

GRAIN BIN ENTRY STANDARD

Third draft

19 October 2011

1. Purpose and Scope

- 1.1 This standard provides recommendations for new design parameters in grain storage facilities.
- 1.2 This standard applies to corrugated and smooth wall steel bins used to store various types of free flowing grain.

2. Background

- 2.1 Injuries and deaths occur in grain bins every year. Limbs are injured or lost by entanglement in unloading equipment. Injuries and deaths occur when an individual is drawn into the enveloping grain flow during the unloading process. This may also occur when an individual breaks through a crust that has formed on the top of the grain mass.
- 2.2 While warning decals clearly state that the bin should not be entered with equipment running and no one should enter a bin without an observer present, operators continually ignore these directions.

3. Definitions

- 3.1 Entry point: This may be an opening in the sidewall of the bin or an opening in the roof either of which is large enough to allow a person to enter the structure.
- 3.2 Restraint: A method to restrain a person in the bin from being drawn into flowing grain or from falling through crusted grain.
- 3.3 Safety decals: Refers to any safety or warning decals posted at the entry locations. These warning and safety decals are to be made in conformance with ASABE standard S441.2.
- 3.4 Discharge sump or well: An opening in the floor of the grain bin that allows grain to flow into the unloading system that is open and closed by the use of a slide gate and allows grain to flow into the unloading system.
- 3.5 Guarding: This may be accomplished by guarding by location or by a method that would prevent an individual's foot from coming in contact with the grain unloading equipment by inadvertently stepping into an open sump.

4. Bin Access

- 4.1 The sidewall access door should be a minimum of 28 inches wide by 60 inches high.
- 4.2 The sidewall access door should be located no higher than 32 inches from the foundation.

- 4.2.1 When the door is more than 16 inches above the foundation a step must be provided between the foundation and the bottom of the door frame.
- 4.2.2 If the step between the foundation and the bottom of the door frame is more than 4' from the ground a work platform with approved hand rails shall be provided.
- 4.3 The roof access opening should be a minimum of 28" by 36" so that a patient secured to a stokes basket could be removed through it.
 - 4.3.1 If the opening is smaller than the dimensions in 4.3, then instructions must be available to tell rescuers how to remove a roof panel section or how to cut the panel to facilitate removal without compromising the structural integrity of the roof.
 - 4.3.2 Access to the entry point may be accomplished by a ladder or stairs on the roof next to the opening or by a platform on the sidewall beneath the opening. In the case of a platform a short ladder or step may be required to reach this access.
 - 4.3.3 A ladder on the inside of the bin should be directly beneath the roof opening.
 - 4.3.4 Provisions should be made either directly above the opening or at the sidewall next to the opening to support a davit arm, tripod or similar device that can be used to extricate a patient and lower them to the ground.
 - 4.3.5 When there is a overhead catwalk and conveyor system, the roof access opening should be located at the 1 or 5 o'clock positions relative to structure to facilitate the attachment of extrication equipment.
 - 4.3.6 The area around such an opening must be capable of carrying the weight of an extrication device and at least three persons. (1000 # minimum)
 - 4.3.7 The opening may be such that hold down devices will need to be removed prior to removing the cover.
- 4.4 All ladders and walkways shall meet ASABE standard S412.1

5. Restraint System

- 5.1 The bin shall have the means to install a restraint system that will allow a person to traverse the entire 360 degree circumference of the bin and at any level of the bin from top to bottom.
 - 5.1.1 The restraint system must support a minimum of 1000 pounds and employ a method to keep the worker from falling more than two feet.
 - 5.1.2 The restraint system should also consist of a secondary system that prevents the attached individual from being pulled into flowing grain.

6. Bin Entry

- 6.1 Prior to anyone entering the bin through any opening all power should be turned off and locked out
- 6.2 No one should enter the bin without having at least one observer present.
- 6.3 When entering the bin through the roof opening the restraint system must be attached to the individual entering the bin. When an individual is in the bin trying to dislodge grain

caked on the side of the bin, the restraint system must be used to keep the individual above the grain in case of a collapse of the grain mass.

- 6.3.1 The observer should be at the same opening and have provisions available to call for help if required. If the restraint system allows for a retrieval line, the observer should have access to that line and maintain a minimum amount of slack in the line and have it secured properly to a substantial anchor..

7. Unloading sumps

- 7.1 Sumps should be adequately sized to allow for grain flow equal to the capacity of the unloading equipment.
- 7.2 Sumps should be located from the center of the bin to the outside wall in close enough proximity so that manual removal of grain between the sumps will not be necessary for startup of the sweep auger.
- 7.3 Sumps should be guarded with some type of grate when anyone is in the structure, however, having a removable grate so that the sump remains unimpeded when the bin is full is acceptable.
 - 7.3.1 Removable grates must be placed over the sump whenever anyone is in the bin after the grain has been removed such that the sump is accessible.

8. Safety Signs

- 8.1 All entry points must have required safety signs prominently displayed.
- 8.2 All safety signs must conform to ASABE Standard S441.2