A silo fire doesn't have to ruin all stored silage

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Davis Hill (in blue coveralls) at the scene of a silo fire.

(PhysOrg.com) -- Sometimes, when harvest conditions are less than ideal, silage with lower-than-optimum moisture levels is put into a silo, potentially leading to excessive heating and a spontaneous-combustion fire.

When a silo burns, a farm operator can lose a tremendous investment of time and money and can face a huge cost to replace ruined feed, but many silo fires can be managed and the damage and loss minimized, according to an agricultural-emergencies expert in Penn State's College of Agricultural Sciences.

"The goal in managing a fire inside a silo is locating the fire area and controlling that area without affecting the rest of the material," said

Davis Hill, director of the Managing Agricultural Emergencies Program. "Better to lose a few tons than a few hundred tons. This is not an easy task but not an impossible one."

The earlier a fire is detected, the easier it is to control, Hill noted, so it is important to regularly monitor silos for a month after harvest. That is a critical time when natural fermentation and heating is taking place inside the silo.

"A silo fire is usually discovered when someone sees smoke coming from the top of the silo or the smell of something burning is evident," he said. "The initial decisions made can mean the difference between salvaging a viable crop or ruining it. First, farmers should realize that silage does not make a good fuel source. Even silage that is too dry likely is too wet to burn quickly."

A fire inside a stack of silage inside a silo does not have adequate air to burn aggressively, so a farmer should not panic.
"The fire is not going anywhere in a hurry -- you have time to evaluate what you have and develop a plan of attack," Hill said. "The key to controlling a fire in a silo is to remove one of the critical ingredients -- the heat source (burning silage), air or fuel."

In an article posted online at www.farmemergencies.psu.edu/ , Hill offers detailed advice on how to analyze a silo fire and instructions for managing and extinguishing it -- with an eye toward preserving most of the stored silage. This information is listed under the Quick Links section of the Web page.

"The best method for fighting a silo fire is to find the heat source and remove it," Hill explained. "Flooding the silo with water will not achieve this mission. Too often, this is what some fire companies want to do. Never allow a fire company to arbitrarily flood a burning silo with water

as its first extinguishing strategy."

All that will do, Hill warned, is ruin the good feed that is not involved with the fire and add more areas where additional heating will occur, possibly causing more fires in other locations in the silo. "The more water that is put on the silage, the harder it will become to unload the silage with the silo unloader. Wet silage does not unload well through silo unloaders."

Locating hotter areas requires using some sort of instrumentation, Hill pointed out. An infrared heat gun can be effective at helping to locate areas on the outside of the silo that are warmer than other areas. The heat generated by a fire will transfer outward, so chances are the blocks will absorb the heat and will be warmer than blocks that are farther away from the fire source. Infrared heat guns can be effective at locating changes in temperature.

Most fire companies now have thermal imaging cameras, according to Hill. These devices can be very effective at locating hot spots in a silo. "These tools are much more sophisticated than the infrared thermometers and are quite accurate from considerable distances," he said. "Calling the fire company to help size up the silo is a legitimate use of local resources."

Prevention is the key to avoiding silo fires, Hill said. He stressed that forage should be chopped at the correct moisture level for the structure in which it will be stored. "Consider adding water if the material is too dry," he said. "Commercial additives are available that will keep the heating under control as well.

"Make sure your silo is checked on a regular basis for cracks in the walls and around doors. Silos should be resealed on the inside periodically to prevent the silage acids from deteriorating the concrete and creating

holes to be penetrated by air and moisture."

Silos that are no longer in use should be empty, Hill said. Many silo fires occur in abandoned silos with old silage in them.
"The material dries out and becomes a haven for rodents that burrow through the silage material," he said. "These burrows serve as air shafts throughout the silo. With changing humidity, more heating will take place, causing potential fire conditions."

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