OVERVIEW OF THE OSHA GRAIN HANDLING STANDARD

40 CFR § 1910.272

NGFA and Grain Journal Safety Conference
July 30, 2014

by
Paul Luther, Luther EHS Consulting, LLC
History

- Between 1958 and 1982 there were 434 documented explosions in US grain handling facilities.
- Resulting in 776 injuries and 209 deaths.
Grain Elevator in Greensburg, KS following April 2007 F5 tornado
Kansas Dust Explosion

SEVEN DEAD IN DEBRUCE GRAIN ELEVATOR BLAST

June 8, 1998  7 fatalities

J Maness
1/29/10
Background of Grain Handling Standard

• OSHA issued *The Grain Elevator Industry Alert* January 1978
• OSHA requested comments and notice of public meetings concerning the industry February 1980
• Notice of Proposed Rulemaking January 6, 1984
• Four public hearings were held in June/July 1984
• Rules adopted December 1987, almost four years later
• Effective date March 30, 1988
  – Housekeeping effective August 1988
Sections of Standard

- *Scope, Application & Definitions*
- Emergency action plan
- Training
- Hot work permit
- Entry into grain storage structures
- Entry into flat storage structures
- Contractor safety
- Housekeeping
Sections of Standard continued

- Grate openings
- Filter collectors
- Preventive maintenance
- Grain stream processing equipment
- Emergency escape
- Continuous flow grain dryers
- Inside bucket elevators
OSHA Inspections, FY 2014
Country Elevator, Terminal Elevator, Feed Mills & Flour Milling

<table>
<thead>
<tr>
<th>Data Criteria</th>
<th>Number</th>
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<tr>
<td>Inspections Conducted</td>
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<tr>
<td>Federal</td>
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<td>Federal</td>
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<td>18(b) State</td>
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<td>Violations Issued (% Serious)</td>
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<tr>
<td>Federal</td>
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<tr>
<td>18(b) State</td>
<td>230 (60%)</td>
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<tr>
<td>Total</td>
<td>696 (75%)</td>
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### OSHA Citations of §1910.272

**OSHA FY 2013**

<table>
<thead>
<tr>
<th>Citations</th>
<th>Inspections</th>
<th>Penalty</th>
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<td>115</td>
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<td>3</td>
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<td>$11,970</td>
<td>Retail Feed Store</td>
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There are 14 compliance sections in 1910.272

<table>
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<th>Paragraph</th>
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<tr>
<td>G</td>
<td>Entry Into Grain Storage Structures</td>
<td>38</td>
</tr>
<tr>
<td>J</td>
<td>Housekeeping</td>
<td>22</td>
</tr>
<tr>
<td>E</td>
<td>Training</td>
<td>14</td>
</tr>
<tr>
<td>M</td>
<td>Preventive Maintenance</td>
<td>11</td>
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**FY 2013 §1910.272 Citations**

By Paragraph

There are 14 compliance sections in 1910.272
Grain Handling Standard
Scope 1910.272(a)

This section contains requirements for the control of grain dust fires and explosions, and certain other safety hazards associated with grain handling facilities. It applies in addition to all other relevant provisions of Part 1910 (or Part 1917 at marine terminals).
Application
1910.272(b)

- Grain elevators, feed mills, flour mills, rice mills, dust pelleting plants, dry corn mills, soybean flaking operations and dry grinding operations of soy cake.
- Three paragraphs for grain elevators only
  - (o) Emergency escape
  - (p) Raw grain dryers
  - (q) Inside bucket elevators
Standard Does Not Apply
1910.272(b)

• To seed plants which handle and prepare seeds for planting of future crops, nor to on-farm storage or feed lots.
  – From Appendix A to 1910.272

• Not applicable to cereal breakfast foods, blended and prepared flour, and dog/cat/other pet foods, bread and other bakery products except cookies and crackers
Definitions
1910.272(c)
Nine terms are defined

• **Fugitive grain dust** – combustible dust particles emitted from the stock handling system, of such size as will pass through a U.S. Standard 40 mesh sieve (425 microns or less)

• **Grain elevator** – a facility engaged in the receipt, handling, storage, and shipment of bulk raw agricultural commodities such as corn, wheat, oats, barley, sunflower seeds, and soybeans.

• **Inside bucket elevator** – 20% of height inside of structure (excludes rail or truck receiving sheds)
Emergency Action Plan (EAP)
1910.272(d) [4% of 2013 Citations]

- Requires plans “be in writing, kept in the workplace”, except for plants with 10 or fewer employees.
- The program should address emergencies reasonably expected in workplace including weather issues and now terrorism issues.
Citation 1 Item 1  Type of Violation: **Serious**

29 CFR 1910.272(d): The employer did not develop and implement an emergency action plan meeting the requirements contained in 1910.38(a):

a) The storage bins - on February 14, 2013, the employer did not develop or implement an emergency action plan for employees entering and working in storage bins.

ABATEMENT CERTIFICATION AND DOCUMENTATION ARE REQUIRED

**ABATEMENT DOCUMENTATION REQUIRED FOR THIS ITEM**

Date By Which Violation Must be Abated: 08/30/2013
Proposed Penalty: $4900.00
Emergency Action Plan
Elements 1910.38 (b) & (c)

• Emergency escape procedures and routes
• Means of reporting emergency
  – Posting of emergency numbers
• Precautions by ‘critical employees’
• Who takes the head count
• Designated safe areas
• Rescue and medical duties for employees who are to perform these duties
• Name of person for further information
Emergency Action Plan

**EXAMPLE**
Develop floor plans for each level.

Show:
1) Exits
2) Escape routes
3) Assemble locations
4) Fire extinguisher locations
5) Water sources
6) Chemical storage rooms
7) Emergency escape ladders

Share with Fire Department
Emergency Action Plan
Elements 1910.38 (b) & (c)

• Emergency escape procedures and routes
• Means of reporting emergency
  – Posting of emergency numbers
• Precautions by ‘critical employees’
• Who takes the head count
• Designated safe areas
• Rescue and medical duties for employees who are to perform these duties
• Name of person for further information (by your employees)
Emergency Action Plan Elements 1910.38(d) Employee Alarm System

- Alarm systems comply with 1910.165:
  - Distinctive signal for each emergency
  - Recognizable above ambient noise levels
  - Maintain and test alarms regularly
  - For 10 or fewer employees, voice communication is acceptable provided all employees can hear the alarm.
Emergency Action Plan  
1910.38(e) & (f)

• (e) Training
  – Train a “sufficient number (one for each 20) of persons” to assist in a safe and orderly emergency evacuation.

• (f) Plan Review with Employees
  – Review when responsibilities or plan changes
  – Cover with New or Temps first day
  – Recommend annual fire drills on each shift and then retrain as needed.
Training

910.272(e)  [14% of 2013 Citations]

• Performance oriented training
• Requires employees to be trained in the hazards associated with their own work tasks
  – No differentiation between full time or temporary employees
• Training required prior to starting work/employment
• Must include
  – (e)(1)(i) General precautions associated with facility (dust explosions, emergency evacuation, etc.)
  – (e)(1)(ii) Specific precautions applicable to job tasks (cleaning grinding equipment, housekeeping, choked legs, preventive maintenance, hot work, LO/TO).
  – (e)(2) Special task such as bin entry, handling toxic substances, etc.
• Annual training for most hazards, or job changes
Citation 1 Item 2 a  Type of Violation: Serious

29 CFR 1910.272(e)(1)(ii): Current employees, and new employees prior to starting work in the grain handling facility were not trained in the specific procedures and safety practices applicable to their job tasks including but not limited to cleaning procedures for grinding equipment, clearing procedures for choked legs, housekeeping procedures, hot work procedures, preventive maintenance procedures and lock-out/tag-out procedures:

a) Outside of the storage bin - on February 14, 2013, the employer did not ensure that employees were protected from bin entry hazards. Employees were not provided with training on specific procedures and safety practices applicable to their job tasks, including but not limited to, grain handling facilities, bin entry, preventive maintenance procedures and lockout/tag-out procedures.

ABATEMENT CERTIFICATION AND DOCUMENTATION ARE REQUIRED

ABATEMENT DOCUMENTATION REQUIRED FOR THIS ITEM

Date By Which Violation Must be Abated: 08/30/2013
Proposed Penalty: $4900.00
Training Issues

• Documentation is not required in §1910.272(e). So the CSHO is instructed to substantiate the adequacy of training by reviewing the employer’s training records, if offered by the employer, and by interviewing the employees.

• OJT for safety has an important place in employee training programs, but it should be used primarily as a hands-on clarification of the training provided in structured programs.
Examples of Grain Industry Training

- Access to Medical Records
- Bin Entry (cleaning bins)
- Bloodborne Pathogens
- Clearing Legs
- Confined Spaces
- Dust Explosion Hazards
- Electrical Work Practices
- Emergency Action Plan
- Fall Protection Equipment
- Fire Extinguisher Use
- First Aid
- Forklift Operator
- Front-end Loader/Bobcat
- Grain Handling / Drying Equipment
- Hazard Communication / GHS
- Hearing Protection
- Hotwork / Cutting / Welding

- Ladder Safety
- Lifting
- Lockout / Tagout
- Manlifts / Elevators
- Personal Protective Equipment
- Pesticide Application
- Preventive Maintenance
- Process Safety Management
- Rail Operations Safety
- Rescue / Emergency Response
- Respiratory Protection
- River Operations Safety
- Storage and handling of LP Gases
- Storage and handling of Anhydrous Ammonia
- Truck Dumper Operation
- Exposure to Asbestos, Lead, other chemicals as appropriate

List not all inclusive
How do you manage so many topics?

- Determine specific needs for the various jobs or duties.
  - Conduct a job safety analysis of each task and area of the plant and what is needed.
- List all the required topics needed for all the workers.
- Make training a team effort of supervisors and employees.
- Give support and resources—equipment time and place to do training.
- Assign someone to insure that training takes place.
- Use outside resources where available.
# Training Calendar

## ANNUAL TRAINING 2014

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Hot Work Permit
1910.272(f) [1% of 2013 Citations]

- Involves electric or gas welding, cutting, brazing or similar flame producing operations
- (1) Permits needed for all Hot Work, with exceptions
  i. In welding shops
  ii. In authorized areas
  iii. Employer (signatory) is present during Hot Work
      - Keep permit at work site until completion of hot work
- How long do you keep Hot Work Permits?
- (2) Permit certifies 1910.252(a) is implemented prior to the beginning of hot work
Fire Prevention and Protection 1910.252(a)

- (2)(i) Remove all combustible material on floor and on floor below where sparks may fall
- (2)(ii) Fire extinguishing equipment handy
- (2)(iii) Fire watch required
  - If combustible material is within 35 feet of operations
  - If combustible material is over 35 feet away but is easily ignitable
  - If combustible material is adjacent to the opposite side of partitions
  - Fire watch is maintained a minimum of 30 minutes after completion of work.
- (2)(iv) Responsible official shall inspect and permit before work begins.
# Hot Work Permits

## WELDING, CUTTING & HOT WORK PERMIT

This permit shall be filled out completely and each item initialed by the Plant Manager or designated Supervisor and the Employee, who is to perform the work, before any welding, cutting or hot work is performed in any grain handling or processing area. The authorizing Manager/Supervisor and employee shall physically inspect the area for all listed safety requirements. If equipment is being repaired or installed, proper lockout procedures shall be followed. Welding and Cutting shall not be permitted inside or within 50' of any facility building/structure unless that building/structure is completely shut down and isolated from the rest of the facility. (All Managers, Supervisors, workers shall know and comply with Corporate safety procedures).

<table>
<thead>
<tr>
<th>Location:</th>
<th>Date:</th>
<th>Time:</th>
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</thead>
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### Description Of Work:

Person(s) Performing Hotwork:

### Safety Requirements:

<table>
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<th>Requirement</th>
<th>Yes</th>
<th>NA</th>
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<tr>
<td>1. All operations in the building/structure/area, including dust systems, are completely shut down and isolated.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Combustible gas test conducted. (If applicable) (tests should be done in all areas)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Conveyors, lugs, fans and other equipment associated with the building/structural/area are shut down and locked out.</td>
<td></td>
<td></td>
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<tr>
<td>4. All spouts, ducts, floor, wall, and bin openings tightly covered and sealed. Do not cut or weld on spouts lined with combustible materials such as polyethylene, urethane, rubber or PVC.</td>
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<tr>
<td>5. Floors, walls, and surrounding area thoroughly cleaned of exposed combustibles and area wet down. (No exposed combustibles are allowed within 50' of the work area and shielded from sparks with non-combustible material). (If freezing conditions exist, wetdown may be omitted).</td>
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<tr>
<td>6. Fire extinguisher(s) readily available within 25' of the work area.</td>
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<tr>
<td>7. Welding, cutting and hot work equipment is inspected for safe condition before use and personal protective equipment is obtained before beginning work.</td>
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<tr>
<td>8. Fire watch scheduled to inspect work area, and areas below, every 30 minutes for a minimum of 4 hours after completion of work. Fire watch time may be greater depending on conditions.</td>
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Employee(s) or Contractor Performing Hotwork

<table>
<thead>
<tr>
<th>Facility Manager or Designate Issuing Permit</th>
</tr>
</thead>
</table>

Expiration of permit (not to exceed one shift duration) | Date: | Time: |

Completion of Hot Work | Date: | Time: |

**ORIGINAL - TO HOT WORK SITE**  **COPY - HELD BY PERMIT WRITER**  **COMPLETED PERMIT TO BE KEPT ON FILE FOR A 1 YEAR PERIOD MINIMUM**
(2)(v) Can combustible materials be removed, relocated or covered?

- Keep combustibles 35 feet away from sparks.
- If you cannot comply cover/wet down or otherwise protect floor/materials,
- Protect ducts or spouts that could carry sparks into tanks or bins
Hot Work Permit System

• Can work be relocated to a safe location?
• Erect guards where to keep sparks away from people.
• Is appropriate PPE being used?
• Are fire extinguishers (or water, sand, etc.) available?
• Complete the permit before beginning work.
Completion of Hot Work

- Inspect for Hot Spots
- Watch for radiant heating – sparks fly!
- Fire watch to remain 30 minutes after work completed per 1910.252(a)(2)(iii)(B)
- After hours, fire watch
  - Recommend extend past 4 hours if welding near or on bins, tanks or silos.
  - Consider monitoring Carbon Monoxide in bin the next day
- Permits are not a record, but an authorization of the signee certifying that certain safety precautions, on the permit checklist, have been implemented prior to hot work beginning.
Citation 1 Item 13 Type of Violation: Serious

29 CFR 1910.272(f)(1): The employer did not issue a permit for all hot work performed in the grain handling facility:

The employer does not issue permits for welding work within the grain handling structure to ensure all safeguards were in place before hot work was initiated.

CERTIFICATION AND DOCUMENTATION OF ABATEMENT REQUIRED

Proposed Penalty: $3,000.00
Entry Into Grain Storage Structures
1910.272 (g) and (h)

- “Grain” includes raw and processed grain and grain products.
- Entry into and rescue from bins, silos and tanks (g) [38% of 2013 Citations]
  - [a 2011 citation in Iowa included an outside storage pile having sidewalls and tarp as a grain storage structure.]
- Entry into flat storage (h) [1% of 2013 Citations]
1910.272(g)(1)(i) The employer shall issue a permit for entering bins, silos, or tanks except..... The permit shall certify that the precautions contained in this paragraph have been implemented prior to the employees entering bins, silos, or tanks. The permit shall be kept on file until completion of the entry procedures.
Citation 1  Item 2  Type of Violation: Serious

29 CFR 1910.272(g)(1)(i): Permit(s) issued for bin, silo, or tank entries did not certify that the precautions contained in this paragraph (1910.272(g)) had been implemented prior to employee(s) entering bins, silos or tanks:

On or about April 19, 2013, the permit issued for the Bin #2 entry was certified stating that the drag conveyor was not locked out and engulfment hazards were present in the grain bin.

Abatement documentation is required for this item in accordance with the requirements of 29 CFR 1903.19(d).

ABATEMENT DOCUMENTATION REQUIRED FOR THIS ITEM

Date By Which Violation Must be Abated: 11/06/2013
Proposed Penalty: $7000.00
# 4 Cited Paragraph in FY 2013

- 1910.272(g)(1)(ii) All mechanical, electrical, hydraulic, and pneumatic equipment which presents a danger to employees inside grain storage structures shall be de-energized and shall be disconnected, locked-out and tagged, blocked-off, or otherwise prevented from operating by other equally effective means or methods.
Citation 2 Item 1  Type of Violation: Willful

29 CFR 1910.272(g)(1)(ii): All mechanical, electrical, hydraulic, and pneumatic equipment which presents a danger to employees inside grain storage structures not deenergized, disconnected, locked-out and tagged, blocked-off, or otherwise prevented from operating by other equally effective means or methods:

On or about April 19, 2013, the drag conveyor used to empty grain from Brock grain bin #2 was not de-energized and locked out when employee(s) entered the bin.

Abatement documentation is required for this item in accordance with the requirements of 29 CFR 1903.19(d).

ABATEMENT DOCUMENTATION REQUIRED FOR THIS ITEM

Date By Which Violation Must be Abated: 11/06/2013
Proposed Penalty: $70000.00

Kimberly A. Stille
Area Director
• 1910.272(g)(1)(iii) The atmosphere within a bin, silo, or tank shall be tested for the presence of combustible gases, vapors, and toxic agents when the employer has reason to believe they may be present. Additionally, the atmosphere within a bin, silo, or tank shall be tested for oxygen content unless there is a continuous natural air movement or continuous forced-air ventilation before and during the period employees are inside.
Citation 2 Item 2  Type of Violation:  Willful

29 CFR 1910.272(g)(1)(iii):

The atmosphere within a bin, silo, or tank in the grain handling facility was not tested for the presence of combustible gases, vapors, and toxic agents prior to employee entry:

The employer failed to protect employees from atmosphere hazards associated with test the air quality inside the grain bins prior to employees entering. This was most recently evident during the inspection of the facility located at [redacted] where the employer has employees entering grain bins to inspect the grain and perform maintenance on the bins and augers without testing the air quality with an approved and calibrated testing device.

Abatement certification and abatement documentation is required for this violation. The documentation should include written verification of abatement, applicable measurements or monitoring results, and photographs or videos which you believe will be helpful. The abatement certification sheet is enclosed with the citations.

Date By Which Violation Must be Abated: 12/16/2011
Proposed Penalty: $28000.00
Entry Into Grain Storage Structures
1910.272 (g) continued

• (2) Body harness with lifeline or a boatswain chair required if engulfment hazard exists.*
• (3) Observer stationed outside. Communication with the entrant shall be maintained. (Optional methods and frequency)
• (4) Employer shall provide equipment for rescue operations suited for the bin, silo or tank.
• (5) Observer shall be trained in rescue procedures, including notification methods for obtaining additional assistance.
• (6) Employees shall not enter bins, silos, tanks underneath a bridging condition or where a buildup of grain products on the sides could fall and bury them
Other 1910.272(g) OSHA citations, FY 2013
Citation 2 Item 2a Type of Violation: Willful

29 CFR 1910.272(g)(2):

When entering the grain handling facility bins from above the level of the grain or product, employees did not wear a body harness with lifeline.

In the grain/bean storage bin(s) of the facility the employer is failing to ensure that employees entering the bins from above the level of the grain or product were wearing a body harness with lifeline while walking on the grain.

Abatement certification and abatement documentation is required for this violation. The documentation should include written verification of abatement, applicable measurements or monitoring results, and photograph or videos which you believe will be helpful. The abatement certification sheet is enclosed with citation.

ABATEMENT DOCUMENTATION REQUIRED FOR THIS ITEM

Date By Which Violation Must be Abated: 01/17/2013
Proposed Penalty: $70000.00
Citation 2 Item 2   Type of Violation: **Willful**

29 CFR 1910.272(g)(2): When entering the grain handling facility bins, silos, or tanks from the top, employees did not wear a body harness with lifeline, or use a boatswain's chair that met the requirements of Subpart D, 29 CFR 1910.28(j)(a):  

a) At the facility - on February 14, 2013, an employee was not provided with a safety harness and lanyard, exposing the employee to an engulfment hazard.

**ABATEMENT CERTIFICATION AND DOCUMENTATION ARE REQUIRED**

**ABATEMENT DOCUMENTATION REQUIRED FOR THIS ITEM**

Date By Which Violation Must be Abated: 08/30/2013  
Proposed Penalty: $49000.00

[Signature]
Robert E. Vazzi  
Area Director
Citation 1 Item 4  Type of Violation: **Serious**

29 CFR 1910.272(g)(3): An observer, equipped to provide assistance, was not stationed outside the bin, silo, or tank being entered by an employee:

On or about April 19, 2013, employee(s) acting as observer(s) were not stationed outside of Brock grain bin #2 for the duration of the bin entry.

Abatement documentation is required for this item in accordance with the requirements of 29 CFR 1903.19(d).

**ABATEMENT DOCUMENTATION REQUIRED FOR THIS ITEM**

Date By Which Violation Must be Abated: 11/06/2013
Proposed Penalty: $7000.00
Citation 1 Item 5  Type of Violation: Serious

29 CFR 1910.272(g)(6): Employees entered bins, silos, or tanks underneath a bridging condition, or where a buildup of grain products on the sides could fall and bury them:

On or about April 19, 2013, employee(s) were exposed to engulfment hazards after being buried in grain that had built up within Brock grain bin #2.

Abatement documentation is required for this item in accordance with the requirements of 29 CFR 1903.19(d).

ABATEMENT DOCUMENTATION REQUIRED FOR THIS ITEM

Date By Which Violation Must be Abated: 11/06/2013
Proposed Penalty: $7000.00
Entry into grain storage
Do I use paragraph (g) or (h)?

- If you are entering a bin of any type above the grain follow 1910.272(g). If you are entering the bottom of a bin through unrestricted ground level opening and there is no atmospheric concerns follow 1910.272(h).
- You can turn aeration on or use forced air fans to get ensure there is no question about the atmosphere issue for flat storage.
OSHA Memo
May 16, 2011

Does the grain storage structure have a flat floor where grain will not empty completely by gravity and workers must enter to reclaim the residual grain using powered equipment or manual means?

Yes

No

1910.272(g) Applies

No

Yes

Does the grain structure have an unrestricted ground level opening that an employee can enter by stepping, walking, or driving?

No

Yes

Will the entry actually occur through the ground level unrestricted opening?

No

Yes

Is the requirement for the structure to have "no toxicity, flammability, oxygen-deficiency, or other atmospheric hazards" met?

1910.272(h) Applies

Yes
What is Unrestricted Ground Level Opening?

• ....[F]lat storage structures must have an unrestricted ground level opening for entry, and not just "large doorways" ... "Unrestricted" in the context of ground level entry means that employees can enter by stepping, walking, or driving through these openings.... Also, for paragraph (h) to apply, the entry into the flat storage structure must actually occur through the unrestricted ground level opening, otherwise paragraph (g) applies.

• Entries [into a flat grain storage structure] made at or above the level of the grain and above ground level will be covered by the general provisions for entry into grain storage structures found in paragraph (g).

Taken from OSHA Letter of Interpretation, May 6, 2011
THOMAS GALASSI, Director, Directorate of Enforcement Programs
Entry into grain storage
Ground level & unrestricted
Entry into grain storage
Ground level & unrestricted

This type of 2 ring door (5’) is available for most new tanks

Tank was modified with this walk in door
Entry into Flat Storage
1910.272(h) [1% of 2013 Citations]

- **Flat storage** – a structure that will not empty completely by gravity, has an unrestricted ground level opening, and must be entered to reclaim the residual grain using powered equipment or manual means.

- (1) Employees are permitted to walk or stand on grain for purposes of inspection or testing with the following provisions required.
  - Whenever an employee walks or stands on grain at a depth that poses an engulfment hazard, a harness with a lifeline, or an alternate means of protection must be provided to prevent the employee from sinking further than waist deep in the grain.
Entry into Flat Storage
1910.272(h)

• (2) When walking or standing on grain, lockout equipment that presents a danger
• (3) Don’t be under a bridging condition or in any location where an accumulation of grain on the sides could fall.
• Permits, rescue and observers are not addressed in paragraph (h).
Prohibited in Bins, Tanks and Silos and Flat Storage Structures
1910.272(g)(1)(iv) & (h)(2)(ii)

• Walking down grain and similar practices where an employee walks on grain to make it flow within or out of a grain storage structure, or where an employee is on moving grain, is prohibited under all circumstances.
Citation 1 Item 3 Type of Violation: Serious

29 CFR 1910.272(g)(1)(iv): "Walking down grain" and similar practices where an employee walks on grain to make it flow within or out from a grain storage structure, or where an employee is on moving grain, was not prohibited:

On or about April 19, 2013, an employee was exposed to moving grain while working in Brock grain bin #2 when the corn started moving because slide gates were opened.

Abatement documentation is required for this item in accordance with the requirements of 29 CFR 1903.19(d).

ABATEMENT DOCUMENTATION REQUIRED FOR THIS ITEM

Date By Which Violation Must be Abated: 11/06/2013
Proposed Penalty: $7000.00
OSHA 29 CFR 1910.146
Entry into Permit Required Confined Spaces

- For entry into spaces that are not grain storage structures bins/tanks/silos
- “29 CFR 1910.272 takes precedence over the permit required confined space standard for the hazards it addresses” per 2005 Letter of Interpretation.”
- Many companies choose to consolidate confined spaces and grain storage structures into one program.
Areas Potentially Under
29 CFR 1910.146

- Hopper trucks
- Rail cars
- Garners/hoppers
- Boot pits
- Liquid tanks
- Cyclones/baghouses
- Ingredient bins (minerals)
- Turnheads
- Scales
- Mixers
- Dryers
- Some tunnels
- Boilers
- Manholes/sumps

List is not all inclusive
### OSHA Citations of 1910.146
OSHA FY 2013

<table>
<thead>
<tr>
<th>Citations</th>
<th>Category Number</th>
<th>Inspections</th>
<th>Penalty</th>
<th>Industry</th>
</tr>
</thead>
<tbody>
<tr>
<td>766</td>
<td></td>
<td>304</td>
<td>$1,957,641</td>
<td>Total for All Industry</td>
</tr>
<tr>
<td>36</td>
<td>1</td>
<td>15</td>
<td>$32,838</td>
<td>Terminal Elevators</td>
</tr>
<tr>
<td>21</td>
<td>7</td>
<td>8</td>
<td>$65,558</td>
<td>Feed Mills</td>
</tr>
<tr>
<td>14</td>
<td>11</td>
<td>6</td>
<td>$14,700</td>
<td>Country Elevators</td>
</tr>
</tbody>
</table>

Section does not apply to agriculture, construction or shipyard employment.
## Differences 1910.146 & 1910.272(g)

<table>
<thead>
<tr>
<th>1910.146</th>
<th>1910.272(g)</th>
</tr>
</thead>
<tbody>
<tr>
<td>11 pages long</td>
<td>1+ pages long</td>
</tr>
<tr>
<td>Addresses labeling of Confined Spaces</td>
<td>No labeling specifically mentioned; make employees aware of hazards</td>
</tr>
<tr>
<td>Requires a permit for entry</td>
<td>Allows alternate to permit</td>
</tr>
<tr>
<td>Requires testing of O₂, LEL &amp; potential toxic gases</td>
<td>Gives option on testing O₂ if forced or natural air draft. Test for LEL and potential toxics</td>
</tr>
<tr>
<td>Defines entrant, attendant &amp; supervisor</td>
<td>Requires an observer</td>
</tr>
<tr>
<td>Does not specifically require employer to provide rescue equipment</td>
<td>Requires employer to provide rescue equipment</td>
</tr>
<tr>
<td>Allows for reclassification of permit requirement</td>
<td>No reclassification mentioned</td>
</tr>
</tbody>
</table>

List not all inclusive
Welcome to the Occupational Safety & Health Administration (OSHA) Confined Spaces Advisor

This Advisor provides guidance to help employers protect workers from the hazards of entry into permit-required confined spaces. The Advisor will help you determine if a space is covered by OSHA's Permit-Required Confined Spaces regulation. The system provides options to review the definitions of technical terms, to review answers to frequently asked questions, and to review the regulatory text.

The OSHA Confined Spaces Advisor is one of a series of elaws (Employment Laws Assistance for Workers and Small Businesses) Advisors developed by the U.S. Department of Labor (DOL) to help employers and employees understand their rights and responsibilities under federal employment laws. To view the entire list of elaws Advisors please visit the elaws website. To learn more about DOL’s efforts to ensure safe and healthful working conditions for America’s workers, visit the OSHA website.

Begin OSHA Confined Spaces Advisor Now
Contractor Safety
1910.272(i) [1% of 2013 Citations]

• Provide specific instructions to contractors on the safety rules that pertain to their work
  – Inform of hazards, fire and explosion
  – Emergency Action Plan

• Normally excluded:
  – Service or inspection related work
  – Vendors
  – Delivery personnel
  – Insurance reps
Citation 1 Item 3  Type of Violation:  Serious

29 CFR1910.272(i)(1); Employer did not inform contractors performing work at the grain handling facility of known potential fire and explosion hazards related to contractor’s work and work area or the applicable safety rules of the facility:

On or about October 29, 2011, the employer did not inform [REDACTED] employees performing work at the grain elevator located [REDACTED] of known potential fire and explosion hazards related to the contractor’s work and work areas and the applicable safety rules of the facility.

29 CFR 1903.19(d)(1) requires certification and documentation that the abatement of the above violation is completed.

Date By Which Violation Must be Abated:  05/07/2012
Proposed Penalty:  $ 7000.00
Housekeeping
1910.272(j) [22% of 2013 Citations]

• Purpose is to minimize potential for dust explosions by controlling dust sources and to provide for a safe and sanitary working environment

• Requires annual training of employees
Housekeeping, 1910.272(j)
1910.272(j)(1) The employer shall develop and implement a written housekeeping program that establishes the frequency and method(s) determined best to reduce accumulation of fugitive grain dust on ledges, floors, equipment, and other exposed surfaces.

Cited 56 times
Citation 2 Item 2 Type of Violation: Repeat

29 CFR 1910.272(j)(1): The employer did not develop and implement a written housekeeping program that established the frequency and the method(s) determined best to reduce accumulations of fugitive grain dust on ledges, floors, equipment, and other exposed surfaces:

a) Lower head house annexes: On November 6, 2013, and at times prior, employees were exposed to explosions, fires and/or deflagration from class II combustible grain dust that was approximately 1/2 inch deep on the overhead beams and rails in the annexes.

ABATEMENT DOCUMENTATION REQUIRED FOR THIS ITEM

Date By Which Violation Must be Abated: 05/13/2014
Proposed Penalty: $38500.00
Citation 2 Item 1 Type of Violation: Willful

29 CFR 1910.272(j)(1): The employer did not develop and implement a written housekeeping program that established the frequency and the method(s) determined best to reduce accumulations of fugitive grain dust on ledges, floors, equipment, and other exposed surfaces in the grain handling facility.

(a) On or about 10/06/11 - Feed Mill, no housekeeping program was established to reduce the accumulation of combustible dust, allowing accumulation of dust on ledges, floors, platforms, electrical equipment, and other exposed surfaces.

Abatement Documentation Required

Date By Which Violation Must be Abated: 04/13/2012
Proposed Penalty: $ 63000.00
Housekeeping Program Requirements 1910.272(j)(1)

• Must be in writing
  – Areas to be cleaned
  – Frequency
  – Methods
  – Assignments
  – Address ledges, floors, equipment and other exposed surfaces

• Outside loadout and receiving areas do not have to be included [2 or more open sides] *Appendix A
Grain Elevator Requirements

1910.272(j)(2)

• (i) Programs shall address fugitive grain dust accumulation in priority areas including:
  – Floors within 35’ of an inside bucket elevator
  – Floors of enclosed areas containing grinders
  – Floors of enclosed areas containing indoor grain dryers

• (ii) **Immediate** removal of fugitive grain dust in priority areas when dust exceeds 1/8”
  – Equivalent protection as an alternate
  – Grain additives or oil / water spray

5th most cited paragraph in 2013
Citation 2 Item 2  Type of Violation:  Willful

29 CFR 1910.272(j)(2)(ii): Fugitive grain dust accumulations were not removed whenever they exceeded 1/8" at priority housekeeping areas, pursuant to the housekeeping program:

On or about October 29, 2011, employees working in the grain elevator were exposed to fire and explosion hazards. Dust was allowed to accumulate greater than 1/8 inch deep in the following locations:

a)  Boot pit - from ledge above an inspection door at the tail pulley on the southwest leg, bucket elevator leg #4.

b)  Boot pit - northeast corner, from the tail pulley casing for the northeast leg, bucket elevator leg #1. Measured approximately one-inch deep.

29 CFR 1903.19(d)(1) requires certification and documentation that the abatement of the above violation is completed.

| Date By Which Violation Must be Abated: | 05/07/2012 |
| Proposed Penalty:                      | $ 70000.00  |
Why OSHA Does Not Define Priority Areas in a Feed Mill

• Mills use many inert and non-explosive ingredients
• Grain is only 25% to 50% of a mill’s ingredients
• Steam and liquids are used in processes, reducing risk of explosion
• Feed mills are subject to FDA GMP’s involving maintaining buildings and facilities in a clean and sanitary manner
Housekeeping Inspections

Neither inspections nor frequency of inspections are in 1910.272(j)

- Priority areas
  - Inspect and clean each shift or as deemed necessary
- Other inside areas, inspect and clean daily, or as needed.
- Outside areas check at least weekly and clean as needed.
- Standard does not address record retention, but keep Housekeeping Logs for 6 to 12 months.
### Housekeeping Inspections

#### Sample “Any Elevator” Housekeeping Log

**Sample “Any Elevator” Housekeeping Log**

- **Inspected By:**
- **Week of:**

**Comments:** Note floor areas and overheads needing cleaning and any equipment leaks needing repair.

<table>
<thead>
<tr>
<th>Location</th>
<th>Mon</th>
<th>Tue</th>
<th>Wed</th>
<th>Thur</th>
<th>Fri</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Boot pit</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Affected Tunnel areas</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>First floor near leg</td>
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<td></td>
<td></td>
<td></td>
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<tr>
<td>Work floor near leg</td>
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<tr>
<td>Hammermill Room</td>
<td></td>
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<td></td>
<td></td>
<td></td>
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<tr>
<td>Gallery floor</td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
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<tr>
<td>Leg casings/spouts</td>
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<td></td>
<td></td>
<td></td>
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<tr>
<td>Seale floor</td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Upper garner</td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Leg drive floor</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Location</th>
<th>Mon</th>
<th>Tue</th>
<th>Wed</th>
<th>Thur</th>
<th>Fri</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Receiving tunnel</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reclalm tunnel A</td>
<td></td>
<td></td>
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<td></td>
<td></td>
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<tr>
<td>Reclalm tunnel B</td>
<td></td>
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<tr>
<td>Lower annex</td>
<td></td>
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<tr>
<td>Upper annex</td>
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<tr>
<td>Upper garner</td>
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<tr>
<td>MCC 1</td>
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<tr>
<td>MCC 2</td>
<td></td>
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</tr>
<tr>
<td>Substation 1</td>
<td></td>
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</tr>
<tr>
<td>D.S.</td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Bin deck</td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Outside leg pits</td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Truck Shed</td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Rail loading area</td>
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</tr>
</tbody>
</table>

#### Magnehelic Gage Readings (inches of water)

<table>
<thead>
<tr>
<th>Location</th>
<th>Mon</th>
<th>Tue</th>
<th>Wed</th>
<th>Thur</th>
<th>Fri</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>D.S. - 1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>D.S. - 2</td>
<td></td>
<td></td>
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<td></td>
<td></td>
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</tr>
<tr>
<td>D.S. - 3</td>
<td></td>
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</tr>
<tr>
<td>D.S. - 4 annex A</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>D.S. - 5</td>
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<tr>
<td>D.S. - 6</td>
<td></td>
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</tr>
<tr>
<td>D.S. - 7 truck rec.</td>
<td></td>
<td></td>
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<tr>
<td>D.S. - 8 Rail loading</td>
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<tr>
<td>D.S. -9</td>
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<td></td>
</tr>
<tr>
<td>D.S. -10 tripper</td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

Inspection records are not required in the standard.
Additional Housekeeping Citations

- OSHA has also cited the industry for housekeeping issues under 1910.22(a) (General Requirements)
  - Housekeeping. (a)(1) All places of employment, passageways, storerooms and service rooms shall be kept clean and orderly and in a sanitary condition.
  - (a)(2) The floor of every workroom shall be maintained in a clean and, so far as possible, a dry condition.
Citation 1 Item 2  Type of Violation: Serious

29 CFR 1910.22(a)(1): All places of employment, passageways, storerooms or service rooms were not kept clean and orderly or in a sanitary condition.

The employer is failing to protect employees from potential explosion hazards associated with potentially combustible dust builds up in excess of 1/32. The most recent example of this was found in __________ up throughout the room. Instances include but are not limited to:

i. Dust in excess of 1/32 built up on the catwalks around the bottoms of the hoppers above packaging lines #3 and #4.

ii. Dust in excess of 1/32 built up on the ventilation duct work located over the top of packaging lines #3 and #4.

Abatement certification and abatement documentation is required for this violation. The documentation should include written verification of abatement, applicable measurements or monitoring results, and photographs or videos which you believe will be helpful. The abatement certification sheet is enclosed with the citations.

ABATEMENT DOCUMENTATION REQUIRED FOR THIS ITEM

Date By Which Violation Must be Abated: 08/07/2014
Proposed Penalty: $6160.00
Use of Compressed Air
1910.272(j)(3)

• “Use of compressed air to clean shall only be permitted when all machinery that presents an ignition source in the area is shut down, and all other known potential ignition sources in the area are removed or controlled.”

• Respirator requirements for blowdown
  – (Check Maximum Use Concentration)
Citation 2 Item 3 Type of Violation: Willful

29 CFR1910.272(j)(3): The use of compressed air to blow dust from ledges, walls, and other areas was permitted when machinery that presented an ignition source in the areas was not shut-down:

On or about October 15, 2011, employees working in and near the grain elevator were exposed to fire and explosion hazards in that compressed air was used for cleaning without first shutting down machinery that presented potential ignition sources.

29 CFR 1903.19(d)(1) requires certification and documentation that the abatement of the above violation is completed.

Date By Which Violation Must be Abated: 05/07/2012
Proposed Penalty: $70000.00
Compressed Air Blowdown
1910.242(b)

- 1910.242 (b) “Compressed air shall not be used for cleaning purposes except where reduced to less than 30 PSI and then only with effective chip guarding and PPE.”
- An April 14, 1978 OSHA Letter of Interpretation states the use of compressed air for cleaning purposes at pressures greater than 30 PSI is permissible, if the outlet is fitted with a relief device that drops the pressure to less than 30 PSI, if the flow is dead ended.
- Air guns used with long pipes are permissible if they meet these requirements.
Options Include

[Images of air blow guns]
## Sample Air blowdown permit

**Date** __________  **Time** ________________  **Expiration** __________

**Areas to be cleaned by blowdown**

---

### Tasks or activity to be done

<table>
<thead>
<tr>
<th>Tasks or activity to be done</th>
<th>YES</th>
<th>NA</th>
<th>Initial</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. All equipment <em>in the area completely shut down in the grain elevator or other hazardous areas.</em></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. All lights and electrical equipment that is to remain energized is in good condition and rated for the area.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. There are no Potential ignition sources such as arcs, sparks or hot surfaces is in the area. (Check bearings, shut down equipment, eliminate heat sources (steam, etc.))</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. All Personnel exposed to blowdown dust will wear proper PPE, such as, dust masks, and goggles.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Air Pressure is limited to 30 psi at the end of the nozzle.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Authorized Employees** ______________________________________________________________________

**Issued by** [signed] _______________________________________________________________________

*(Supervisor or designated person.)*
Housekeeping Grain Spills
1910.272(j)(4)

• Grain or spilled products are not considered to be fugitive grain dust
• The housekeeping plan shall address the procedures for removing such spills from the work area.
Grate Openings
1910.272(k) [1% of 2013 Citations]

• Receiving pit openings, such as truck and rail receiving pits, shall be covered by grates.
• Width of the openings shall be a maximum of 2.5 inches (6.35 cm)
Citation 1 Item 10  Type of Violation:  Serious

29 CFR 1910.272(k): Receiving pit feed openings in the grain handling facility, such as truck or railcar receiving pits, were not covered by grates which had a maximum opening width of 2 1/2 inches:

(a) On or about 10/06/11 - Feed Mill, truck receiving pit grates had openings more than 2 1/2 inches wide.

(b) On or about 10/06/11 - Feed Mill, railcar receiving pit grates had openings more than 2 1/2 inches wide.

(c) On or about 10/06/11 - Feed Mill, railcar receiving pit did not have grates.

Abatement Documentation Required

Date By Which Violation Must be Abated:  04/13/2012
Proposed Penalty:  $ 6300.00
Filter Collectors
1910.272(l) [1% of 2013 Citations]

• Defined as being part of a pneumatic dust collection system.
• Must be equipped with a monitoring device that measures pressure drop across the filter.
• For filters installed after March, 1988
  – Outside, or
  – Inside area protected by explosion suppression system, or
  – Inside area separated by one hour firewall, adjacent to an outer wall, and vented to the outside with material designed to resist rupture.
PM Program Requirements
1910.272(m) [11% of 2013 Citations]

(1) Form of program not discussed (electronic or written) – rule just says you need one.

(i) Regular scheduled inspections of at least mechanical and safety control equipment associated with dryers, process equipment dust collection equipment and bucket elevators

(ii) Address lubrication and other maintenance in accordance with manufacturer’s recommendation or by prior history

Frequency of inspection not specified
Frequency may vary throughout the year
Citation 1 Item 6  Type of Violation:  Serious

29CFR 1910.272(m)(1)(i): Regularly scheduled inspections of at least the mechanical and safety control equipment associated with dryers, grain stream processing equipment, dust collection equipment including filter collectors, and bucket elevators was not accomplished:

On or about October 29, 2011, employees working in and near the grain elevator were exposed to fire and explosion hazards. The employer did not follow the manufacturers’ maintenance inspection schedules, nor were the employer’s inspection schedules consistently followed for the following equipment:

a)  Bucket Elevator Legs
b)  Dust Collectors
c)  Bucket Elevator Leg Belt Alignment Monitors
d)  Bucket Elevator Leg Bearing Monitors
e)  Bucket Elevator Leg Magnets

29 CFR 1903.19(d)(1) requires certification and documentation that the abatement of the above violation is completed.

Date By Which Violation Must be Abated:  05/16/2012
Proposed Penalty:  $ 7000.00
PM Program Requirements
1910.272(m)

(1) Form of program not discussed \((\text{electronic or written})\) – rule just says you need one.

- (i) Regular scheduled inspections of mechanical and safety control equipment, process equipment dust collection equipment and bucket elevators

- (ii) Address lubrication and other maintenance in accordance with manufacturer’s recommendation or by prior history
  - Frequency of inspection not specified
  - Frequency may vary during the year
Dust Filter & Bearing Maintenance

(2) Malfunctions in filters must be promptly corrected. Promptly remove from service overheated bearings and slipping or misaligned belts (on inside bucket elevators).
Preventive Maintenance
1910.272(m)

(3) Certification records must be maintained
   – Date, name, equipment
   – “Work Orders would be an indication of an
effective PM program.”

(4) Use proper lock-out and tag-out procedures
when servicing equipment.
Citation 1 Item 7  Type of Violation:  Serious

29 CFR 1910.272(m)(1)(ii): Lubrication and other appropriate maintenance in accordance with manufacturers' recommendations, or as determined necessary by prior operating records was not accomplished:

On or about October 29, 2011, employees working in and near the grain elevator were exposed to fire and explosion hazards. The employer did not follow manufacturer's, or their own, lubrication and maintenance schedules. Equipment such as bucket elevator legs, bucket elevator leg magnets, and conveyors did not have manufacturer's information available to set recommended lubrication and maintenance intervals.

29 CFR 1903.19(d)(1) requires certification and documentation that the abatement of the above violation is completed.

Date By Which Violation Must be Abated: 05/16/2012
Proposed Penalty: $7000.00

Citation 1 Item 8  Type of Violation:  Serious

29 CFR 1910.272(m)(3): A certification record was not maintained of each inspection, performed in accordance with this paragraph (m), containing the date of the inspection, the name of the person who performed the inspection and the serial number, or other identifier, of the equipment specified in paragraph (m)(1)(i) of this section that was inspected:

On or about October 29, 2011, employees working in and near the grain elevator were exposed to fire and explosion hazards in that each certification record did not contain the year of inspection, and did not include the serial number or other identifier for each piece of equipment to be inspected. Items referenced manufacturer's instructions that were not available to the employee performing the maintenance.

29 CFR 1903.19(d)(1) requires certification and documentation that the abatement of the above violation is completed.

Date By Which Violation Must be Abated: 05/16/2012
Proposed Penalty: $7000.00
Observations on Maintenance Programs

- No Written/Electronic Preventive Maintenance Program In Place
- If The Program Is In Place – Not Followed Consistently
- Equipment Manuals – Either Not Kept or Not Utilized
- Manufacturer’s Specifications/Recommendations Simply Ignored
Grain Stream Processing Equipment
1910.272(n) [<1% of 2013 Citations]

- Magnets are needed on processing equipment
  - Hammermills
  - Flakers
  - Roller mills
- Magnets typically on receiving system
- Magnets should be cleaned regularly.
Emergency Escape
1910.272(o) [<1% of 2013 Citations]
Pertains only to grain elevators

Grain elevator is “a facility engaged in the receipt, handling, storage and shipment of bulk raw agricultural commodities such as corn, wheat, oats, barley, sunflower seeds, and soybeans.

• (1) Two means of emergency escape are needed from the bin decks (galleries).

• (2) Tunnels constructed after March 1988 need two means of egress.

Address emergency escape in EAP.
Continuous Flow Grain Dryers

1910.272(p) [<1% of 2013 Citations]

Pertains only to direct heat dryers at grain elevators

- **Automatic controls** which shut off fuel supply in case of power or flame failure or interruption of air movement through the exhaust fan.

- **Controls to stop grain from being fed** into the dryer if temperature in exhaust is excessive.

- **Dryers installed after March 1988** need to be outside or inside protected by a one hour fire wall or fire protection equipment.
Inside Bucket Elevators
1910.272(q) [2% of 2013 Citations]
Pertains only to grain elevators

Inside bucket elevator – 20% of height inside of structure (excludes rail or truck receiving sheds)

- (1) Prohibits jogging to free choked legs
- (2) New belts & lagging conductive with surface resistance not to exceed 300 megohms
- (3) Access to head and boot for inspection and cleaning.
Citation 2 Item 4  Type of Violation:  Willful

29 CFR 1910.272(q)(1): Inside bucket elevator(s) were jogged to free choked leg(s):

On or about October 27th, 2011, employees working in and near the grain elevator were exposed to fire and explosion hazards in that inside bucket elevator(s) were jogged to free choked leg(s), including but not limited to an instance in which approximately 20 buckets were torn off the bucket elevator leg #1 belt.

29 CFR 1903.19(d)(1) requires certification and documentation that the abatement of the above violation is completed.

Date By Which Violation Must be Abated: 05/07/2012
Proposed Penalty: $70000.00
Inside Bucket Elevators
1910.272(q)
Pertains only to grain elevators

(4) Bearings external to the casing or temperature monitor or vibration monitor or other means to monitor the condition of the bearings.

(5) Motion detection which shuts down the leg when the belt speed is reduced by no more than 20% of normal speed.

(6)(i.) Equip bucket elevators with a belt alignment monitoring device which will initiate an alarm when the belt is not tracking properly; or,

(ii.) Provide a means to keep the belt tracking properly, such as a system that provides constant alignment adjustment of belts.
Rub Blocks
Temperature
Motion
Inside Bucket Elevators

1910.272(q)

Pertains only to grain elevators

(7) Paragraphs (q)(5) (motion switches) and (q)(6) (belt alignment devices) are not required for grain elevators having a permanent storage capacity of less than one million bushels, provided that daily visual inspection is made of bucket movement and tracking of the belt.

- Permanent storage capacity is all storage except for outside piles.
Inside Bucket Elevators

1910.272(q)

Pertains only to grain elevators

(8) Paragraphs (q)(4) (bearings), (q)(5)(motion), and (q)(6)(alignment) of this section do not apply to the following:

• (i.) Bucket elevators which are equipped with an operational fire and explosion suppression system capable of protecting at least the head and boot sections; or,

• (ii.) Bucket elevators which are equipped with pneumatic or other dust control systems or methods that keep the dust concentration inside the bucket elevator at least 25 % below the lower explosive limit at all times during operations.
Non-Mandatory Appendices

- Appendix A – alternate means of compliance (significant discussion on housekeeping)
- Appendix B – Cross reference of national consensus standards
  - NFPA 61, 66, 68, 69 and 91
- Appendix C – Reference material
Additional Resources
OSHA Grain Handling Standard

www.OSHA.gov

Hit “S” for Standards on index

Part 1910 Occupational Safety and Health

1910.272
Thursday
December 31, 1987

Part III

Department of Labor
Occupational Safety and Health Administration

29 CFR Parts 1910 and 1917
Grain Handling Facilities; Final Rule
OSHA Letters of Interpretation

Currently OSHA has 39 Letters of Interpretation for 1910.272, located on the OSHA Website under “I”.

<table>
<thead>
<tr>
<th>Standard Number</th>
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- **1910.272** - Clarification of the Applicability of 29 CFR 1910.272(g) or (h) During Grain Storage Structure Entry Operations, [05/16/2011]
- **1910.272** - Clarification on when a worker may be inside a grain storage bin while a sweep auger is operating, [05/16/2011]
- **1910.272** - Concern regarding the Hazard Information Bulletin, [06/19/1995]
- **1910.272** - Grain Handling Facilities - Inspection Guidance and Standard, [01/06/1992]
- **1910.272** - Grain Handling Standard, analytical requirements for percentage of fugitive dust and % combustible dust, [10/20/1988]
- **1910.272** - Grain elevator inspection activities, [05/30/1991]
- **1910.272** - Grain handlers and engulfment hazards; procedures for unguarded sweep augers, [09/29/2008]
- **1910.272** - Grain handling facilities, [10/08/1991]
- **1910.272** - Guarding requirements for sweep augers in grain silos, [12/24/2009]
- **1910.272** - Industries involved in peanut production, [06/03/1993]
- **1910.272** - Location of excessive temperature sensors in the grain industry [04/03/1991]
- **1910.272** - OSHA’s authority to perform enforcement activities at small farms with grain storage structures involved in oostharvest crop activities, [06/28/2011]
OSHA Compliance Directive
Inspection of Grain Handling Facilities
CPL 02-02-004 (11/08/1996)

- Handbook used by OSHA inspectors
- Requires PPE, & recommends natural fiber clothes
- Use man-lifts only if no other means of transport available. If you need to use it, train them first.
- “Because of spark-producing potential, no equipment including flash bulbs and electronic flashes (cameras) or electrical equipment, shall be used in hazardous areas in grain handling facilities unless the equipment is approved for use in these types of areas.”
- Electrical hazard locations
- How to take dust samples for analysis
OSHA has developed this webpage to provide workers, employers, and safety and health professionals useful, up-to-date safety and health information on grain handling facilities.

What are grain handling facilities?

Grain handling facilities are facilities that may receive, handle, store, process and ship bulk raw agricultural commodities such as (but not limited to) corn, wheat, oats, barley, sunflower seeds, and soybeans. Grain handling facilities include grain elevators, feed mills, flour mills, rice mills, dust pelletizing plants, dry corn mills, facilities with soybean flaking operations, and facilities with dry grinding operations of soycase.

What are the hazards in grain handling facilities?

The grain handling industry is a high hazard industry where workers can be exposed to numerous serious and life threatening hazards. These hazards include: fires and explosions from grain dust accumulation, suffocation from engulfment and...
Worker Entry into Grain Storage Bins

Engulfment and Suffocation Hazards
Grain storage bin entry is very dangerous and exposes workers to serious suffocation hazards - a leading cause of fatalities in this industry. Suffocation can occur when workers are engulfed (buried or covered) by grain or when bins develop hazardous atmospheres or a lack of oxygen.

Engulfment can occur when a worker does the following:
- Stands on moving or flowing grain (see figure 1) - The moving grain acts like "quicksand" and buries the worker in seconds.
- Stands on or below a "bridging" condition (see figure 2) - "Bridging" occurs when grain clumps together, because of moisture or mold, creating an empty space beneath the grain as it is unloaded. If a worker stands on or below the "bridged" grain, it can cause respiration under the worker's weight unexpectedly, thus burying the worker.
- Stands next to an accumulated pile of grain on the side of the bin (see figure 3) - The grain pile can collapse onto the worker unexpectedly or when the worker attempts to dislodge it.

The grain's behavior and weight make it extremely difficult for a worker to get out of the grain without assistance. Tragically, incidents in grain bins often result in multiple fatalities because workers attempt rescue and fail as well. These fatalities are preventable if employers follow work practices and provide training and equipment as required by OSHA's inspection of Grain Handling Facilities standard, 29 CFR 1910.272.

Where Workers Enter Storage Bins, Employers Must:
- De-energize, turn off and disconnect, lock-out and tag, or block off all mechanical, electrical, hydraulic and pneumatic equipment that presents a danger, particularly grain-moving equipment. Grain must not be moved or emptied into or out of the bin.
- Prohibit walking down grain and similar practices where a worker walks on grain to make it flow.
- Prohibit entry onto or below a bridging condition, where grain is built up on the side of the bin.
- Provide each worker entering a bin from a level at or above stored grain, or when a worker will walk or stand on stored grain with a body harness with a lifeline, or a boatman's chair. Ensure that the lifeline is positioned and of sufficient length to prevent a worker from sinking further than waist-deep in grain.
- Provide workers with rescue equipment, such as winch systems that are specifically suited for rescue from the bin (see figure 4).
- Station an observer who is equipped to provide assistance and perform rescue operations outside the bin (see figure 4).
- Ensure that communications (visual, voice or signal line) are maintained between the observer and the workers who entered the bin.
- Test the air within a bin for oxygen content and the presence of hazardous gases before entry.
- Provide and continue ventilation until any unsafe atmospheric conditions are eliminated.
- If toxicity or oxygen deficiency cannot be eliminated, workers must wear appropriate respirators.
- Issue a permit each time a worker enters a bin, unless the employer is present during the entire entry operation. The permit must certify that the above precautions have been implemented before workers enter the bin.

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Additional Guidance
- For additional information on safe work practices in grain handling facilities, please see:
- For additional information on safe work practices in confined spaces, see 29 CFR 1910.146, Permit-Required Confined Spaces.
- For additional information on respirators, see 29 CFR 1910.134, Respiratory Protection.
- For additional information on preparing young workers to work safely, please visit:
  - www.osha.gov/SLTC/teamworkers/index.html, and
  - www.osha.gov/SLTC/youth/agriculture/index.html

This is one in a series of informational fact sheets highlighting OSHA programs, policies or standards. It does not impose any new compliance requirements. For a comprehensive list of compliance requirements of OSHA standards or regulations, refer to Title 29 of the Code of Federal Regulations. This information will be made available to sensory impaired individuals upon request.

For more complete information:
OSHA
Occupational Safety and Health Administration
U.S. Department of Labor
www.osha.gov
(304) 312-9300; toll-free: (877) 889-5627.

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Combustible Dust

Does your company or firm process any of these products or materials in powdered form?

If your company or firm processes any of these products or materials, there is potential for a "Combustible Dust" explosion.

### Agricultural Products
- Egg white
- Milk, powdered
- Milk, nonfat, dry
- Soy flour
- Starch, corn
- Starch, rice
- Starch, wheat
- Sugar
- Sugar, molasses
- Sugar, beet
- Tapioca
- Whey
- Wood flour

### Agricultural Dusts
- Alfalfa
- Apple
- Beets root
- Carageen
- Cottonseed
- Dust, wood
- Dust, corn
- Dust, rice
- Cotton

### Chemical Dyes
- Acid dye
- Anthraquinone
- Acrilic acid
- Calcium acetate
- Calcium stearate
- Carboxy-methyl cellulose
- Dextrin
- Lactose
- Lead stearate
- Maleic cellulose
- Paraffin
- Sodium carbonate
- Sodium stearate
- Sulfur
- Synthetic dyes
- Tarred phenol
- Toluene
- Vinyl benzyl
- Vinyl acetate
- Vinyl chloride
- Vinyl chloroform
- Vinyl cyanide
- Vinyl acetate
- Vinyl chloride

### Wood Dusts
- Acrylic acid
- Acrylonitrile
- Acrylate
- Ethylene
- Propylene

### Dust Control Measures
- The dust collection system (dusts and dust collectors) is designed in a manner (e.g., no leakage) that fugitive dust is not allowed to accumulate in the work area.
- The facility has a housekeeping program with regular cleaning frequencies established for floors and horizontal surfaces, such as dusts, pipes, nooks, and crannies, to minimize dust accumulations within operating areas of the facility.
- The working surfaces are designed in a manner to minimize dust accumulation and facilitate cleaning.

### Ignition Control Measures
- Electrically powered cleaning devices such as vacuum cleaners, and electrical equipment are approved for the hazard classifications of Class I locations.
- The facility has an ignition control program, such as grounding and bonding and other methods, for dissipating any electrostatic charge that could be generated while transporting the dust through the ductwork.
- The facility has a Hot Work permit program.

Areas where smoking is prohibited are posted with "No Smoking" signs.

Dust systems, dust collectors, and dust-handling machinery are bonded and grounded to minimize accumulation of static electrical charge.

### Prevention Measures
- The facility has a Hot Work permit program.

### OSHA

Occupational Safety and Health Administration
U.S. Department of Labor
NGFA and Grain Journal
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