

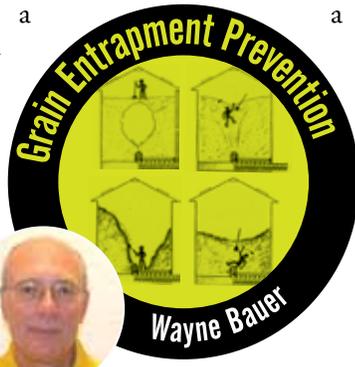
# Cofferdams

RESCUE FROM GRAIN ENTRAPMENTS REQUIRES SOME TYPE OF RESTRAINING WALL MATERIAL

I take exception to a statement shared in an OSHA Fact Sheet that was mailed to the grain industry by the Occupational Safety and Health Administration in August 2010.

When OSHA put the grain industry "on notice" last summer, the agency suggested that a winch or mechanical advantage system should be used to rescue someone from outside a bin, without entering the confined space.

You should never attempt to pull



a victim buried above his or her waist out of the stored commodity, without relieving most of the pressure exerted around the victim by the commodity.

## Some Facts

The facts are that the majority of all known or reported grain entrapments and/or engulfments happen in steel bins, and the medium is often corn.

For starters, let's define entrapment and engulfment.

**Entrapment** is the situation in which the victim is partially buried in the commodity. Some portion of the victim's body remains outside of the stored grain.

**Engulfment** is the situation in which the victim is entirely submerged in the commodity. As serious a situation as entrapment is, engulfment is worse, because the victim will suffocate quickly when completely submerged in grain.

If a victim is buried above the waist in grain, it would require 800 to 1,000 lbs. of force to extricate that person, without the use of some type of restraining wall material or cofferdam, also known as a rescue tube.

You can imagine what would happen to the victim's arms, shoulders, and/or back, if you applied that kind of force to a person using some type of winch from outside the confined space.

## Successful Rescue

In order to perform a successful rescue in this type of situation, a rescuer must enter the bin and place a cofferdam or restraining wall around the victim.

Once this cofferdam is in place, you can remove some of the grain between the victim and restraining wall formed by the device with a vacuum, scoop, or your own hardhat.

Remove enough grain, until the victim can climb out on his or her own, or your rescue team can remove the victim without inflicting additional injury.

## Cofferdam Testing

There are a number of cofferdams on the market, which you can buy, or you can construct your own. Generally, cofferdams are constructed of wood, aluminum, or plastic.

An agricultural engineering group at Oklahoma State University (OSU) in Stillwater performed a few preliminary tests on them in 2010, under the direction of Dr. Carol Jones. Her comments:

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Response No. 581



Six cofferdams commercially available on the market, from left: Res-Q-Tube from The GSI Group, LLC; Oak Tree Cabinets; Oklahoma State University; Lambton 4-H Club of Ontario; KC Supply Co. Inc.; Liberty Tube from RBH Mill & Elevator.

particular cofferdam in use. The larger the panel, the more force required to insert it in the grain. Training and experience are keys to using these barriers successfully.

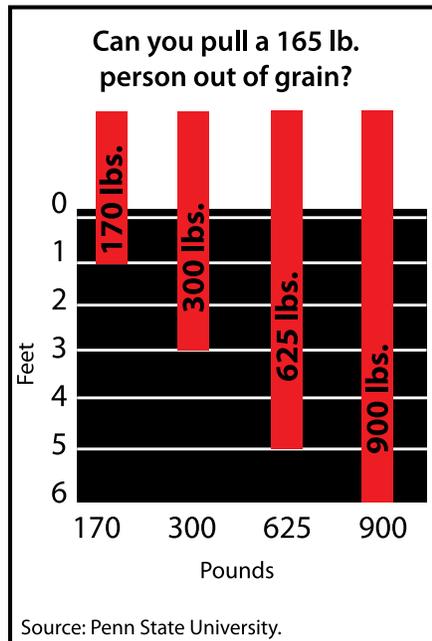
“Another consideration when selecting a cofferdam is the width of access points in bins. Some cofferdams have wider panels than others. A rescue can be complicated by the inability of equipment to fit through access openings into the bins.

The weight of each panel also should ▶

“The force required to insert cofferdam panels into grain is large, much larger than one would expect. Our tests showed that between 300 and 800 pounds of steady force is required to push one panel three feet into corn that is in good condition.

“It is important to follow specific cofferdam vendor directions. One vendor instructs users to use an impact tool provided ‘with the cofferdam to drive the panels in place.’ Another vendor suggests removing grain as the panels are inserted one foot at a time.

“The bottom line is that it takes extreme effort to place these barriers in place, and poor-quality grain only makes the task more difficult. If rescuers are standing in grain, the task is even more difficult. Rescuers must be prepared and aware of the challenges and the characteristics of the



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Elevator workers and first responders train in the use of cofferdams during an entrapment simulation. Photo courtesy of SATRA.

be considered. Is your rescue team going to be required to carry these panels up 100-foot ladders? If so, the larger panels

will be difficult to handle.

“Knowing the design of bins at your facility will help you select the

right cofferdam product for your rescue team.

“At OSU, we will be conducting additional testing this summer to determine if improved surface finishes and beveled edges on the bottoms of cofferdams will make their use easier.

“However, availability when you need one should be the priority for your rescue team. Every fire department or grain elevator should have a cofferdam close by. Hopefully, it will never be needed, but it is truly the first critical step in saving an entrapped victim. The job just can't be accomplished without a barrier to relieve the grain pressure on a victim, and a cofferdam, regardless of which one you select, is the tool of choice for the task.

“Whether you choose a commercial product or construct your own cofferdam, the goal is to have one when you need it and to know how to use it efficiently by knowing its characteristics and being prepared to deal with the situation successfully to save a life.”

### Cofferdam Manufacturers

Following are manufacturers of cofferdams currently available on the market. To view these products, the photo on p. 59 illustrates these products.

- Res-Q-Tube from The GSI Group, LLC, Assumption, IL; 800-474-2467 (aluminum).
- Oak Tree Cabinets, Reese, MI; 989-868-3191 (Baltic birch/plywood).
- Oklahoma State University, Stillwater, OK; 405-744-6667 (plywood).
- Lambton County 4-H, Dresden, ON, Canada; 519-683-4569 (aluminum).
- KC Supply Co. Inc., Kansas City, MO; 800-527-8775 (aluminum).
- Liberty Tube, RBH Mill & Elevator, Kansas City, MO; 800-821-5578 (plastic).

The Safety and Technical Rescue Association (SATRA) will demo two or three of these rescue tubes at each of its training sessions held in the next six months.

*Wayne Bauer is safety and security director of Star of the West Milling Co., Frankenmuth, MI; 989-652-7026.*



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