Introduction

The Occupational Safety and Health Administration (OSHA) has been concerned about the safety surrounding sweep augers since 2009. The OSHA Grain Handling Standard 29 CFR 1910.272 was interpreted by OSHA to mean that an employee could not enter a grain bin while the sweep auger was engaged. About four years later, and after much discussion with industry, OSHA backed off its ruling to a certain extent. In a memorandum issued in May 2013, OSHA agreed that workers could be allowed into a bin with the sweep auger engaged if certain conditions were met. These conditions are listed below. The OSHA standards listed in this fact sheet are available at the www.osha.gov website by searching for the number of the standard.

While not all farms are under the jurisdiction of OSHA, the same safety guidelines are good “best practices” to follow to keep workers and family members safe while working around grain bins. If a farm bin has a sweep auger, efforts to meet the conditions below will certainly help to provide a safer working environment and could potentially save a life or a limb from entanglement.

Reducing Danger when Operating Sweep Augers

These 10 steps are required by OSHA and go a long way in keeping workers safe when entering and working around grain bins.

1. Workers must obtain a bin entry permit certifying that the precautions contained in 1910.272(g) have been implemented, unless the employer or the employer’s representative who would issue the permit is present during the entire operation. (An example of a bin entry permit is given at the end of this fact sheet.)

2. The grain entry points and the subfloor auger must be de-energized and locked out/tagged out before anyone enters the bin. Figure 1 demonstrates locking out/tagging out of an energy source.

3. Grates/guards must be in place and SECURED on the subfloor auger sumps before the sweep auger is operated. The space between the bars on the grates is determined by the distance between the bin floor and the auger flights or paddles (Figure 6).

4. Grates/guards must be in place and SECURED on the subfloor auger sumps before the sweep auger is operated. The space between the bars on the grates is determined by the distance between the bin floor and the auger flights or paddles (Figure 6).

Figure 1. Lock out/tag out of electrical equipment.

Figure 2. Unguarded bin sump.
4. Walking on the grain where the depth of the grain presents an engulfment hazard is forbidden.

5. Sweep augers, including portable sweep augers, must have guards that protect against contact with moving parts at both the top and back areas of the sweep auger. The only unguarded portion of the sweep auger should be the front point of operation. Figures 7 and 8 show an auger with no acceptable guarding and an auger with an acceptable guard system.

6. An observer must be positioned outside the storage structure and have contact with the person working in the bin either through sight, radio or voice. This observer must be trained in emergency procedures and rescue, and know who to contact in case of an emergency.

7. When the sweep auger is energized, a worker may enter the bin if grates are secured over the sumps (see step 3) and the worker must use engineering controls within the bin to prevent the worker from coming in contact with the operating sweep auger. These engineering controls may include:
   a. Sweep auger equipped with an attached guard preventing contact with the worker on the unguarded portion
Sump Opening Guard Guidelines

According to 29 CFR 1910 Subpart O machinery and machine guarding.

Four examples of sump guards based on distance from grain floor to auger flights or conveyor paddle.

<table>
<thead>
<tr>
<th>Distance from Grain Floor to Auger</th>
<th>Protective Covering</th>
<th>Maximum Vertical Opening</th>
</tr>
</thead>
<tbody>
<tr>
<td>Greater than 31.5” deep</td>
<td>6” opening</td>
<td>1 ⅞ inches</td>
</tr>
<tr>
<td></td>
<td>2 1/8” opening</td>
<td>2 ⅛ inches</td>
</tr>
<tr>
<td></td>
<td>1 1/2” opening</td>
<td>1 ½ inches</td>
</tr>
<tr>
<td></td>
<td>5/8” opening</td>
<td>Protective Covering not required</td>
</tr>
</tbody>
</table>

Evaluate Opening:

- less than 6” may be necessary to avoid tripping hazard.

Figure 6. Sump opening guard design requirements.
Figure 9. Sweep auger “dead man” handle that energizes the sweep auger only when the worker grips the handle.

Figure 10. “Dead man” control handle for sweep auger.

Figure 11. Sweep auger worker protection fencing.

Figure 12. Worker protection caging and sweep auger controls.

Zero-Entry Sweep Augers

Clearly, the safest place to be when unloading or working around a grain bin is outside the bin. If workers do not need to enter the bin to dislodge out-of-condition grain clumps and bridges, entrapment and engulfment do not occur. There are two factors that help to keep workers out of bins: keeping grain in good condition, so clumping and bridging do not occur and using zero-entry sweep augers. In the past decade, bin sweep manufacturers have made great advances in sweep design. Zero-entry sweep augers are controlled from outside of the bin and are robust enough to handle out-of-condition grain without help from workers entering the bin.

When purchasing a zero-entry sweep auger, consideration for the types of grain and how often the bin is swept is important. Different types of grain and higher moisture content grain require greater horsepower and larger clearances. Emptying bins completely to the floor more frequently makes it easier for bin sweeps to move the remaining product to the
sump openings. Upgrading an existing sweep auger to “zero-
entry” is something to consider in some situations. Be sure to
work with a reputable dealer of zero-entry bin sweeps when
making the decision to retrofit existing equipment or purchase
new equipment. If a current sweep auger requires a cord to be
run into the bin for power, the sweep is not a good candidate
for zero-entry retrofitting. A person must enter the bin to plug
the cord into the sweep or retrieve the cord to plug in to power
outside of the bin, thus “zero-entry” is not possible.

Grain facility managers report great benefits from installing
and using zero-entry sweep augers. These benefits include:
• Reduced time to sweep out bins. Therefore, bins get
swept out more often and out-of-condition grain does not
develop when old grain is left repeatedly in the bottom of
bins.
• Temporary help may be used with reduced training re-
quirements because workers do not have to enter the bin.
• Bins can be used for multiple commodities because of
the ease and completeness of bin clean out.
• Added efficiency in unloading a bin. The sweep can work
24/7 while workers may not be available for continuous
work assignments. This reduces an otherwise two- or
three-day task to a task that takes just a few hours.
• Significant reduction in risk because workers do not enter
the bin until it is completely empty.

Sweep Auger Policies

Commercial grain facilities and facilities that must meet
OSHA standards should have a sweep auger use and main-
tenance policy. The National Grain and Feed Association has
produced an excellent resource that gives an example of just
such a policy. This information may be accessed at: https://
www.ngfa.org/wp-content/uploads/Guidance-for-Sweep-
policy is based on the 10 steps reported in this fact sheet. It
also provides definitions of terms used in the OSHA policy
as well as in the 10 steps. Training is addressed along with
safety steps, preparation for sweep-cleaning operations and
disciplinary action for employees not willing to follow the
requirements set forth in the operating guidelines.

Summary

With planning, training and coordination, the risks that are inherent in working inside grain bins can be reduced. Equipping with safety features and having management policies in place certainly help workers stay safe. Grain bin sweeps are an important part of the unloading process of grain bins. Guidelines for safe working conditions are in place and must be followed. When the 10 steps listed above are followed, incidents involving injury and death are greatly reduced, and in most cases, eliminated. When these methods become habit in a facility, the safety culture of the facility is greatly reinforced.

References and other information sources:
## CONFINED SPACE ENTRY PERMIT

Example (Other examples are available on the Internet)

<table>
<thead>
<tr>
<th>REQUIREMENTS COMPLETED</th>
<th>DATE</th>
<th>TIME</th>
<th>REQUIREMENTS COMPLETED</th>
<th>DATE</th>
<th>TIME</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lockout/De-energize/Tagout</td>
<td>Full Body Harness w/&quot;D&quot; Ring</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Line(s) Broken-Capped-Blank</td>
<td>Emergency Escape Retrieval Equipment</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Purge-Flush and Vent</td>
<td>Lifelines</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ventilation</td>
<td>Fire Extinguishers</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Secure Area (Post and Flag)</td>
<td>Lighting (Explosive proof)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Breathing Apparatus</td>
<td>Protective Clothing</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Resuscitator - Inhalator</td>
<td>Respirator(s) (Air Purifying)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Standby Safety Personnel</td>
<td>Burning and Welding Permit</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Continuous Monitoring:**  
- Yes  
- No

**Periodic Monitoring Frequency:**

<table>
<thead>
<tr>
<th>Test(s)</th>
<th>Permissible entry level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Percent of oxygen</td>
<td>19.5% TO 23.5%</td>
</tr>
<tr>
<td>Lower flammable limit</td>
<td>Under 10%</td>
</tr>
<tr>
<td>Carbon monoxide</td>
<td>+35 PPM</td>
</tr>
<tr>
<td>Aromatic Hydrocarbon</td>
<td>+1 PPM +5 PPM</td>
</tr>
<tr>
<td>Hydrogen Cyanide</td>
<td>4 PPM (Skin)</td>
</tr>
<tr>
<td>Hydrogen Sulfide</td>
<td>+10 PPM +15 PPM</td>
</tr>
<tr>
<td>Sulfur Dioxide</td>
<td>+2 PPM +5 PPM</td>
</tr>
<tr>
<td>Ammonia</td>
<td>35 PPM</td>
</tr>
</tbody>
</table>

* Short-term exposure limit: Employees can work in the area up to 15 minutes.  
+ 8 hour Time Weighted Average: Employees can work in the area 8 hours (longer with appropriate respiratory protection).
The Oklahoma Cooperative Extension Service

WE ARE OKLAHOMA

The Cooperative Extension Service is the largest, most successful informal educational organization in the world. It is a nationwide system funded and guided by a partnership of federal, state, and local governments that delivers information to help people help themselves through the land-grant university system.

Extension carries out programs in the broad categories of agriculture, natural resources and environment; family and consumer sciences; 4-H and other youth; and community resource development. Extension staff members live and work among the people they serve to help stimulate and educate Americans to plan ahead and cope with their problems.

Some characteristics of the Cooperative Extension system are:

• The federal, state, and local governments cooperatively share in its financial support and program direction.
• It is administered by the land-grant university as designated by the state legislature through an Extension director.
• Extension programs are nonpolitical, objective, and research-based information.
• It provides practical, problem-oriented education for people of all ages. It is designated to take the knowledge of the university to those persons who do not or cannot participate in the formal classroom instruction of the university.

• It utilizes research from university, government, and other sources to help people make their own decisions.
• More than a million volunteers help multiply the impact of the Extension professional staff.
• It dispenses no funds to the public.
• It is not a regulatory agency, but it does inform people of regulations and of their options in meeting them.
• Local programs are developed and carried out in full recognition of national problems and goals.
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