Flowing Grain is a Killer
by Bob Aheirn, PhD, U of IL, and Advisor to GPCAH

Flowing grain can kill, and it can kill quickly. It takes less than five seconds for a person caught in flowing grain to be trapped. This past fall harvest will present enhanced risk with high moisture grain coming out of storage this spring. In recent years the Midwest states, where the largest percentage of on-farm grain storage exists, have averaged 17 food products and grain suffocation related deaths per year (14 in GPCAH states). The number could be much higher this year with the enhanced risk.

Flowing grain in a storage bin or gravity-flow wagon is like quicksand, it can immobilize a person almost instantly, and a person can become totally submerged in flowing grain in 20 seconds or less. To prevent grain bin suffocations, it’s necessary to understand the risks and follow the appropriate steps to avoid becoming a victim. Simply “being aware” will not prevent tragedy. The following are recommendations based on research in Illinois and other states.

Even when grain is not flowing, a person can still suffocate, especially when grain is in poor condition. Moldy or wet grain often clumps or bridges together in the upper layers. As the grain is unloaded from the bottom, a large air pocket may form below the surface. A person who walks over the crusted surface can easily break through and be buried alive under thousands of pounds of grain.

A long wooden pole can be used to test for and break up bridges of grain from above, outside the bin.

Work with at least one helper if you need to go into a grain bin; bins are “confined spaces” that require special procedures for safe entry. These procedures include the use of secured lifeline to prevent a worker from being pulled under flowing grain or falling through a crust that formed in the top layers of grain. The lifeline needs to be attached to a harness strapped around the person’s torso. The helper or observer should have a cell phone or other communication means to allow them to quickly summon local rescue personnel if needed.

Before entering a bin, turn off all unloading equipment and use a padlock to lock out switches so they can’t be activated accidentally. This includes sweep augers and augers on automatic unloading circuits.

Director’s Message
by Fred Gerr, MD

As you may have heard, I was appointed to be the new director of the Great Plains Center for Agricultural Health following the departure of the previous director, Wayne Sanderson. Those of you who know Wayne know that his shoes will be hard to fill. Fortunately, the Center and the larger agricultural health and safety community include many people with impressive expertise and a deep commitment to protecting the safety and health of agricultural workers, members of their families, and rural community residents.

Many of you don’t know me so I thought I might introduce myself. I have been a member of the faculty at the University of Iowa for almost eight years. I am a practicing medical doctor at the University of Iowa Hospitals and Clinics and have a background in occupational medicine and internal medicine. For the past twenty-five years, I have focused my professional attention exclusively on the prevention and treatment of work-related illness and injury. Although my work has not been solely devoted to agricultural health, for decades I have treated patients with pesticide poisoning and have engaged in research on the ways that pesticides can harm the brain and nerves. I have also been involved in efforts to prevent painful conditions of the back, neck, and arms so common among workers in many industries, including agriculture.
If someone on your farm has become totally engulfed in grain, shut off power to unloading equipment immediately. Then turn on the aeration fan and call your local rescue squad. The best way to rescue a completely submerged victim is to rapidly remove the grain by cutting open the bin with special rescue tools.

If a person is partially submerged in grain, the observer or first person on the scene should not attempt to enter the bin, and only allow trained rescue personnel to attempt the rescue. Grain will typically be bridged up around and above the person. To protect the person from the grain avalanching down on them, a dam or barrier needs to be placed near and around their body. Rescue workers can often set up rigging that will allow them to reach the victim by entering from the top of the bin. The goal should be to protect and secure the victim so the grain can be moved away from the person to safely extricate them.

First and foremost, take every step possible to manage stored grain to prevent problems that might increase the need to enter the bin. Grain quality management begins at harvest but includes close monitoring and supervision throughout the storage period. It is important to take the appropriate steps to manage risks associated with grain storage to protect the most valuable resource you have on a farm...those who live and work on it.
Eleven proposals were submitted to the Great Plains Center for Agricultural Health (GPCAH) for FY 2010 pilot/feasibility project funding that began in October. The chosen projects listed below represent an investment of the entire budget allocation to GPCAH by NIOSH for pilot/feasibility projects. Details about the GPCAH pilot/feasibility project program can be accessed at www.public-health.uiowa.edu/GPCAH.

Reminder - the request for FY2011 proposals is due March 31, 2010.

Individual Variation in Paraoxonase 1 Activity in Human Serum Over Time (University of Iowa, Human Toxicology - Laura Badtke) Paraoxonase 1 (PON1) is a serum glycoprotein capable of hydrolyzing many pesticides. Genetic and environmental factors influence PON1 levels, leading to a substantial variation in PON1 among individuals within a population. The hypothesis is that individual serum PON1 levels vary significantly over time due to changes in lifestyle, dietary, and occupational exposure factors. By using three serum samples taken since 1994 (roughly every 5 years) from 256 participants as part of the Keokuk County Rural Health Study, we will determine the genotypes represented and PON1 activities at those three time points. These results will help to counsel rural populations in identifying lifestyle and dietary changes that could limit adverse health effects and decrease chronic illness related to environmental exposures.

Improving Agricultural Environmental Health Literacy (AgriWellness, Inc. - Mike Rosmann) Among the biggest challenges facing agricultural environmental health are limited understanding of environmental health concepts and issues among the public, health professionals and policy makers, along with inadequate community capacity to address agricultural environmental health concerns. This project will carry out pilot work to link a nonprofit healthcare organization, two colleges of public health, educators and concerned citizens in a western Iowa agricultural county to address emerging agricultural environmental health concerns. During this pilot phase investigators will conduct focus group forums, establish cooperative agreements, collect initial study data on health literacy, public health variables, air and water quality, and complete two research proposals to carry out the follow-up work to enhance health literacy and to build capacity to address identified environmental health concerns.

Neurobehavioral Effects of Organic Solvent Exposure among Farmers (University of Iowa, Epidemiology - Sara Starks) The widespread use of organic solvents in agricultural products and processes results in substantial risk of exposure to farmers and farm workers. To better estimate effects of solvent exposure on the central nervous system (CNS), we propose analyses of data from an epidemiological study of 701 farmers from Iowa and North Carolina from whom information about solvent exposure and measures of CNS function were obtained. The primary aims of the study are 1) to characterize occupational solvent exposures among farmers and 2) to model exposure-effect associations between estimates of cumulative lifetime organic solvent exposure and neurobehavioral measures of CNS function while controlling for relevant covariates.

For more information on the GPCAH Feasibility Projects for 2010, or information on the 2011 Pilot Research Proposals contact Murray Madsen at murray-madsen@uiowa.edu or 319/335-4481 or visit the GPCAH website at www.public-health.uiowa.edu/GPCAH.
Fatal Grain Bin Engulfment Incidents in Press Clippings, GPCA 9-States, 2007 to Date
(Source: GPCA FAIMS – Farm and Agricultural Injury Monitoring Services)
Contact murray-madsen@uiowa.edu or 319/335-4481 for additional information

2010
JAN MN Age 55 Working with vacuum conveyor inside grain bin which held wet corn with frozen crust
JAN IL Age 22 Engulfed working with 2 co-workers moving corn with auger inside grain bin

2009
JAN MO Age 84 Covered to neck after falling from top of silo into soybeans while unloading it
FEB SD Age 23 Fell through surface of corn in grain bin while working to empty it
MAR IA Age 70 Climbed into grain bin and was engulfed in soybeans flowing from bin into bottom auger
APR IA Age 60 Engulfed inside grain bin that was being unloaded
JUL MN Age 13 Engulfed under corn in a grain bin being emptied
AUG MO Age 61 Engulfed in corn attempting to remove crusted layer in grain bin
SEP MN Age 75 Engulfed by corn inside bin attempting to clear a blockage as the bin was being emptied
SEP IA Age 54 Engulfed in grain bin of corn as it was being emptied at co-op elevator
NOV MN Age 75 Engulfed by corn inside grain bin
NOV KS Age 59 Employee engulfed in milo at co-op elevator
DEC SD Age 52 Trying to free sunflowers stuck to silo wall when covered by shifting grain

2008
APR NE Age 43 Engulfed in corn inside grain bin
JUN ND Age 66 Engulfed while using grain vacuum to free stuck auger in partially full bin of corn
NOV MN Age 63 Engulfed in bin half full of shelled corn
DEC ND Age 45 Engulfed in corn while working inside bin as it was being filled

2007
FEB WI Age 63 Engulfed in corn inside bin while investigating unspecified problem
FEB KS Age 66 Engulfed in soybeans inside bin while breaking crust to maintain flow to unloading auger
FEB MO Age 28.30 Engulfed in grain while breaking clods to allow flow through ground level grate
MAY NE Age 34 Engulfed in grain at grain storage facility on farm
AUG MN Age 20 Trapped in a grain bin
SEP NE Age 66 Engulfed by corn in bin while unloading bin into semi-trailer
OCT ND Age 51 Engulfed removing canola that had caked to inside of bin

* For the period 2004-8, the 9-state GPCA region averaged 14 fatal occupational injuries from engulfments in food products and crops according to The US Bureau of Labor Statistics Census of Fatal Occupational Injuries.