**Horizontal Silo Safety in an Agricultural Setting**

[Name of Farm]

**Disclaimer:** The following Horizontal Silo Safety written program is provided only as a template guide to assist employers and employees in creating a safe environment around horizontal silos. It is not intended to supersede the requirements of any OSHA standards. Employers need to review this written template program and make adjustments to it that are specific to their business. An employer will need to add information relevant to their particular facilities in order to develop an effective, comprehensive program. There is no OSHA requirement for a written Horizontal Silo Safety Program. In addition, while not required by OSHA, it is highly recommended that this policy be followed as a best practice that will protect employees from these workplace hazards.

**HORIZONTAL SILO SAFETY WRITTEN PROGRAM**

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

[Insert name of farm]

**I. PURPOSE**

This program will help to identify hazards that can be addressed to reduce the incidence of falling, engulfment, struck-by incidents, equipment rollovers and other hazards surrounding the management of horizontal silos found on the farm. The purpose of this written Horizontal Silo Safety program is to ensure that employers and employees identify hazards and know how to protect themselves from these hazards. The program ensures that:

A. The farm has safety procedures in place for the management of all horizontal silos.

B. All horizontal silos are in good condition and up to recommended specifications.

C. Employees will understand the procedures to be used when working on and around horizontal silos.

D. Identifies by job title who has the responsibility for maintaining the program, developing procedures, inspecting bunker silos, and conduct training, etc.

**Note:** This written program will be available to all employees for review upon their request and will be located in the following area:

**Location:** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ [Location of Horizontal Silos/Bunkers]

**II. AUTHORITY AND REFERENCE**

Occupational Safety and Health Administration (OSHA) General Industry Standards. References ASAE S412.1 Ladders, Cages, Walkways and Stairs.

**III. DEFINITIONS**

Horizontal Silo: Storage system where forage is piled in relatively low, long piles that may or may not be contained by a sidewall. These types of silos might also be called bunk silos, trench silos, pits, drive over piles or stacks.

Facing: Removing the front layer of silage off of horizontal silo face.

**IV. APPLICATION**

This program applies to any horizontal silo which is known to be present in the workplace. Bunker, trench and drive-over pile silos are as common a sight on today’s farms as are upright silos. While some serious hazards associated with upright silos are eliminated (i.e., silo gas), horizontal silos introduce their own set of hazards. Tractor and dump truck overturn hazards are common, falls from bunker sidewalls while covering and uncovering the silage are a risk, and the feedout of silage can result in silage cave-in and engulfment. Workers being struck by equipment can be a hazard. There is an always present the risk of entanglement in rotating machinery parts with when using silage defacers. Hazards and risk have not been are not eliminated just because the upright silo has been replaced with a horizontal storage system. This program will help you to identify the hazards and risks as well as identify methods to control or eliminate the hazards.

**V. RESPONSIBILITY FOR COMPLIANCE**

A. The administration of this program will be the responsibility of

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ .

[person/position designated]

The administrative responsibilities of this individual/position will include:

1. Identification of the employees to be included in the Horizontal Silo Safety program.

2. Inspection and maintenance of all horizontal silos on the farm to identify hazards and risks.

3. Coordination and supervision of employee training.

4. Coordination and supervision of the farm's horizontal silo program.

5. Coordination and supervision of required recordkeeping.

6. Periodic evaluation of the overall program.

B. Employees are responsible for following all safe work practices and using proper precautions required by the guidelines in this program.

**VI. Inspection of Horizontal Silos**

*OSHA has yet to adopt a specific agricultural standard for Horizontal Bunker Silos.*

1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

[person/position designated]

is responsible for inspecting and evaluating the hazards posed by all horizontal silos located on the farm. He/she will provide information to protect employees from coming into contact with hazards created by improperly installed or maintained systems.

1. Inspection shall take place pre-harvest.

2 Cracked sidewalls should be repaired prior to use as these structural elements could fail if left unrepaired.

3. If possible sighting rails should be installed and maintained to give equipment operators a visual clue while backing, unloading, and packing forage into the bunker.

4. Cracked concrete or pavement, or rutted approaches to the bunker, trench or pile site should be repaired before use to maintain traction and stability for trucks and tractors.

B. Evaluate machinery to be used in bunker management and inspect safety features.

1. Rollover Protection Systems.

2. Guarding of PTOs and any other functional components.

3. Seatbelts are available and in good working order.

4. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ [person/position designated]

is responsible for conducting annual inspections of bunker silos and to include new information regarding hazard control as it is received. If new bunker silos are identified on the farm,

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ [person/position designated]

must inspect them and make appropriate changes to control or eliminate hazards.

**VII. OPERATION INSTRUCTIONS – HORIZONTAL SILO MANAGEMENT**

A. Equipment

1. Use only ROPS and seat belt equipped tractors and other equipment to pack forage in bunker, trench and drive over piles.

2. Use low-clearance, wide front-end tractors.

3. Additional tractor weights improve stability.

4. Back the packing tractor up sloped forage surfaces when possible.

5. Front-wheel and front wheel-assist drive tractors provide extra traction and stability for towing and packing.

B. Procedures for “Packing In” Safety

1. Use “progressive wedge” during filling of the silo: the wedge provides a safe slope for the unloading and packing operations. A progressive wedge with a maximum 3 to 1 slope minimizes the risk of roll-over. This results in a rise of 1 foot in every 3 foot of horizontal run. It is also important to maintain the 3 to 1 slope on both sides of drive-over piles.

2. Try to not fill a bunker or trench silo higher than the sides of the retaining wall (recommendation only)

3. Know where other workers are located. Use standard agricultural hand signals for communications.

4. Keep unauthorized personnel and bystanders out of the horizontal silo areas.

5. Using dump trucks for hauling forage to the silo.

a. Have good seat and shoulder belts to protect the operator.

b. Do not back dump trucks onto the silage pile.

c. As the bed is raised for unloading, it is important that the load center of gravity stay between the frame rails of the truck frame. A dump truck becomes less stable as its bed is raised, particularly when the surface is less than perfectly flat, such as it is during unloading operations.

d. A tire rut or depression from a previous load, low tires on one side of the truck, uneven loading of the truck, or even a wind gust increases the risk of a truck tipping over during unloading, especially when two or more of these hazards combine at a single point in time.

6. Covering the forage:

a. If employee is required to stand and/or work on a sidewall in bunker silos and if the sidewall is several feet above the ground, fall protection should be provided.

i. Fall protection standards generally recommend that anytime a worker is on a walking/working surface (horizontal and vertical) with an unprotected side or edge which is 4 feet (1.8 m) or more above a lower level, he or she should be protected from falling by the use of guardrails or other fall protection systems.

C. Procedures for “Feed Out” Safety.

1. Methods to avoid undercutting silage face, creating dangerous overhang:

a. Use of silage defacers, reduces the hazard of undercutting a silage face. A silage defacer consists of a hydraulic powered set of rotating knives mounted in an open framework. The defacer can be mounted on a skid steer, loader, or a material handler’s boom to extend to the top of the silage face for knocking the silage loose at the top of the face.

b. The height of the silage face should not exceed the reach of the unloading equipment.

c. Collapsing silage faces are a particular hazard for a farmer or nutritionist collecting silage samples. When gathering silage for analysis, use a loader bucket to scoop up silage and move it away from the silage face.

d. No one should stand at the silage face if it exceeds their height.

e. Keep people and equipment back from the top edge of the silage face to prevent collapsing it from the top.

f. Know where other workers are located. Use standard agricultural hand signals for communications.

**IX. EMPLOYEE TRAINING**

A. Each employee will attend a Horizontal Silo safety training where they will receive information on the following topics:

1. All horizontal silo operating procedures.

2. Safety issues surrounding bunker silos and what hazards to recognize

3. Equipment safety features and procedures.

All training will be presented to employees in a manner that employees receiving it are capable of understanding (visual and oral presentations). Training presentations will be delivered in the primary language and at the appropriate literacy levels of the workers. During, and at the end of training, an assessment will be made to see that employees understood the training.

B. Upon completion of the training program, each employee will sign a form documenting that he/she has received the training. (See Form #2)

C. Whenever a new employee is transferred or hired, he/she will be provided training regarding horizontal silo safety if it will be part of their assignment. The training session will be conducted by

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[person/position designated]

before the start of his/her employment.

D. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ [person/position designated]

will conduct training on the specific hazards of the job and the appropriate personal protective equipment and safety precautions and procedures.

E. Refresher training will be done by

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[person/position designated]

Refresher training can be delivered for the following circumstances; when job duties change, after an incident, or close call or when supervisor inspections reveal improper procedure. Refresher training will follow the procedures outlined in IX (A-D).

**X. INFORMATION TO CONTRACTORS**

A. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

[person/position designated]

is responsible for providing outside contractors with any and all information regarding horizontal bunker silo and potential hazards.

**XI. PERSONNEL POLICIES**

When an employee is not following safety rules regarding horizontal silo safety, disciplinary action will be taken.

**LIST OF SAMPLE FORMS**

Form 1 HORIZONTAL SILO OPERATIONS SUMMARY

Form 2 EMPLOYEE HORIZONTAL SILO SAFETY TRAINING RECORD

Form 3 HORIZONTAL SILO SAFETY CHECKLIST

Form #1

**HORIZONTAL SILO SAFETY OPERATION ANNUAL PROGRAM SUMMARY**

**Training**

|  |  |  |
| --- | --- | --- |
|  | **Number of Training**  **Courses Presented:** | **Number of Employees Trained:** |
| **New-employee training:** |  |  |
| **Procedure-specific training:** |  |  |
| **New-procedure training:** |  |  |
| **Other training:** |  |  |
| **Total courses/employees** |  |  |

**Horizontal Silos**

|  |  |  |
| --- | --- | --- |
|  | **Horizontal Silos** | **Inspected Pre-harvest** |
| **Previous Total:** |  |  |
| **New This Year:** |  |  |
| **Revised Total:** |  |  |

**The following activities have been completed:**

\_\_\_\_\_ Written program is up to date.

\_\_\_\_\_ Servicing and maintenance protocols are up to date.

\_\_\_\_\_ All training is up to date.

\_\_\_\_\_ All horizontal silos have been inspected

**If any of the above activities are not complete, explain:**

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Completed By: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Form #2 **EMPLOYEE HORIZONTAL SILO SAFETY TRAINING RECORD**

The following employee(s) have completed training in Horizontal Silo Safety. Each trained employee is now knowledgeable in all 3 different training topics covered in the Horizontal Silo Procedures Training.

1. All bunker silo operating procedures.

2. Safety issues surrounding bunker silos and what hazards to recognize

3. Equipment safety features and procedures.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Employee's Name** | **Employee's Signature** | **Date of Training** | **Trainer’s Name** | **Trainer's Signature** |
|  |  |  |  |  |
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Form #3 **Horizontal Bunker Silo Safety Checklist**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | **Horizontal Silo Safety Checklist** | **Yes** | **No** | **N/A** | **Comments** | **Date Improved** |
| 1 | Have all employees been trained on horizontal silo hazards? |  |  |  |  |  |
| 2 | Are silo walls inspected for structural defects prior to filling the silo? |  |  |  |  |  |
| 2 | Are only ROPS and seatbelt equipped tractors and other equipment used for packing silos? |  |  |  |  |  |
| 3 | Is a progressive wedge with 3:1 slope maintained when filling the silo? |  |  |  |  |  |
| 4 | Is silage not packed higher than silo walls? |  |  |  |  |  |
| 5 | Is the face of the silage higher than the reach of the unloading equipment (silage wall is not undercut by unloading equipment)? |  |  |  |  |  |
| 6 | Are personnel kept away from silage faces? |  |  |  |  |  |
| 7 | Is fall protection used when working near edges greater than 4’ in height? |  |  |  |  |  |