Showing lanyard connected to lid and container

## CONCLUSION

The addition of the lanyard and quick disconnects on each end allowed for the opening of IMCs to the pivot point safely, even if the containers rail stops were malfunctioning. This device along with the change in the method of opening the container provided “built-in redundancy” thus making the opening of hard lid containers at the Linde site safe.

## REFERENCES

1. U.S. Army Corps of Engineers (USACE). 2000. Record of Decision for the Linde Site, Tonawanda, New York. March 3.
2. MHF Logistical Solutions, Inc., Customer Intermodal Container Management Program, April, 2004.
3. Department of Transportation, Code of Federal Regulations, 49 CFR, 2009.