Prepare Storage Facilities Prior to Wheat Harvest

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Preparing grain bins and storage facilities prior to wheat harvest is one of several critical steps to help ensure that grain quality is maintained throughout the storage period. If preparation is not completed, the stored commodity has a greater chance to deteriorate more quickly.

After a storage facility is emptied of commodity, steps need to be taken to remove any residual grain and dust. Insects, molds, and fungi can survive on a relatively small quantity of old grain and contaminate the newly harvested grain put into storage. For some insects, it only takes a few kernels to maintain a population until the next harvest.

Before entering a structure to perform cleaning duties, ensure that all energized systems are locked out and tagged out so that someone cannot inadvertently turn on equipment that could cause potential harm to personnel inside (Fig. 1). Make sure that confined space entry permits have been filled out, submitted, and approved before entering a structure (Fig. 2).

Fig. 1.

Fig. 2.

It is also important to determine the air quality in the structure before entering. The use of a gas monitor to test the oxygen level prior to entering is critical (Fig. 3). Moldy grain can produce carbon dioxide and those levels may be too high in a confined area or the carbon dioxide may have displaced oxygen. After determining that the air quality is safe, it is still prudent to use a NIOSH approved respirator to prevent exposure to high levels of dusts or molds (Fig. 4). As always, safety first!

Fig. 3.

Fig. 4.

Removing residual grain and dust can be a tedious process. Grain and dust stuck to the sidewalls should be knocked down and then swept up (Fig. 5). Grain and dust along the base of the walls (Fig. 6), on ledges (Fig. 7), behind ladders, in sumps (Fig. 8), under grates, in sweep auger components (Fig. 9), and around hatch and door openings need to be removed. Whisk brooms, angle brooms, standard brooms, and push brooms can aid in accumulating old product. Explosion proof vacuum cleaners can also be used to remove residual grains and dust.

Fig. 5.

Fig. 6.

Fig. 7.

Fig. 8.

Fig. 9.

After cleaning is completed, application of an insecticide labeled for empty structures can be effective in controlling any lingering insects. It is important to apply these insecticides a couple of weeks before harvest to allow them to act. A list of insecticides approved for empty structure application and perimeter sprays can be found in Oklahoma Cooperative Extension Fact Sheet BAE-1112 (https://extension.okstate.edu/fact-sheets/preparing-grain-bins-and-flat-storages-prior-to-harvest-or-incoming-product-storage.html).

In bins containing perforated floors to accommodate aeration systems, whole and broken kernels, chaff, and dust can accumulate between sections and under the floor (Fig. 10). Occasionally, sections of flooring need to be removed so that the residual grain products can be cleaned from this area.

Fig. 10.

Dispose of all residual grain products off-site to prevent reinfestation from occurring. If the flooring cannot be removed or is too difficult to remove, then a fumigant will need to be used to kill all insect life stages living in residual grain. Special precautions and thorough sealing of the structure are needed when applying fumigants. Make sure your employee is certified to apply a fumigant or hire a reputable company to perform this task.

It is also important to take care of the area outside of the storage facility. Remove all vegetation from around the structure because insects and rodents can harbor in these areas (Fig. 11). It is easier to maintain these areas and remove spilled grain if there is no or limited vegetation. Spilled grain around your facility will attract insects and rodents, so immediate cleanup is necessary (Fig. 12). A few insecticides are labeled for perimeter treatments around structures (see Fact Sheet listed above) and can help limit insects from coming into the facility. Follow all label instructions for correct application. Although the label for perimeter treatments may state to treat a band up to 10 feet, the Oklahoma minimum standards for pesticides restricts application use only up to 3 feet from the structure on a porous substrate such as bare ground, gravel, or turf. Do not use these products on concrete or asphalt around the structure.

Fig. 11.

Fig. 12.

Now that cleaning has been completed, inspect the integrity of your storage facility. Replace missing hardware, and caulk and seal any openings caused by shifting, wear, damage, or rust. These openings may allow insects and/or moisture to enter the structure and cause issues later during the storage period. Limiting access to the stored grain will help maintain it in good condition longer.

Time and effort taken in cleaning and preparing storage structures prior to harvest are important in alleviating potential problems. Grain quality preservation is the end goal and can be achieved if appropriate steps are taken before harvest begins.