

# GRAIN HANDLING



# OSHA Region VI

- Dallas Regional Office
- Dallas, Ft. Worth
- Corpus, San Antonio, Austin
- El Paso, Lubbock
- Houston South, Houston North
- Louisiana
- Oklahoma
- Arkansas

# Region 6 Emphasis Program

- NAICS Codes
- 311211 Flour and other Grain Milling
- 311212 Rice milling
- 311119 Other animal food mfr. (except slaughtering)
- 311223 Cottonseed oil milling
- 493130 Farm products warehousing & storage
- 424510 Grain & Field Bean merchants/wholesalers
- 422590 Other Farm-Product raw material wholesalers
  
- **Not covering on-farm storage or feed lots**

# What Does OSHA Plan to Do?

- Random list of employers for the Area Office
- Notify targeted facilities by letter with 90 days notice
- Some random comprehensive inspections
- Follow up / Complaints / Referrals / Severe Injuries
- Random list not required for Un-programmed Activity
- **UPAs = Fatality, Fire, Media, Complaint, Follow-up**

# Hazards for OSHA's Attention

- #1 – Housekeeping and Grain Dust
- #2 - Grain Entrapment, Bin Entry: Confined space related injuries and fatalities – 47 fatal and non-fatal cases in 2015; 51% of cases were fatalities related to grain entrapments
- #3 – Falls from elevation, Railcar loading
- #4 - Machine Guarding
- #5 – Struck-by heavy equipment
- #6 – Electrical and Lock Out Energy Control

# OSHA's Grain Handling Law

- Requirements Include:
- Emergency Action Plan & Emergency Escape
- Worker training
- Hot Work permits
- Entry into Bins & Silos
- Contractors
- Housekeeping
- Dust Accumulations & Emissions
- Preventive Maintenance
- Grain Stream Processing Equipment & Dryers
- Bucket Elevators
-

# OSHA's Grain Handling Law

- **Worker Training Requirements**
- **1910.272(e)(1)(ii)** 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.
- Engulfment can occur in:
  - Silos
  - Bins
  - Exterior
  - Confined Space

1910.272(o)(1) - No 2nd Means of Escape from  
Galleries (*Bin Decks*)





# 1910.272(j)(2)(ii) - Grain dust- Housekeeping



# Combustible Dust questions

- Is there a Dust Collector?
- Is the Dust collector inside?
- Do they blow grain dust to clean or vacuum?
- Is the Duct system grounded?
- Is plastic pipe used for the ducts?
- How much dust is there?

# Recent Citation History in Texas

- 5(a)(1) for dust explosion, deflagration and fire resulting from dust collectors, mixers, ductwork, hammer mill, (fuel, spark, and air)
- No explosion venting, automatic shutoff, or path for venting of a fireball.
- Other items –
  - permit-required confined space
  - lockout/tagout
  - unguarded belts
  - pulleys, sprockets
  - dust collection system monitoring required in the grain standard.

# Hot Works

- **1910.272(e)(1)(ii)** Specific procedures and safety practices applicable to their job tasks including hot work procedures
- **1910.272(f)(1)** The employer shall issue a permit for all hot work, with the following exceptions:
- **1910.272(f)(2)** The permit shall certify that the requirements contained in 1910.252(a) have been implemented prior to beginning the hot work operations. The permit shall be kept on file until completion of the hot work operations.
- Welding, Hot works is done on catwalks, rails, bins, grates, and vehicles.

# Belt Operated Manlifts



- **1910.68(c)(1)(ii)(b)**The width of the belt at minimum –
- 12” for travel up to 100 feet,
- 14” for travel up to 150 feet,
- 16” for travel exceeding 150’
  
- **1910.68(c)(3)(i)***Minimum depth of step –*
- 12 inches nor more than 14 inches deep, measured from the belt to the edge of the step or platform.

**1910.68(c)(3)(ii)***Width.* The width of the step or platform shall be not less than the width of the belt to which it is attached

# Belt Operated Manlifts



- **1910.68(c)(3)(v)Surfaces.** The upper or working surfaces of the step shall be of a material having inherent nonslip characteristics (coefficient of friction not less than 0.5) or shall be covered completely by a nonslip tread securely fastened to it

- **1910.68(b)(7)(i)Fixed type.** On the ascending side of the manlift floor openings shall be provided with a bevel guard or cone meeting the following requirements

**1910.68(b)(7)(i)(a)**The cone shall make an angle of not less than 45 deg. with the horizontal. An angle of 60 deg. or greater shall be used where ceiling heights permit.

# Belt Operated Manlifts

- The victim was riding a belt operated manlift as he had done for 32 years at the facility.
  - He fell approximately 80ft. to his death landing on a concrete floor.
  - He used the manlift multiple times daily for reaching work areas on upper and lower levels of the facility.
- 
- RECENT Fatality – Do Not Carry Tools, only pocket tools
  - ANSI Standards

# Vertical Conveyors – Material Lifts

- RECENT Fatality – Lift failed when overloaded with bags of grain
- Operator training and Posted load limits
- Preventive Maintenance
- Enforce the work rules



# Engulfment

- Silos
- Bins
- Exterior
- Confined Space
- The biggest existing hazard now seems to be engulfment hazards
- The little grain facilities are being acquired by bigger companies and are moving way more product than they used to, and the time pressures are greater which leads to shortcuts being taken, with people entering bins with grain in them, often against written company policy but with managers' knowledge.

# Walking the Grain

- Dec 2009 - An employee entered a grain storage bin to dislodge sunflowers that had bridged in the bin. The sunflowers broke loose engulfing the employee resulting in death.

# Bin Entry

- June 2007, an employee was buried from grain that collapsed onto him while in a grain bin.
- April 2006, Employee #1 was entering an elevated grain bin to unclog the chute that went into the cleaner. He was later found in the bottom of the grain bin and was nonresponsive. Emergency services responded, but he could not be revived.

# Fire Fighting

- Fire chief killed, 4 firefighters hurt in Okla. grain elevator blaze
- March 2009
- Hydro Fire Chief, Nolan Schmidt — a father of two and a local mechanic — was one of at least five firefighters who climbed into the mammoth bin half full of soybeans at the Hydro Cooperative. Fellow firefighters later cut through the side of the metal bin to remove Schmidt and four other colleagues, who were overwhelmed by the thick smoke.

# Dryer fire

- Any dryer using an open flame to heat the air poses a constant fire hazard when used to dry any crop.
- Clean the dryer, air ducts, and area around the dryer at least daily.
- Frequently remove the collection of lint on the dryer column and in the plenum chamber, as this material becomes extremely dry and can be ignited during dryer operation



# Fall Protection – Falling Objects

- Ladders – Silos – Holes – Manlifts – Platforms
- Vehicles – Loaders – Machinery – Equipment
- Anything with 4 feet or more elevation
- Falling Object Protection
  - Secure stacks and pallets
  - Toeguards
  - Elevators and bucket maintenance

# Trailers

- Nov 2009
- Decedent was standing on the trailer catwalk facing the rear of the truck waiting to dump a 5 gallon bucket of chopped corn cobs into the trailer tank to clean the tank of mineral residue. The decedent stepped off the catwalk with his left foot into thin air and fell head first to the concrete pavement.

# Railcars

- Jan 2007 Employee was standing on top of railcar loading wheat. When employee finished the task and attempted to close the hatch the wind caught the hatch and slammed it back into the employee knocking him to the ground. Employee was conscious after striking the ground but died enroute to the hospital of a heart attack. The employee was not wearing any type of fall protection at the time of the accident.



# 1910.23(c)(1) - Catwalks



- November 2008
- Patch with duct tape an exterior grain leg
- 4' x 6' platform approximately 140 feet above the ground below.
- Guardrail on work platform gave way,
- 
- Employee was not wearing any fall protection equipment and was pronounced dead at the scene.

## 1910.23(c)(1) - Unguarded Elevator Shaft



# 1910.23(c)(1) - Unguarded Opening



## 1910.23(d)(1)(iii) - No Stair Railings



# 1910.23(d)(1)(ii) - Missing Mid-rail on Stair Railing



## 1910.27(c)(4) - Ladder Rung Clearance



## 1910.27(d)(2) - Landing Platforms

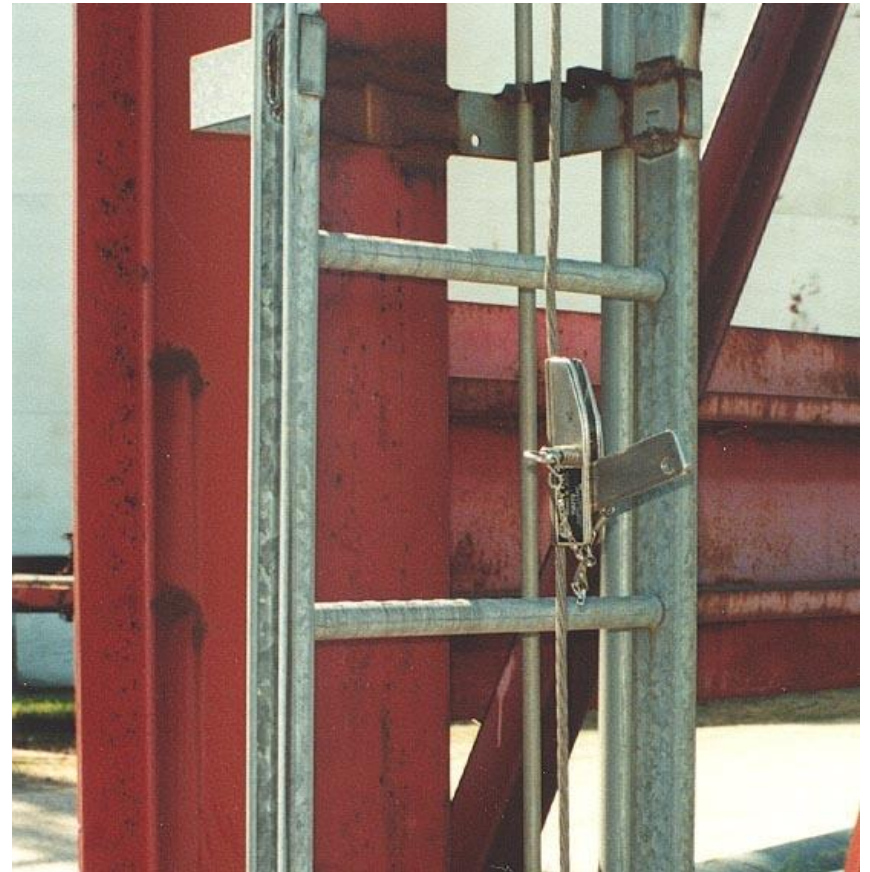


## 1910.27(d)(3) - No Ladder Extensions

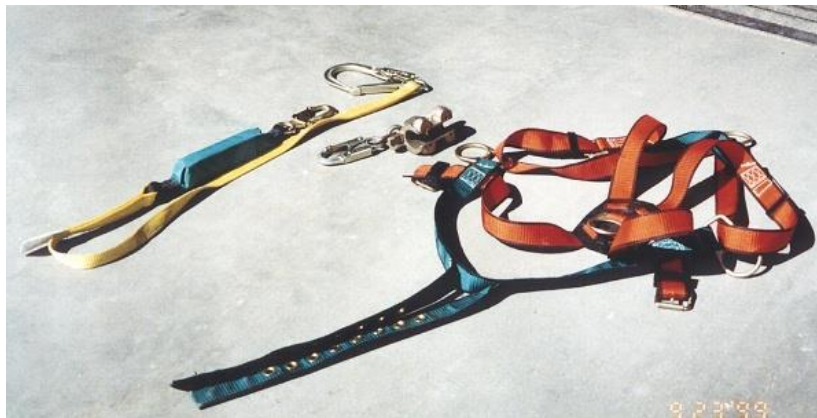
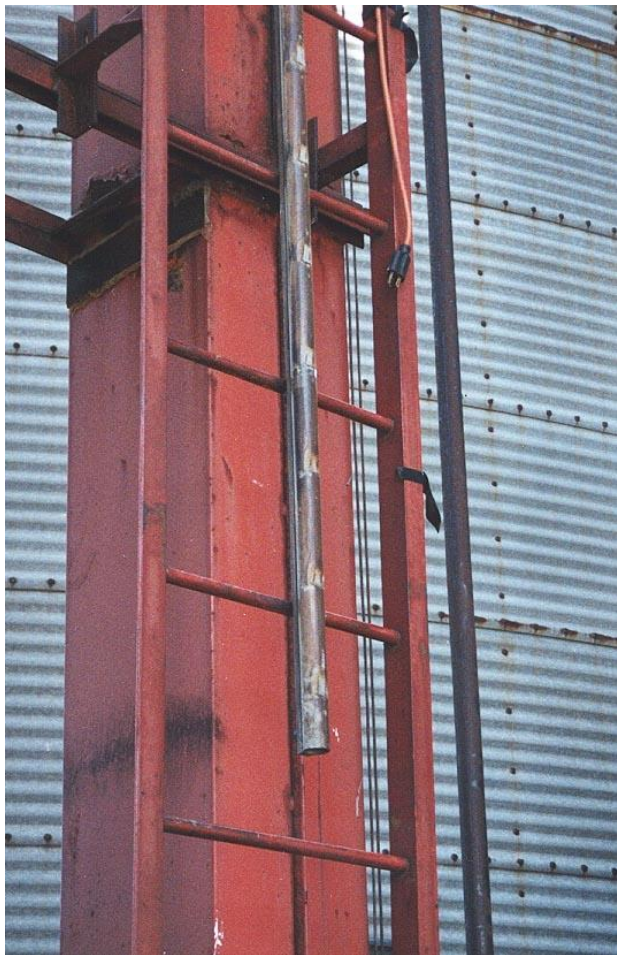




## 1910.27(d)(5) - Ladder Safety Devices



# 1910.27(d)(5) - Ladder Safety Devices



## 1910.27(d)(5) - Cages, Safety Devices, etc...



## 1910.27(f) - Damaged Ladder



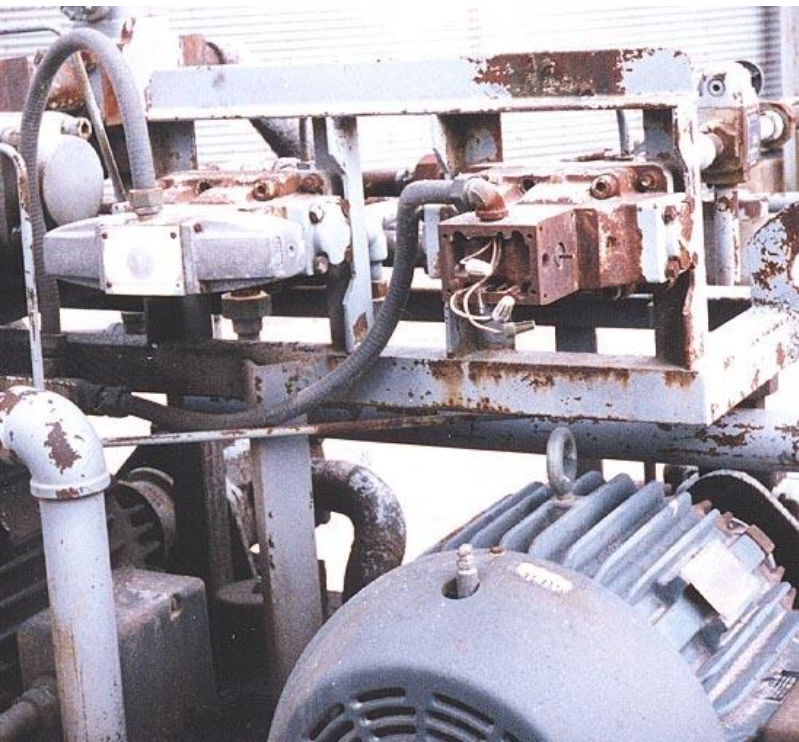
# Electrical Hazards

- Old equipment
- Live parts
- Electrical approved for Class II (Combustible Dust)
- Arc Flash

- 1910.305(b)(2) - Approved covers  
(not secured in place)
- 1910.305(g)(2)(iii) - Cable pulled out of  
strain relief



# 1910.305(b)(2) - Approved covers



1910.305(g)(1)(i) - Approved equipment  
(metal receptacle box)





# 1910.307(b) - Electrical equipment safe for hazardous locations ( Combustible Dust)



1910.303(b)(1) - Damaged insulation  
1910.305(g)(1)(i) - Approved equipment  
(metal receptacle box)



# 1910.305(b)(1) - Closed openings in boxes (knock-outs)

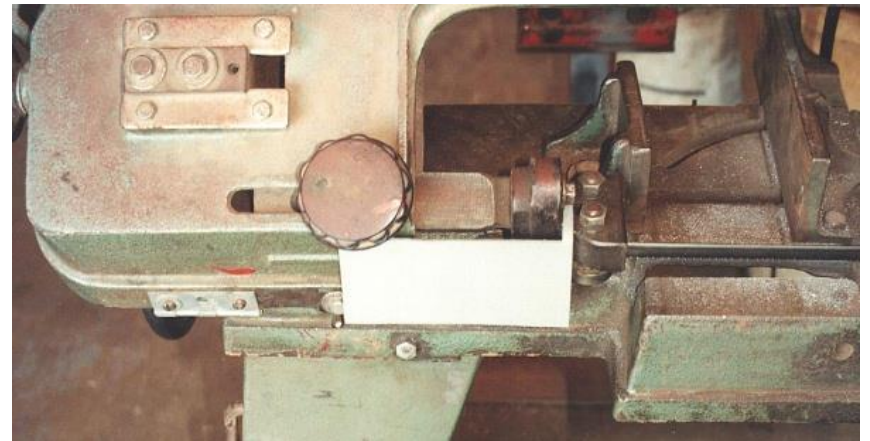


# **GUARDING AND LOCKOUT**

# Lockout

- Written program
- Written procedures for specific equipment
- Documented Training
- Who is designated to lock out
- Are they locking out?
- Look at all augers, conveyors, jam clearing, packaging machines, blenders, gear boxes,

# 1910 212(a)(1) - Unguarded saw blade



## 1910.212(a)(1) - Inadequate guard

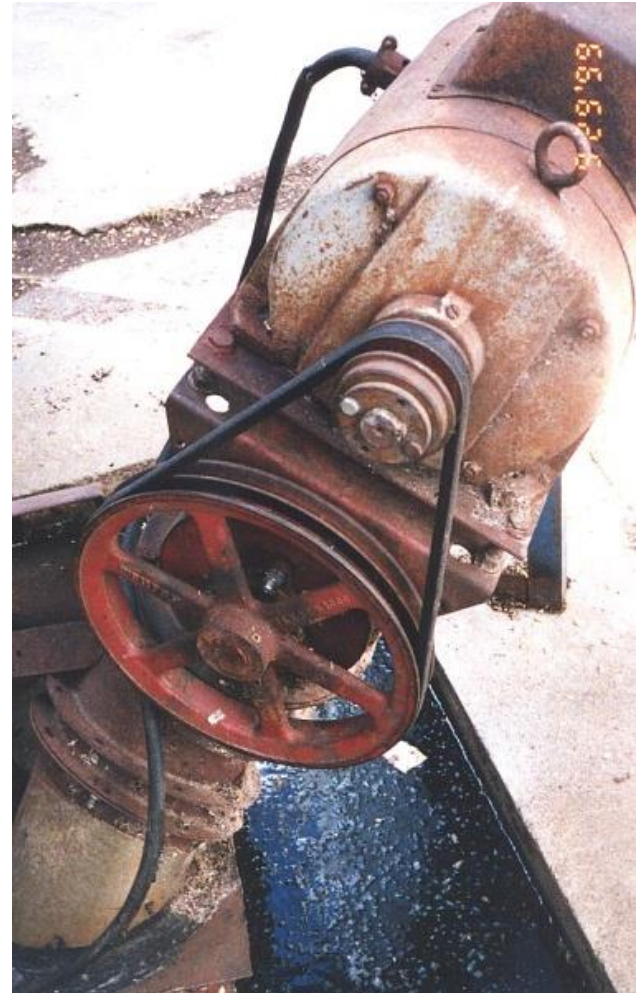
- August 6, 2009, Two (2) employees were attempting to move some railcars to a elevator to start loading. Employee #1 was up on last railcar and was suppose to be braking them and the other employee #2 was using the railcar puller with cable when employee #1 got off moving railcar to disconnect the cable. Employee #1 started back up the ladder to use the brake and as the employee attempted to go back up the ladder, his foot slipped off ladder and was pulled into the moving wheel, Employee sustained severe injuries to his foot

# Augers

- Jan 2008 Employee fell into a moving grain auger.
- Dec 2006 Employee #1 was delivering feed to a farm. He placed the auger from the truck over the bin door to fill the bin. A rope used to open the bin door from the ground broke, and the employee climbed onto the bin to fix the rope. The employee had a remote control that activated the auger in his pocket. As he climbed onto the bin, he contacted the remote control and activated the auger. He became pinned between the auger and the bin and was killed.



# 1910.219(e)(3)(i) - Unguarded belts and pulleys



# 1910.242(b) - Air pressure over 30#



# 1910.219(f)(3) - Unguarded chain and sprocket



## 1910.253(b)(4)(iii) - Separation of Oxy / Fuel Proper & Secured Storage



# OTHER HAZARDS

## 1910.132(a) - P.P.E., Unsanitary condition



# Dump Trucks

- Many semi-truck will bring grain into the elevator.
- When they back up, the driver cannot usually see behind him. A spotter and backup alarms should be used. Good communication is essential between the driver and the spotter.
- PPE – Hi Vis Vests, Hard Hat, constant communication and no vehicle movement without eye contact.

# Fumigants and Pesticides

- What, Where, How long – Post Warning Signs
- Some pesticides (e.g., organophosphates) may produce respiratory center failure
- Others (e.g., chlorinated hydrocarbons, methyl-bromide, and carbondi-sulphide) may cause hemorrhagic pulmonary edema
- Severe incidents of illness with exposure to fumigated agricultural products in railroad cars reported by several states.



# Asbestos

- Many old facilities used asbestos as insulation.
- Is there asbestos at the facility?
- Has there ever been monitoring?

# Respirators

- Respirators – commonly cited by OSHA
- Dust, chemicals, confined space entry
- Medical evaluation
- Fit testing
- Training
- Maintenance and care

# Suffocation Incident

- 2009 - An 17 year old employee was walking the grain while scraping clusters of grain off the inside walls of the silo, the employee was engulfed and suffocated. No fall harness. No Attendant.
- \$1,592,500 OSHA proposed fine

# Drowning

- Jun 2008 An employee was loading a grain barge when he fell overboard and drowned

# Powered Industrial Vehicles

- Certification of training for the operator?
- Document and correct near misses?
- Skid-steer loader that was equipped with a pallet fork attachment. The loader tipped forward, and Employee #1 was caught in between the skid arms and the ground. He was crushed and killed.
- Forklift truck near the city limits when it overturned. His right leg became caught underneath it and had to be surgically amputated below the knee.
- **ROPS and SEATBELTS**

# Recordkeeping – online posting

- 250 or more Ees – Post 300A by July 2017
  - Post all 2017 forms by July 2018
- 20 - 249 Ees – Post 300A by July 2017
  - Post 300A for 2017 due by July 2018
- 20 - 249 Ees – In high risk industries
  - 31....All milling operations
  - 42....Wholesalers
  - 4931...Warehousing

# Recordkeeping – New Rules

- Incentive programs – focus on leading indicators
  - Avoid incentives that may discourage reporting incidents
  - Goal is NOT zero – Goal is report and correct
- Establishment vs. Firm – local establishment ee count
- Drug and Alcohol Testing
  - Not Prohibited
  - Ok to test for cause
  - Ok for state or federal regulations

# Outreach and Cooperative Efforts

- OSHA Stand Up for Grain Handling Safety
- Grain Engulfment Prevention
  
- March 27<sup>th</sup> – 31<sup>st</sup>
- [www.oshastanddown.org](http://www.oshastanddown.org)
  
- Provide a focused training session on topics such as lock-out/tag-out, walk down, fall prevention, permitting, or any other prevention measures



# Questions

- [Perkins.casey@dol.gov](mailto:Perkins.casey@dol.gov)
- OSHA Austin Area Office
- 512-374-0271 x 225
  
- Joann Natarajan – Compliance Assistance Specialist
- X 232
  
- OSHA Consultation – TX Dept. of Insurance
  
- Local Area Offices