Boot Pits & Other Confined Spaces

Presented By: John Lee, Grain and Feed Association of Illinois
Confined Space Regulation

• 1910.146 is Performance Standard
  • Dictates “How NOT What”

• Specification Standards
  • Dictates “How AND What”
    • 1910.23

• Not Black and White
  • Employers Evaluate Spaces

• Shades of Gray
  • Limited or Restricted Entry/Exit
  • Designed for Continuous Employee Occupancy
# Grain LEP Enforcement Data

## 10 Most Frequently Cited Standards

<table>
<thead>
<tr>
<th>Standard</th>
<th>Code</th>
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</thead>
<tbody>
<tr>
<td>Grain Handling Facilities</td>
<td>§ 1910.272</td>
</tr>
<tr>
<td>Mechanical Power-Transmission Apparatus</td>
<td>§ 1910.219</td>
</tr>
<tr>
<td>Guarding Floor and Wall Openings and Holes</td>
<td>§ 1910.23</td>
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<tr>
<td>Permit-Required Confined Spaces</td>
<td>§ 1910.146</td>
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<tr>
<td>Electrical Safety</td>
<td>§ 1910.305 &amp; 303</td>
</tr>
<tr>
<td>Fixed Ladders</td>
<td>§ 1910.27</td>
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<tr>
<td>Hazard Communication</td>
<td>§ 1910.1200</td>
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<tr>
<td>Respiratory Protection</td>
<td>§ 1910.134</td>
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<tr>
<td>Personal Protective Equipment</td>
<td>§ 1910.132</td>
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</table>
OSHA Must Prove For Any Citation
1910.146

• Exposed employee
• Serious hazard
• Employer had knowledge
• Feasible method to abate the hazard(s)
Local and Regional Enforcement Programs for Grain

**Region V**
(IL, IN, MI, MN, OH, WI)

**Region VI**
(AR, LA, NM, OK, TX)

**Region VII**
(IA, KS, MO, NE)

**Region VIII**
(CO, MT, ND, SD, UT, WY)

**Region X**
(AK, ID, OR, WA)
What We Will Cover

• Background
• Requirements
• Evaluations
• Alternate Procedures
• Reclassification
• Spaces At Grain and Feed Facilities
• Grain Storage Structure Entry
Why did OSHA develop a Confined Space standard?

- 122 confined space accidents each year led to 173 fatalities.
- 60% of the fatalities occurred during rescue attempts.

29 & 37 year old workers died cleaning tanker car. One employee fell in and the other went in to rescue. Both died CO poisoning. 6-24-14
Intended to protect workers from toxic, flammable, explosive, or asphyxiating atmospheres.

Possible engulfment.

Any other recognized serious hazard (example: hazardous energy).

The standard focuses on areas with immediate health or safety risks, denoting them as “Permit Required Confined Space.”
OSHA 1910.146

• 1910.146 is a “horizontal regulation”: in other words, it applies to all industry types.

• 1910.272 is a “vertical regulation”: it applies only to grain handling.

• On April 15, 1993, OSHA's permit-required confined spaces final rule went into effect.

• 1910.146 was amended in 1999.
  • Enhanced employee participation in the employer's permit-required space program
  • Authorized representatives have opportunity to observe any testing or monitoring
  • Strengthening and clarifying the criteria employers must satisfy when preparing for timely rescue of incapacitated permit space entrants
Requirements of 1910.146(c)

• The employer must evaluate spaces
• If employer determines confined spaces present:
  • Post signs identifying spaces
  • Determine if employees will enter
  • Written program needed if entered

Must an employer covered by an industry-specific standard perform the initial workplace evaluation required by 1910.146(c)(1)?
Yes. Employers with spaces covered by a specific industry standard must still determine if they have spaces which would qualify as a permit space not covered by the industry specific standard. Therefore, all employers must do an initial evaluation under 1910.146(c)(1).

Some Hazards and Potential Hazards At Grain and Feed Facility Boot Pits, Tunnels, Dryers, Baghouse etc.

- Machine Guarding
- Carbon Monoxide
- Natural Gas/LP
- Hydrogen Sulfide
- Oxygen Displacement
- Ladders access
- Walking on Conveying Equipment
Evaluating Confined Spaces

Confined spaces have **all three elements:**

1. Large enough for employees to enter and perform certain jobs
2. Limited or restricted means for entry or exit; **and**
3. Not designed for continuous human occupancy

Permit Spaces have at least **one of the following:**

1. Contains or potential to contain hazardous atmosphere;
2. Contains a material that has potential to engulf an entrant;
3. Has walls that converge inward or floors that slope downward and taper into smaller area which could trap or asphyxiate entrant; **and/or**
4. Contains “any other recognized safety hazard”
Is large enough and so configured that an employee can bodily enter and perform assigned work?
Has limited or restricted means for entry or exit?

Yes, ladders equal restricted means of entry or exit
Has limited or restricted means for entry or exit?

No, because they have stairs as access point.
Not designed for continuous human occupancy

Yes. Not designed for continuous occupancy.

Maybe
Is the space designed for continuous occupancy?

• The preamble of the (PRCS) at page 4478 reflects OSHA's position: "OSHA believes that the final rule's definition properly places the focus on the design of the space, which is the key to whether a human can occupy the space under normal operating conditions." If, when the space was originally designed or subsequently redesigned, the designer took into consideration that humans would be entering the space and provided for the human occupancy (such as: provided ventilation, lighting, sufficient room to accomplish the anticipated task, etc.), then the space would be designed for employee occupancy.
Permit-Required Confined Spaces

Confined spaces have all three elements:
1. Large enough for employees to enter and perform certain jobs
2. Limited or restricted means for entry or exit; and
3. Not designed for continuous human occupancy

Permit Spaces have at least one of the following:
1. Contains or potential to contain hazardous atmosphere;
2. Contains a material that has potential to engulf an entrant;
3. Has walls that converge inward or floors that slope downward and taper into smaller area which could trap or asphyxiate entrant; and/or
4. Contains “any other recognized safety hazard”
Contains or potential to contain hazardous atmosphere

Yes, Because of housekeeping, engine exhaust, rust etc.
Contains a material that has potential to engulf an entrant.
Has walls that converge inward or floors that slope downward and taper into smaller area which could trap or asphyxiate entrant
Contains “any other recognized safety hazard”

Yes, unsafe access point & exit onto leg boot

Yes, unguarded conveyor & bad access point
How Would You Evaluate These Tunnels?

1. Large enough for employees to enter and perform certain jobs
2. Limited or restricted means for entry or exit; and
3. Not designed for continuous human occupancy
Can the distance an employee must travel in a space such as a tunnel, to reach a point of safety be a determinant for classifying a space as a confined space?

Yes. The determination would most likely be a function of the time of travel to the point of safety.

Scale Pits

Don’t Forget To Evaluate and Label Scale Pits.
Grain Dryers?
Oh No, I Have Permit Required CS at My Facility
Now You must label each PRCS

• What should Confined Space Sign Say
• "DANGER -- PERMIT-REQUIRED CONFINED SPACE -- AUTHORIZED ENTRANTS ONLY" or using an equally effective means.

• If employees are not to enter and work in permit spaces, employers must take effective measures to prevent them from entering these spaces. If employees are expected to enter permit spaces, the employer must develop a written permit space program and make it available to employees or their representatives.
If employees are not to enter this space lock it out, label and train employees so no one has access and you are done with this Permit Required Confined Space.
Can OSHA cite an employer for not documenting the initial evaluation of the workplace required by paragraph 1910.146(c)(1)?

• The evaluation need not be documented.
• The employer, however, must be able to explain how the evaluation was conducted and describe the results.

Thus, OSHA's citation will be for failure to evaluate as required by the standard, rather than for failure to create a record of the evaluation.

What If I Evaluate the Spaces and Determine They Are NOT Confined Spaces?

How will OSHA address a space that does not satisfy the criteria for a confined space but that potentially contains a hazardous atmosphere?

• Employers must comply with the permissible exposure limits
• Requirements contained in standards (1910.1020) addressing specific toxic substances and air contaminants, to the extent applicable, in all spaces in which employees may be present.
• In addition, the respiratory protection standard, 29 C.F.R. 1910.134, applies where an employee must enter a space in which a hazardous atmosphere may be present and no other specific standard applies.

Atmospheric Hazards

• Oxygen Conc. <19.5% or >23.5% (too much or too little oxygen)
• Flammable gases greater than 10% LEL
• Carbon monoxide >25 ppm
• Hydrogen sulfide >10 ppm
• Exposure to toxins above their P.E.L.
  • Phosphine 0.3 ppm
• Dust obscuring vision to ≤5’
Is There An Easier Way To Comply With 1910.146?

YES

OSHA provides the solution to our problem...kind of....
Alternate Procedures
Boot Pits Monitored For Alternate Procedure Use.

• Various Sizes
• Hazards Potential (Internal/External)
• Housekeeping
• Atmospheric Conditions
• Activity Inside/Outside Pit (within 35’)
• Weather Conditions (Wind Speed/Direction Included)
Standard States...1st Choice Alternate Procedures

• The employer may use **alternate procedures** (c)(5)(i)
  • Need not comply with:
    • Paragraph (d) through (f) [identify (space/purpose), evaluate hazards, develop procedures, and permit]
    • Paragraph (h) through (k) [Duties through rescue/emergency services]
  • Provided that:
    • Only hazard posed is actual or potential atmospheric;
    • Can demonstrate forced air ventilation (if needed) alone maintains safe entry;
    • Develops monitoring and inspection data
    • Entry is not needed to obtain data
    • Cover can safely be removed
  • Atmospheric testing performed is to verify no hazards
  • **Dependent on task involved** (hot work)
Data Required for Alternate Procedures

• The data must demonstrate that there are no non-atmospheric hazards and that the ventilation will keep the air inside the permit space safe for entry. This should include initial data in the form of:
  • **Volume of the space** to be entered;
  • Capacity and configuration of the **ventilation** equipment to be used; (if needed)
  • Identified **atmospheric hazards** and **potential hazards**;
  • The sampling results from routine testing of the space from the time ventilating has begun through final determination of acceptable entry conditions; and
  • Atmospheric **hazards created by work** in the space.
What Should I Test For and How Often?

• O2, flammable gases & vapors, toxic air contaminants

• Most four gas testers will test for:
  • Oxygen
  • Carbon Monoxide
  • Hydrogen Sulfide
  • Combustible LEL

• Alternate entry has no set amount of data you need to gather

• It must be enough to demonstrate that conditions will not change regardless of activity (in and around space)

• OSHA employee told me “at least through the seasons” others have said mountains of data
Atmospheric Monitor

- Is it calibrated?
- Did you bump test? (with equipment requirements)
- What are the numbers telling you about the air quality?
- Never use a monitor that is not functioning properly.
Always test the air at various levels to be sure that the entire space is safe.

Good air near the opening does NOT mean there is good air at the bottom!
What Spaces Can Use Alternate Procedures?

Space must be evaluated according to OSHA's confined space regulation 1910.146(c)(1)

The space must meet the conditions of no standing water, no sludge from decaying grain, and housekeeping is in accordance with OSHA standards for grain handling facilities.

The entry/exit(s) from the space (ladders/stairs non standard) in compliance with OSHA standards?

Machine guarding is in compliance with OSHA standards.

Potential hazards outside of the space, which may contribute to a hazardous atmosphere within the space during entry procedures, must be mitigated or eliminated to the best of the facility's ability?
Why Alternate Procedures?

• Initial Monitoring Recorded on Log for Specific Space (Daily unless changes in activity around space since prior reading)
• Wear Monitor During Entry (continuously monitor)
• No Other Paperwork Needed
• No Observer Needed
• No Rescue Service Needed
• Normally No Other Regulations Are Required Other Than 1910.146
• Basically go into and out of the space as you wish!
1910.146(c)(5)(ii)(C)
Before an employee enters the space, the internal atmosphere shall be tested, with a calibrated direct-reading instrument, for oxygen content, for flammable gases and vapors, and for potential toxic air contaminants, in that order. Any employee who enters the space, or that employee's authorized representative, shall be provided an opportunity to observe the pre-entry testing required by this paragraph.

Maintain records for the life of the space to show ongoing testing of acceptable atmospheric conditions.
Note: This tunnel does not qualify for Alternate Entry Procedures. There is an auger cover off exposing employees to entanglement hazard.
Alternative Entry example
2nd Choice If Space is Permit-Required ..... Reclassify to Non-Permit CS(1910.146(c)(7))

• Reclassifying into non-permit space:
  • Contains no actual or potential atmospheric hazard.
  • All hazards within the space are eliminated without entry.
  • Control of atmospheric hazards through forced air ventilation does not constitute elimination of the hazards.

• Documentation of the basis for determination (air monitoring) shall certify:
  • Date
  • Location of space
  • Signature of person making determination

• Dependent on task involved.
1910.146(c)(7)(iii)
The employer shall document the basis for determining that all hazards in a permit space have been eliminated, through a certification that contains the date, the location of the space, and the signature of the person making the determination. The certification shall be made available to each employee entering the space or to that employee's authorized representative.

Maintain for 1 year.

## Certification of Permit Required Confined Space Reclassification

Confined Space Name: __________________________
Date: ______/____/______
Confined Space Location: ________________________________
Reason for Entry: __________________________________________

Monitor Functioning Properly? ____________________________ Yes  No
Date Monitor Calibrated: ______/____/______

Atmospheric Monitor Readings:

<table>
<thead>
<tr>
<th>Time</th>
<th>Oxygen 19.5-23.5%</th>
<th>LFL &lt;10%</th>
<th>CO &lt;25 ppm</th>
<th>H2S &lt;10 ppm</th>
<th>Signature</th>
</tr>
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</table>

Time Space Was Certified as Reclassified: ______:______ AM PM (circle one)
Time Certification Expires: ______:______ AM PM (circle one)

Signature of Reclassification Entry Supervisor: ________________________________
Signature(s) of Entrant(s): ___________________________________________________

Signature(s) of Entrant(s): ___________________________________________________

Time Space Exited: ______:______ AM PM (circle one)

Cancelling Final Check: (check one)

_______Space has been returned to operating condition
_______Space has not been returned to operating condition

Time Certification Cancelled: ______:______ AM PM (circle one)

Entry Supervisor Signature: _________________________________________________
When and Why Do I Use Reclassification to Declassify a Space from PRCS to Non-Permit Required?

• Only hazard is potential atmospheric hazard
• Lockout/Tagout or other hazard eliminate steps need to be taken for safe entry
• Elimination of hazards can be performed from outside the space
• Performing tasks such as unplugging leg, working on conveying equipment, or cleaning dryer/performing maintenance to dryer (must have double block and bleed).
• Cannot be used for area where hot work or similar tasks are being performed!
If I add permanent fans can I “Reclassify” space forever?
No, Control of atmospheric hazards through forced air ventilation does not constitute elimination of the hazards.
## Alternate Procedures vs. Reclassification

### Alternate Procedures
- Initial Monitoring (documented)
- Continuous Monitoring During Entry
- Still considered PRCS but you have eliminated atmospheric hazards

### Reclassification
- Certification (permit)
  - Shows Atmosphere Is Good
  - Equipment LOTO
  - Elimination of Other Hazards
- Initial Monitoring (documented)
- Permit Cancelling
- Best Practice to Monitor Continuously During Entry
Permit Required Confined Space Entry
(1910.146(d))

• If you cannot reclassify or use alternate entry procedures, then you must do a full blown permit required confined space entry.
  • Complete permit
  • Test and/or monitor space
  • Attendant Needed
  • Rescue Equipment
Grain Storage Structures
And the Confined Space Standard
Is This a 1910.146 Permit Required Confined Space?

1. Large enough for employees to enter and perform certain jobs
2. Limited or restricted means for entry or exit; and
3. Not designed for continuous human occupancy

1. Contains or potential to contain hazardous atmosphere;
2. Contains a material that has potential to engulf an entrant;
3. Has walls that converge inward or floors that slope downward and taper into smaller area which could trap or asphyxiate entrant; and/or
4. Contains “any other recognized safety hazard”
Some companies use 1910.146 rules for Bin Entry. Is that OK?

Yes. However 1910.272 rules take precedence.
If Using 1910.146 to Enter Grain Bins You Better Train Employees to Deal With Atmospheric & Engulfment Hazards
• **Question #1**: Are grain bins required to be labeled as permit-required?
  • **Answer #1**: No

• **Question #2**: Does the Grain Handling Standard, 29 CFR 1910.272, supersede the requirements of 29 CFR 1910.146 with regard to entry into grain bins, silos, tanks, and other grain structures?
  • **Answer #2**: Yes. 1910.272(g) takes precedence over the permit-required confined space standard for the hazards it addresses.
Recommended Practices

• Document space determination for boot pits

• There is not “one size fits all”

• Gather a critical mass of air monitoring data to show there is no potential for a hazardous atmosphere

• Use NGFA’s “Permit Required Confined Space/Boot Pit Evaluation Guide for Grain Elevators” (Sept. 2013)
Conclusion

• Some OSHA Area Offices *automatically* consider boot pits to be permit-required confined spaces because of the *potential* for atmospheric hazard
• No two confined spaces are the same!
• Confined spaces need to be evaluated on their own merit
• Boot pits normally do not possess a hazardous atmosphere
• Bad atmospheres are usually caused from poor housekeeping and/or activities within or outside the space (welding, chemical application, etc.)
• May have hazards associated with entry (ladder not compliant with osha or unguarded equipment)
• If the you determine the space is not PRCS other regulations may apply such as 1910.1020 (Employee Exposure) and 1910.134 (Respiratory).
Thursday Refreshment
Break Sponsors

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