Biological Systems Engineering

Engineering Update **Fall 2009**

Engineering Update: ASABE Blue Ribbon Winner!

In this issue…

BSE is located in Seitz

Engineering Update

Biological Systems Engineering
September 2009

Virginia Tech *Invent the Future*

To: Extension Unit Directors, Extension District Directors, Extension Program Leaders, and ANR Agents

Dear Co-Workers: Engineering Update is a joint effort of Biological Systems Engineering and other interested parties. Subject matter areas include timely information on water quality, natural resource management, TMDL, air emissions, animal waste management, machinery management, precision farming, application technology, farm safety, energy, engineering education, and technology. Please use this information in your on-going Extension programs and circulate to all Extension staff and interested parties. Engineering Update is electronically accessible at: (http://intra.ext.vt.edu/anr/bse/index.html).

VirginiaTech *Invent the Future*

Virginia Cooperative Extension
A partnership of Virginia Tech and Virginia State University www.ext.vt.edu

VSU Virginia State

Virginia Master Well Owner Network In-service Training

A Virginia Master Well Owner Network (VMWON) agent in-service training workshop is scheduled for Oct. 27 and 28 at the Virginia Cooperative Extension Southwest District Office in Abingdon.

ANR and FCS agents are encouraged to attend.

Topics to be covered:

- √ Groundwater in Virginia
- √ Breakout sessions:
  1. Groundwater Models
  2. Strategies for Outreach
  3. Resources for Underserved and Low-income Persons
- √ Proper Well Construction and Management
- √ Springs and Cisterns
- √ Wellhead Protection and Land use Impacts
- √ Water Testing and Interpretation
- √ How to Conduct a Drinking Water Clinic
- √ Facilitating Participation of Underserved Populations
- √ Solving Water Problems
- √ Working with Volunteers

Guest speakers will be local experts in the drilling and water treatment industries, representatives of state agencies, and extension specialists.

The session format will include power point presentations, use of physical groundwater models, and group problem-solving activities. Once agents complete the training workshop, they are encouraged to work with the Virginia Household Water Quality Program to conduct a drinking water clinic for homeowners in their county.

Please contact Erin James to register for the training workshop in Abingdon at 540-231-9058 or ejames@vt.edu. ***Space is limited.***

PLANS

Building and facility plans are now available for download from the VCE Intranet. Plans are categorized under five main categories: Forage Storage and Feeding, Grain Handling and Feeding, Beef, Horse, and Sheep. You will need Adobe Acrobat to download these files. Please visit: ***http://www.ext.vt.edu/vce/anr/bse/index.html***

Understanding the 25x'25 Energy Initiative

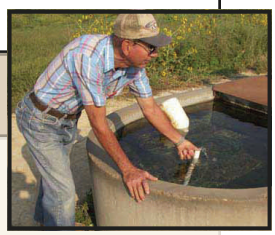
Recent Web Meeting on National Renewable Energy Initiative: *Recording Available Online*

Virginia Cooperative Extension, in collaboration with other organizations, held a webinar on August 5, 2009 titled ***Understanding the 25x'25 Initiative: Exploring Opportunities for Virginia.*** This web meeting event served to educate participants on a renewable energy initiative which seeks to source 25 percent of our nation's energy from renewable sources by the year 2025.

Representatives from Virginia Cooperative Extension, Chesapeake Bay Foundation, 25x'25 Alliance, San Joaquin Valley Clean Energy Organization, James Madison University and the Virginia Department of Forestry presented information on this and similar renewable energy programs underway in our region. Eighty- seven people registered for this event with participation from individual farmers, interested citizens, various environmental groups, state agencies and universities, businesses, and other sectors. Approximately, 60 percent of registered participants participated in the live session and we anticipate many more accessing the archived version available at Virginia Cooperative Extension's Agricultural Byproduct Utilization website (www.bse.vt.edu/green). One hundred percent of surveyed participants indicated that they had learned more about renewable energy initiatives in Virginia via this brief web meeting session.

Please contact John Ignosh (jignosh@vt.edu) for more information.

Solar Water Pumps for Livestock



Solar water pumps can provide water for livestock in remote areas where it would be expensive to run electrical lines. Increasing electrical rates may make solar pumps more practical even where electricity is available.

Determining the water requirements for the livestock you are watering is the first step in planning a system. After determining the amount of water needed, you will need to determine length of pipe needed and the size needed. The diameter of pipe needed is determined by the length and the amount of water that will be pumped through it.

The volume of water in gallons per minute (gpm) plus the pressure drop through the supply lines, pressure needed at the waterers and the elevation differences between the water supply and the highest waterer will determine the pump size.

Most solar pumps are low volume (2-5 gpm) and pumps operate on 12 or 24 volts with 3 to 4 amps of direct current. One horsepower equals 746 watts at 100 percent efficiency so these are low power. The solar array is sized for the capacity of watts needed. They should be sized for 25 percent more amp capacity than the pump requires.

The following are some good resources on solar water pumping:

Solar Powered Livestock Watering Systems, University of Tennessee: http://www.utextension.utk.edu/publications/pbfiles/pb1640.pdf

Pumping Water from Remote Locations for Livestock Watering, Virginia Cooperative Extension: http://pubs.ext.vt.edu/442-755

Selection of Alternative Watering Systems, University of Tennessee: http://www.utextension.utk.edu/publications/pbfiles/PB1641.pdf

Waterers and Watering Systems, Kansas State University: http://www.oznet.ksu.edu/library/lvstk2/S147.pdf

What about Radiant Barriers?

Reflective insulation systems are made from aluminum foils with a variety of backings such as roof sheathing, kraft paper, plastic film, cardboard, etc. The resistance to heat flow depends on the direction of heat flow. With this type of insulation most effective reduction occurs with downward heat flow. Reflective systems are usually located between roof rafters, floor joists, or wall studs. Reflective insulation placed in walls or on the attic floor must be perforated to allow water vapor to pass through it.

If a single reflective surface is used alone and faces an open space, such as an attic, it is called a radiant barrier (sometimes called radiant heat barrier). Some radiant barriers have a reflective surface on both sides so either side can face the open air space. Properties to look for are high reflectivity and very low emittance (the energy radiated from the material's surface), which enable it to reflect radiant heat energy while giving off (emit) very little.

Radiant barriers are most effective in blocking summer radiant heat gain, while saving air-conditioning costs. Although the radiant barrier may be somewhat effective in retaining heat within a cold-climate home, it may also block any winter radiant heat gain in the attic.

What is radiant heat transfer and why are radiant barriers effective?

Radiant heat transfer occurs when electromagnetic waves travel in a straight line through a vacuum or air between surfaces that are at different temperatures, heating any object in its path. The earth receives all its solar heat through radiation. Dark, rough surfaces will generally absorb radiant heat and become warm, while smooth, shiny surfaces will reflect the radiation. This is why radiant heat transfer can be limited by the use of radiant barriers, which have shiny foil surfaces.

Will I still need insulation if I use a radiant barrier?

Due to the way heat is transferred, you still need insulation. The amount of thermal insulation affects the potential radiant barrier energy savings. For example, installing a radiant barrier in an attic that already has high levels of insulation (R-30 or above) would result in much lower energy savings than in an attic insulated at a low level (R-11 or less).

Conventional types of insulation consist of fibers or cells that trap air or contain a gas to retard heat conduction. These types of insulation reduce conductive, convective, and radiant heat transfer at a rate determined by their R-value. Radiant barriers reduce only radiant heat transfer. There is no current method for assigning an R-value to radiant barriers.

What is the effect of radiant barriers on heating and cooling bills?

According to the DOE, your savings on heating and cooling bills will vary depending on a number of factors. These factors include: type of radiant barrier application, size of your house, whether your home is a ranch style or a two story house, amount of insulation in the attic, effectiveness of attic ventilation, color of the roof, thermostat settings, tightness of the building envelope, actual weather conditions, efficiency of the heating and cooling equipment, and fuel prices. Their document, *Radiant Barrier Attic Fact Sheet*, shows how to calculate the economics of radiant barriers and added ceiling insulation. The document includes an Energy Savings Worksheet with an example. The worksheet is part of the fact sheet and can be found at http://www.ornl.gov/sci/roofs+walls/radiant/rb_05.html

How are radiant barriers installed?

A radiant heat barrier must have an air space next to a reflective side to be effective. If you do not allow for this air space, the radiant barrier acts as a conductor and just passes the heat along from a hot surface to a cooler surface. Therefore, if the material you purchase is reflective on only one side (has only one "shiny side"), this side should be facing the air space. It can not be sandwiched between two materials, as the air space is critical to its performance. They should also be installed to prevent dust build-up as dust and dirt will decrease their effectiveness.

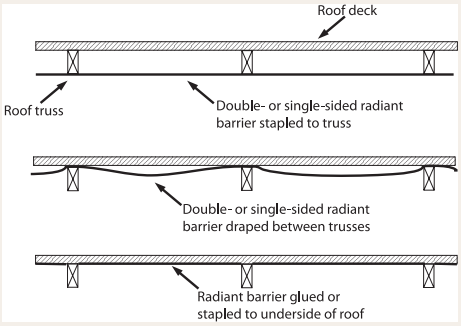


Figure 1. Attaching radiant barriers

Several methods for installing radiant barriers in new construction include (Figure 1):

(Continued on page 5)

What about Radiant Barriers?

(Continued from page 4)

√ Attached to either the faces or bottoms of the rafters or top chords of the roof trusses (this method can also be used in existing homes).

√ Draped over the rafters or trusses in a way that allows the product to droop (i.e. hang loosely) 1½ to 3 inches between each rafter.

√ Attached to the underside of the roof deck (sheathing) with the foil side facing the air space or attic space.

Installation methods differ depending on the individual home, with issues such as dust and/or possible moisture accumulation, locations of bathroom/kitchen vents and recessed lights, safety, visibility of roof components, attic accessibility, etc. You will have to do further research to determine the best option for your home.

References and Resources

√ University of Florida. 2009. *Energy Efficient Building Construction in Florida.* Florida Cooperative Extension Service, Institute of Food and Agricultural Sciences, Gainesville, FL. SP 267.

√ U.S. Department of Energy. *Revised June 2001. Radiant Barrier Attic Fact Sheet*. http://www.ornl.gov/sci/roofs+walls/radiant/rb_05.html

(R. Grisso)

Holiday Safety

The holidays are a time for brightly colored lights inside and out, and neatly wrapped packages under the Christmas tree. But improper care, use and disposal of these holiday trappings, including the Christmas tree, can ruin the holiday season.

To help ensure happy holiday memories, use proper fire-safety precautions this holiday season:

√ Keep your Christmas tree watered and away from heat sources.

√ Inspect lights for frayed wire, broken plugs and sockets, and avoid overloading electrical cords that could deteriorate and cause a fire.

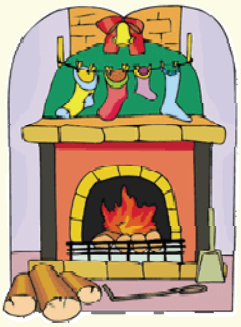
√ Use only non-combustible decorations.

√ Turn tree lights off when the tree is unattended.

√ Remove your Christmas tree soon after the holidays and dispose of it properly.

√ Consider community tree recycling projects. Possible uses of Christmas trees include mulching and underwater structure for improved fish habitat.

√ Dispose of wrapping paper, boxes and other Christmas waste properly. Recycle these materials where practical.



Fireplaces

√ Before lighting any fire, remove all greens, boughs, papers, and other decorations from fireplace area. Check to see that the flue is open.

√ Use care with "fire salts," which produce colored flames when thrown on wood fires. They contain heavy metals that can cause intense gastrointestinal irritation and vomiting if eaten.

√ Do not burn wrapping papers in the fireplace. A flash fire may result as wrappings ignite suddenly and burn intensely.

Toys and Ornament

√ Purchase appropriate toys for the appropriate age. Some toys designed for older children might be dangerous for younger children.

√ Electric toys should be UL/FM approved.

√ Toys with sharp points, sharp edges, strings, cords, or parts small enough to be swallowed should not be given to small children.

√ Place older ornaments and decorations that might be painted with lead paint out of the reach of small children and pets.

Security

√ Use your home burglar alarm system.

√ If you plan to travel for the holidays don't discuss your plans with strangers.

√ Have a trusted friend or neighbor to keep an eye on your home.

Automated Grain-Monitoring Systems

Automated grain-monitoring systems reduce drying costs and storage risks. They take the guesswork out of managing stored grain. Companies offering automated systems say the systems can reduce drying costs, lower the risk of grain going out of condition, minimize shrink and prevent spoilage. Since the systems are automated, they reduce the labor normally required to manage natural air drying and storage.

Reducing risk was at the top of the list for most farmers when they installed automated control and monitoring systems.

The longer stored grain is kept, the more you earn from storage. The large on-farm bins will require a monitoring system. You will have to have a monitoring system for risk management.

By some estimates, less than 5% of on-farm grain storage has a fixed monitoring and control system in place.

Automated system basics

Although automated grain management systems differ in many respects, they have several elements in common. Most systems hang multiple temperature and/or moisture sensors in the bin. Data from the sensors are funneled to a computerized controller installed on the outside of the bin. The controller uses a set of operating instructions built into its software (an algorithm) to evaluate internal bin conditions, as well as temperature and humidity data from an on-site weather station, to control fans and supplemental heat, if available.

Most systems also are able to transmit and store in-bin temperature and/or moisture and other data for viewing on an office computer or cellphone. The systems also make it possible to change operating instructions to the controller from off-site locations. Most companies also offer basic systems that centralize control and monitoring functions at the bin site.

The systems differ in several respects. Some systems use digital sensors, which they claim are more accurate than analog sensors and allow virtually unlimited numbers of sensors to be chained on a two-wire feed. Some systems use traditional analog thermocouples in their system. This limits the number of sensors that can be deployed, although sensor numbers are sufficient to effectively monitor grain drying and long-term storage.

Below is a comparisons of three commercial automated grain-monitoring systems:

AgriDry Bullseye Bin Monitor

The Bullseye Bin Monitor from AgriDry uses in-bin temperature data from up to 24 sensors, as well as temperature and humidity data from an on-site weather station, to control fans for natural air and heat-supplemented drying, as well as long-term storage.

A typical system uses four thermocouple cables, each with six thermocouples spaced every 3 to 6 ft (depending on bin height). Three of the thermocouple cables are placed around the bin perimeter, and the fourth is in the center. The company recommends a single six-thermocouple cable when using the company's grain spreader, which distributes fines and helps assure more uniform airflow through the grain mass.

The first cable includes a thermocouple placed 4 in. from the floor. The grain mass temperature is compared to outside ambient temperature to determine whether the fan should be run or whether supplemental heat is needed.

Data from the controller at each bin are transferred for viewing by computer by either of two methods, depending on which option the customer chooses. The first pathway uses 900-MHz radios, which can transmit data up to 40 miles, depending on antenna height, terrain and other factors. This allows the operator to use a home computer to monitor and control multiple bins on multiple sites. The operator also can view data collected on the office computer from computers at other locations by using remote access software.

The system also can be controlled and monitored from the bin site by plugging a laptop computer into the controller or via a built-in screen on the controller. The second pathway uses a satellite modem to transfer data to Pioneer's MarketPoint Web site, as well as an AgriDry Web site.

The retail price for hardware for a one-cable, six-sensor system, including a satellite modem, is about $3,600, plus installation, without the Pioneer discount. Many systems are self-installed.

Visit www.agridryllc.com or www.freeproductinfo.net/fin

IntegrisPro

The IntegrisPro from Integris can monitor information from a virtually unlimited number of digital sensors. Typically, the controller for a 48-ft-dia. bin would capture data from 60 temperature sensors arrayed along six cables. In addition, it would collect data from a humidity sensor at the top of the bin; temperature, pressure and humidity sensors in the fan plenum; and temperature and humidity sensors from an on-site weather station. All the data are fed into an aeration algorithm to automatically control fans for natural air and heat-supplemented drying and long-term storage.

Using digital sensors are more cost-effective than analog systems. The system's digital temperature sensors are fed into a reinforced plastic housing, which allows them to be removed from inside the housing, serviced and replaced even when a bin is full. A farmer can service it himself.

(Continued on page 7)

Automated Grain-Monitoring Systems *(cont')*

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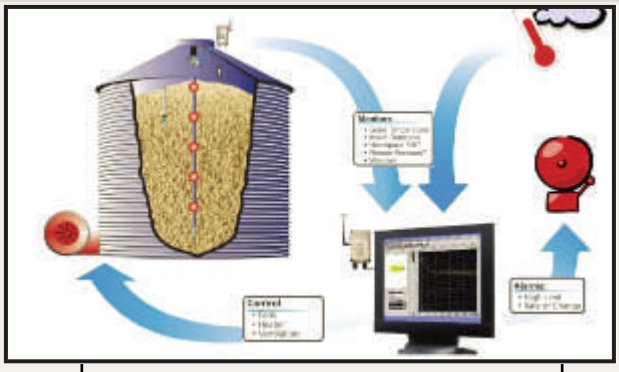
Customers can add an Insector insect sensor system, which developed in conjunction with USDA researchers. The Insector system is able to detect and identify specific insects long before an infestation is detected.



The IntegrisPro system relays bin operating data to a farm's central computer using 900-MHz or 2.4-GHz radios. Bins can be monitored and controlled from anywhere with Internet access using remote-access software. The operator can check bin conditions on site using a handheld plug-in StorMax monitor.

In addition to collecting ongoing data showing temperature changes through the grain, the graphical reporting system offers analysis tools. It also shows grain level and volume and includes a modeling tool that provides drying scenarios based on historic weather patterns. The owner can use this tool to design an aeration system or to determine when high-moisture grain put in a bin early in the season will dry down so bin filling can continue.

System costs typically run about $0.15/bu for facilities with a capacity under 100,000 bu. The hardware and installation costs drop to $0.05 to $0.10/bu on a 500,000-bu facility. An extended warranty with ongoing call center support costs less than $0.01/bu/year. Complete systems also can be rented for about $0.02 to $0.04/bu/year, depending on facility size.

Visit www.integrisusa.com or www.freeproductinfo.net/fin

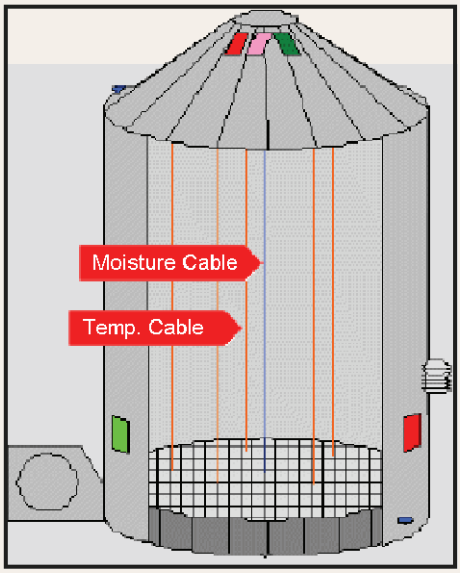
Intelliair BinManager

The BinManager uses digital moisture and temperature sensors arrayed every 4 ft to monitor and control natural air and heat-supplemented drying and long-term storage. A 48-ft-dia. bin typically is outfitted with six sensor cables, each with multiple sensors to detect moisture and temperature levels in the bin.

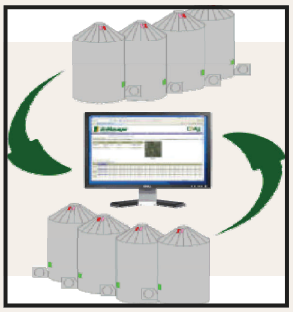
These sensors, as well as temperature and humidity sensors in the fan plenum, and temperature and humidity sensors in an on-site weather station, feed into a bin-mounted controller. A software formula in the controller's computer drives the drying process, including fan and heater use needed to maintain conditions for long-term storage. In the future, the system also will include a laser imagery system to monitor bin filling and emptying.

Although bin-operating parameters can be set and monitored from the bin site, BinManager relies primarily on a Web interface for monitoring and adjusting control functions.

A farmer can check grain bins with Internet access, including his Blackberry (or other Web-capable cell phones). The Web interface also reduces software-related challenges, which can occur as computer operating systems change.



Communications to and from the bin site are through a cellular modem. If several bins on the site are outfitted with BinManager systems, information from each bin is relayed wirelessly to the cellular modem for transfer to BinManager Web server computers. In addition to control and monitoring functions, the system also has an alert feature, which automatically contacts up to five individuals via telephone, e-mail or text in case of a problem at a bin site that requires immediate attention.



The cost of installing BinManager on a 48 to 60-ft-dia. bin typically is $0.10 to $0.12/bu of storage capacity. Systems for smaller bins cost up to $0.20/bu. In addition, BinManager charges a $495 annual fee, which covers cellular airtime and Web site access.

Visit www.binmanager.com or www.freeproductinfo.net/fin

Trust the system

The biggest challenge after installation is convincing the manager to trust the system's automated functions. New customers often try to out-guess the technology. Just because the ambient air feels too humid to dry grain does not mean it is. The automated grain-monitoring systems take into account the plenum air temperature and moisture levels, fan warm-up and heater availability to determine the best air to push through the grain mass. Customers often say the best thing they learn from the first year of using an automated grain-monitoring system is to keep their hands off.

(R. Grisso)

Conservation Easement on Public Property Surrounding Carvins Cove Reservoir

On April 21, 2008, the City of Roanoke formally established a permanent conservation easement on 6,185 acres of publicly owned land around the Carvins Cove water reservoir.

This conservation easement had been discussed, considered and debated since 1996. It wasn't until after Dr. Rupert Cutler, who first proposed it, retired from his public post on City Council that it finally happened. Luckily, Rupert was still around to enjoy the success.

It had broad support and is the largest conservation easement ever placed on public land in Virginia. But it wasn't the only one. The same day, Gov. Tim Kaine announced the placement of an easement on 5,000 acres around Smith Mountain Lake.

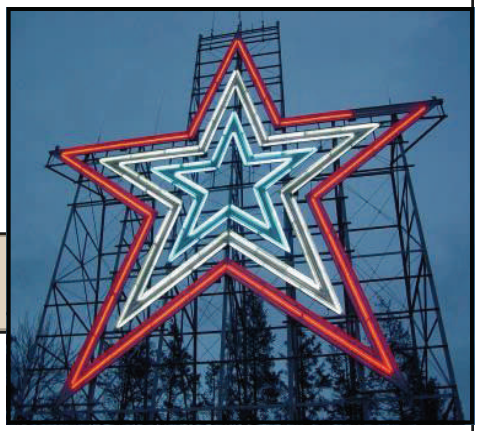
"What a great day for Western Virginia," said Roger Holnback of the Western Virginia Land Trust, which co-holds the easement with the Virginia Outdoors Foundation. In late 2007, the City of Roanoke established a management plan for Carvins Cove reservoir, which included a recommendation the easement be established.

Mayor Nelson Harris endorsed it. A task force, formed in 1999, suggested changes to the City Code to allow recreational uses of the city owned land and began to design terms of an eventual easement.

It was agreed the easement would apply only to land above the 1,500 foot elevation. This left a large area uncovered.

The task force is now working on regulations to allow an additional 6,000 acres to be incorporated into the protected area, after transferring the water reservoir to the Western Virginia Water Authority.

Another proposal under discussion is to place an easement on the slopes of Mill Mountain, location of the famous Roanoke (Neon) Star.



Employees Prepared for Emergencies?

Attend a free webinar to Learn About Programs that Are Available Through Your Local Red Cross Chapter.

Event Title: Are Your Employees Prepared for Emergencies?

Implementing a comprehensive, organization-wide safety, preparedness and business continuity program is an enormous task. Fortunately, the American Red Cross can make it easier than ever for you to create a safer workplace.

Attend our free online seminar on OSHA and preparedness information, as well as the latest health and safety training programs. This Webinar is ideal for facility managers, safety and human resource professionals, and other individuals tasked with managing safety and emergency preparedness plans.

Webinar link:
http://download.101com.com/OHS/webinar/98621/files/lobby.html

September 20-26, 2009 National Farm Safety Week

"**Rural Roadway Safety… Alert, Aware & Alive**," the slogan of National Farm Safety & Health Week, is especially timely as the week runs on the cusp of the harvest season.

For agricultural safety and health professionals who live and work in rural America, sharing farmers' pride and excitement about the harvest season is tempered by the continued & urgent need to foster increased understanding regarding the prevention of ag related injuries and illness.

Farm safety specialists are concentrating their efforts on increasing awareness of National Farm Safety & Health Week and the practical applications of this year's.

Promoting this year's key message, that motor vehicle-ag equipment collisions are preventable, offers safety and health professionals a fresh opportunity to interact with and educate people in their communities.

Please communicate the message to keep the farmers safe, especially regarding awareness and recognition of roadway hazards by both producers and other drivers.

(R. Grisso)

"Rural Roadway Safety …. Alert, Aware & Alive"

Rural Roadway Safety Tips:

√ Be a safe driving role model for your kids. Always wear your seatbelt and insist passengers do too.

√ Follow the speed limit. Speeding drivers may not be able to avoid a collision with a Slow Moving Vehicle.

√ Be patient when following farm machinery. Only pass in designated passing zones when the roadway is clear of oncoming traffic.

√ Never ride or allow passengers in the cargo area of a pickup.

√ Watch for unlicensed youth driving farm equipment.

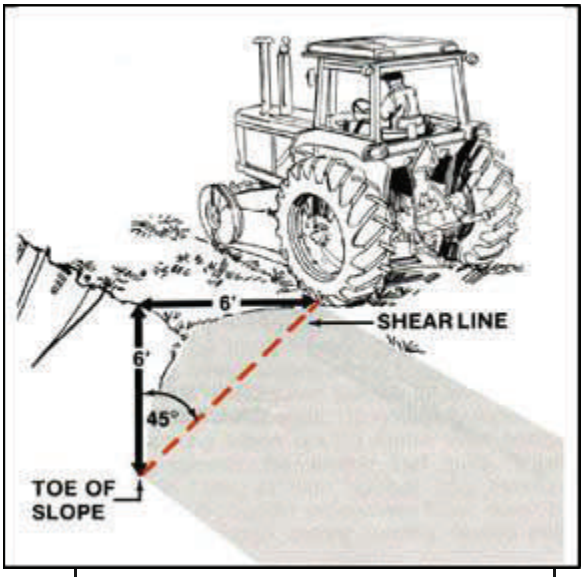
√ Be cautious of loose gravel, soft shoulders, tight curves, and blind intersections caused by mature crops.

(R. Grisso)

http://www.ext.vt.edu/news/mediakits/farmsafety.html

Hayride Safety Reminders

With the fall season upon us, the popularity of hayrides as fundraisers or social events increases. However, reports of injury-producing incidents involving hayrides have been on the increase over the past several years. These events need to be well organized and carefully monitored, so that a fun outdoor activity doesn't turn into a tragedy.



To approach the planning and coordination of a hayride, consider the 3 H's: Hitching, Highways & Horseplay

Hitching includes the wagon, the tractor or truck that is pulling the wagon, and the safeguards used to ensure that the wagon is properly attached.

- √ Never attach more than one wagon behind the pulling vehicle. Extra wagons make the "snaking" action of the caravan more severe and may result in sideswiping or overturning of the trailing wagons.
- √ A truck or tractor should never pull a wagon so fast that it sways out of a straight line.
- √ "Proper hitching also includes using a well-designed hitch pin with a clip or lock between the wagon and the pulling vehicle; and installing safety chains to ensure that the wagon does not disconnect while in motion," according to Professor Dennis J. Murphy, agricultural safety specialist at the Pennsylvania State University.
- √ Avoid crushing injuries when hitching equipment: *http://pubs.ext.vt.edu/442-092*
- √ Know about soil shear lines (the distance one should keep equipment away from an embankment): *http://www.nasdonline.org/docs/d001501-d001600/d001590/d001590.html*

Highway considerations include careful planning of the hayride route. First, try to keep your hayride off public roads altogether. But if you must use a roadway:

- √ Highways with excessive vehicular traffic moving at high rates of speed should be avoided at all costs.
- √ Hayride organizers should consult with local law enforcement agencies to seek their advice on which roads to use. These agencies may also be willing to provide security and safety during the hayride. To further reduce the highway hayride hazard, have escort vehicles traveling in front and in back of the hayride with their emergency lights activated.
- √ Trailers and tractors should meet the requirements for proper marking and lighting. Tail lights need to be in place, reflective materials, and a visible Slow Moving Vehicle (SMV) emblem. For information on marking and lighting see a publication on NASD at: *http://www.nasdonline.org/docs/d000101-d000200/d000148/d000148.html*

Horseplay on a hayride should not be tolerated and may become an unwanted distraction to the driver.

- √ Planned activities, such as singing or story-telling, may help focus the attention of children and teenagers.
- √ Adult supervision is a must! Passengers can easily fall from a wagon or truck and be run over by the vehicle's wheels causing traumatic injuries or death.
- √ All riders should be sitting down while the wagon or truck is moving.
- √ Be sure these rules are clearly stated to all participants before the ride begins.
- √ And always -- No riders on the tractor.

Recognizing Stress and Depression

Cases of suicide have been reported on farms across the country. It is no surprise that farm families are being negatively impacted by current market prices. Farm income is significantly lower while expenses have not dropped. Severe financial strain can caused elevated levels of stress for farm families. With the financial stress often comes emotional stress.

There are a number of signs of stress that can be recognized by family, friends, employees, veterinarians, Extension professionals, school personnel, or health and human service workers. These signs include:

Changes in routine – family stops attending church, 4-H/FFA activities, or no longer stops at the coffee shop or feed mill.

Care of livestock declines – animals may not be cared for properly; show signs of neglect.

Increase in illness – may experience more colds, flu, aches, pains, etc.

Increase in farm accidents – stress causes fatigue which may result in increased accidents; children may not be well cared for.

Appearance of farmstead declines – family no longer takes pride in the way buildings and grounds appear.

Children show signs of stress – children may act out, be increasingly absent or show declines in academic performance.

CHRONIC OR PROLONGED STRESS

Individuals or families experiencing prolonged stress may exhibit the following effects:

Physical – headaches, ulcers, backaches, sleep disturbance.

Emotional – sadness, depression, bitterness, anger, anxiety.

Behavioral – irritability, acting out, withdrawal.

Cognitive – memory loss, lack of concentration, inability to make decisions.

Self-Esteem – "I'm a failure.", "I blew it.", "Why can't I…?"

HOW TO REFER A PERSON FOR HELP

If you recognize signs of depression or suicide in a friend or family member, consider the following:

√ Be aware of the services available in your local community and what they can offer.

√ Listen for signs the person or family needs help that you can't provide, i.e., financial, legal, counseling.

√ Assess what community resources would be most appropriate.

√ Discuss referral with the person or family, "It sounds/looks like you are feeling _____. I think _____ could help you deal with your situation."

√ If the person/family is unwilling to take the initiative or where there is danger if no action is taken, you need to take the initiative.

√ Call an agency in the community that deals with these issues.

√ Identify yourself and your relationship with the person or family for whom you are seeking assistance.

√ Explain to the agency what you believe the person/family needs.

√ Provide information about the family and particulars of their situation.

√ Ask the agency what follow-up will be taken.

Many people are reluctant to get involved in these family situations because they are very personal issues. However, it is better to be proactive in getting help for the person/family than watching something tragic happen and wishing you had done something.

Source: *Farm and Ranch Family Stress and Depression, A Checklist for Making Referrals,* Roger T. Williams, University of Wisconsin-Madison and Robert J. Fetsch, Colorado State University . Available at: http://mtt.cahs.colostate.edu/current_issues/depression

(R Grisso)

"Death by Cell Phone" Billboards

"Death by Cell Phone" is the title of a new billboard advertisement the National Safety Council launched today in 67 markets nationwide (see below), reaching more than 1 million people daily. The billboards feature Linda, a 61-year-old wife, mother and grandmother from Oklahoma, and Joe, a 12-year-old boy from Michigan, with one tragic thing in common: both were killed in car crashes caused by drivers using cell phones.

The title comes from the words of Linda's daughter, Jennifer Smith, describing the young man who hit her mother: "He ran a red light and T-boned her car at 45 to 50 mph, which was the posted speed limit. My mother died within a couple of hours from blunt force trauma to the head, neck and chest. I just call it death by cell phone."

The billboard features photos of Linda and Joe, along with the address of a Web site where viewers can watch a short video ***deathbycellphone.org*** that tells their stories. Appearing in the video are Smith and Joe's father, David Teater.

Smith and Teater make impassioned pleas for Americans to hang up their cell phones and stop text messaging while driving. Both believe the drivers of the cars that killed their loved ones were unaware of the cognitive distraction caused by talking on a cell phone or texting while driving.

According to one estimate, cell phone use is a factor in 6 percent of all crashes, which equates to 636,000 crashes, 330,000 injuries, 12,000 serious injuries and 2,600 deaths each year. Studies also show that cell phone-using drivers are four times more likely to be involved in personal injury crashes than other drivers, and that most crashes are caused by driver inattention, with cell phone use being the number-one distraction.

According to a recent (2008) poll by Nationwide Insurance, roughly eight in ten (81%) cell phone owners report that they talk on their cell phone while driving. Comparatively, about one in five (18%) cell phone owners report that they send text messages while driving.

Smith and Teater anticipate a change of culture in the US to recognize cell phone use while driving as particularly hazardous. The change will entail time, public education, state level legislation and law enforcement, and technology solutions offered by wireless operators and auto manufacturers.

"I can close my eyes and envision, maybe it is five years from now, maybe it is 10 years, when we can all look back and say 'hey, remember when we all used to talk on cell phones when we drove? What idiots we were to do that,'" Teater said.

Since his son's death, David Teater has sought to educate the public about the dangers of cell phone use while driving. In April he joined the NSC, accepting the newly created position of Senior Director, Transportation Strategic Initiatives, focusing his efforts on reducing distracted driving and teen driving fatalities.

In January, the NSC became the first organization to call for a nationwide ban on all forms of cell phone use while driving. It is estimated more than 100 million people engage in this activity daily. A fact sheet, data resources and other information concerning cell phone use while driving are available on the NSC Web site at ***distracteddriving.nsc.org***.

The National Safety Council (***www.nsc.org***) saves lives by preventing injuries and deaths at work, in homes and communities, and on the roads, through leadership, research, education and advocacy. (R. Grisso)

http://downloads.nsc.org/word/death_by_cellphones_markets.doc

Oil Analysis: 5 Things to Know

Oil analysis is an important part of machinery management. Used appropriately, there is little doubt that an effective oil analysis program can help identify lubrication-related failures, often before any significant machine wear has occurred. Too often producers miss the need of oil analysis simply because they don't understand what oil analysis can and can not do. Below are "five fallacies" of oil analysis - things that are often overlooked or not understood but vital to the long-term benefits of oil analysis as a conditioning monitoring tool.

Fallacy #1: Reservoir sampling is fine. Fact: While certain homogeneous properties such as viscosity are unchanged no matter where in the system you sample from, the concentration of suspended material such as wear debris, particles and moisture can vary by several orders of magnitude depending on where the sample is taken. For maximum effectiveness, take samples immediately downstream of the component(s) of interest or source of contaminant ingression.

In fact, in large circulating systems with significant reservoir capacity, the dilution effects alone can render the identification of active machine wear virtually impossible with reservoir sampling.

Fallacy #2: Routine oil analysis will always find active machine wear. Fact: Depending on the wear mode and degree of severity, wear particle sizes are often 5 to 10 microns and larger. So, why does this matter? Size is important because the most commonly used test method, "elemental spectroscopy," has a limit to the size of particles it can detect. Depending on instrument and methodology, conventional elemental analysis can not detect particles larger than 3 to 8 microns in size, rendering it useless in situations of advanced machine wear, or where the failure mode naturally generates larger particles, such as fatigue or severe sliding wear.

Fallacy #3: Particle counting is proactive. Fact: Particle contamination accounts for 60 to 80 percent of all lubrication-related failures. Because of this, most oil analysis practitioners recommend the use of ISO particle counting to measure fluid cleanliness, believing that particle counting is a proactive means to prevent many failures. But unless you have taken the time to determine exactly how clean each system needs to be and have a plan to address fluid cleanliness levels that are too high, particle counting will have little to no effect at reducing the overall number of machine failures.

Fallacy #4: Water is water is water. Fact: Water, in the form of washdown, airborne humidity or from the process itself is a dangerous contaminant. Because of this, all oil analysis labs test for water. However, in many instances, the test methods used by some labs are unable to detect the presence of water until it is five to 10 times higher than recommended for some machines. Like many oil analysis test parameters, labs have a variety of methods they can use to identify water.

Fallacy #5: Vibration analysis is better at finding failures than oil analysis. Fact: While it's true that some failure mechanisms, such as misalignment, are better detected using vibration. Most experts recognize that oil analysis will generally detect active machine wear before vibration analysis. In truth, the combination of oil analysis for early detection coupled with the advanced diagnostic capabilities of vibration analysis make the benefits of these two techniques far greater when treated as teammates rather than opponents.

Now you know the most misunderstood aspects of oil analysis. Get them wrong and you could be living with a false sense of security. Get them right and you should reap the benefits that many companies get from a well-engineered, reliability-focused oil analysis program.

(R. Grisso)

Yield Monitor Pre-Season Checks

Just a refresher to remind everyone to check their yield monitoring system before harvest begins to ensure proper operation. A few quick items to remember:

1. Make sure your data card has been downloaded and all yield data backed up.
2. Ensure all sensors are clean of debris and functioning properly.
3. Check to make sure that the system powers up and no alarms or faults appear on the scene.
4. Think about uploading all farms and field names to the data card, if not completed already. It will save time and possible headaches during harvest.
5. Review all calibration procedures provided in the operator's manual.

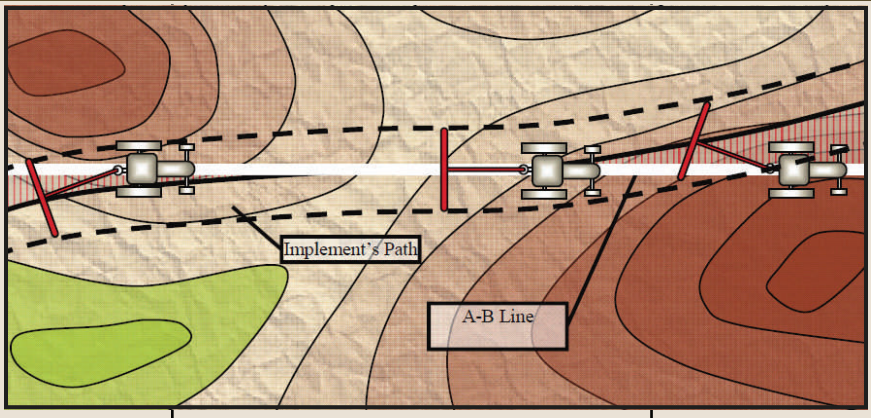
For additional pre- and in-season checks and maintenance, review the operator's manual before day 1 of harvest.

Also review VCE Publication: *"Precision Farming Tools: Yield Monitor"* @ http://pubs.ext.vt.edu/442-502

(R. Grisso)

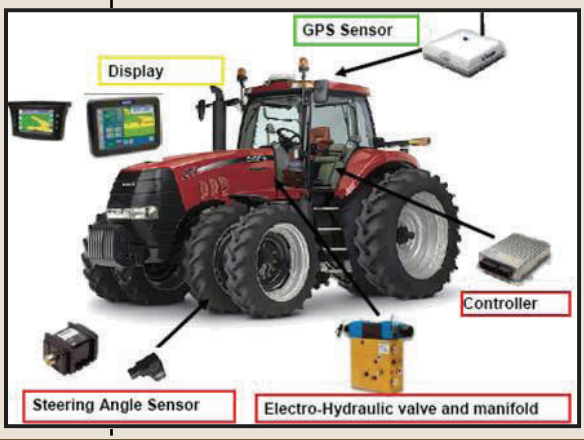
Agricultural Automatic Vehicle Guidance

During the ASABE Meeting this summer a distinguished lecture was presented by Arthur F. Lange, and Jorge A. Heraud, both are engineers from Trimble. Their presentation and materials were excellent.



Abstract: Automatic guidance based on GPS is a rapidly expanding technology in the area of precision agriculture. Its adoption is fueled by a quick return on investment, ease of operation and installation, as well as the availability of lower cost system options. This report covers the history of the development of vehicle guidance from the early days of guidance to current and future applications with a focus on GPS-based automatic guidance. It also reviews GPS basics, the different correction sources typically used in agriculture, as well as future developments we can expect in Global Navigation Satellite Systems.

To access these presentation and written documents, go to web site provided below and download items of interest.



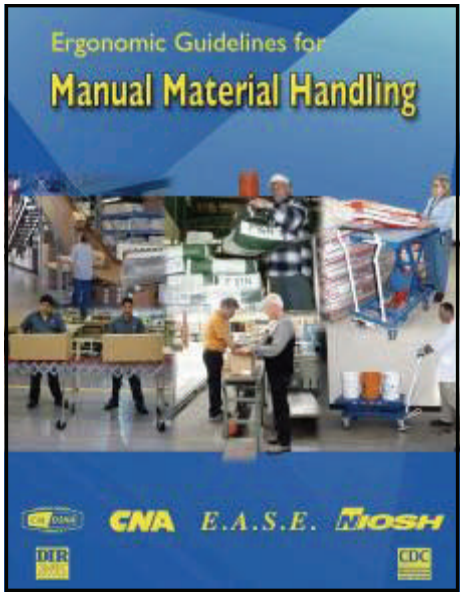
http://bsesrv214.bse.vt.edu/Dist_Lecture_2009/

Ergonomic Guidelines for Manual Material Handling

In April, CAL/OSHA released a new guideline that addresses the ever-present ergonomics concern of manual material handling. This guideline was created in partnership with the Material Handling Industry of America (MHIA) and a key product council of the MHIA, the Ergonomic Assist Systems and Equipment (EASE) council, insurance companies and the National Institute for Occupational Safety and Health (NIOSH). That is a lot of acronyms , but the important point is that a lot of experts from around the country came together to develop a simple, functional guideline to the help industry deal with a very common problem.

The booklet is written for managers and supervisors in industries that involve the manual handling of containers. It offers suggestions to improve the handling of rectangular, square and cylindrical containers, sacks and bags.

The guideline is laid out in four distinct areas starting with a presentation of background information, and then the core of the document, which are solutions for material handling. One of the factors about this guideline that addresses the functional needs of an organization is that it provides solutions that may still involve manually handling of materials. It provides suggestions for mechanical assists to further reduce the potential risks of the task. The resources section provides references, links and risk assessment tools to help the company decide which solution approach is necessary for any given situation.



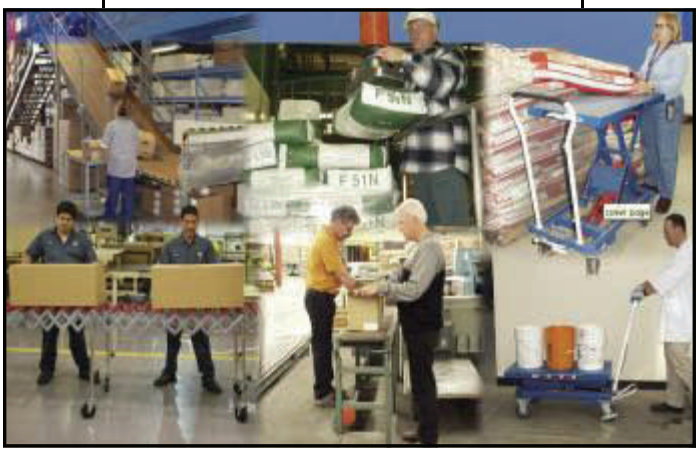
The actual sections of the guideline are laid out as follows:

"**Improving Manual Material Handling in Your Workplace**" lists the benefits of improving work tasks. It also contains information on risk factors, types of ergonomic improvements and effective training and sets out a four-step proactive action plan. The plan identifies problems, sets priorities, recommends changes and follow up.

Sections 1 & 2 of "**Improvement Options**" provide ways to improve lifting, lowering, filling, emptying or carrying tasks by changing work practices and/or the use of equipment. Guidelines for safer work practices are included.

Section 3 of "**Improvement Options**" provides ideas for using equipment instead of manually handling individual containers. Guidelines for safer equipment use are included.

The "**Resources**" section contains additional information on administrative improvements, work assessment tools and comprehensive analysis methods. This section also includes an improvement evaluation tool and a list of professional and trade organizations related to material handling.



To obtain a free copy of the guideline, use the following links and download a PDF copy of the guideline:

NIOSH: ***www.cdc.gov/niosh/docs/2007-131***

(R. Grisso)

Robert Grisso Named Fellow of ASABE

Robert "Bobby" Grisso, professor of biological systems engineering in CALS and farm equipment and safety specialist for VCE, was elected into the American Society of Agricultural and Biological Engineers' (ASABE) 2009 Class of Fellows.

Grisso was formally presented with the honor at the annual ASABE meeting in Reno, NV, on June 23.

The rank of Fellow is bestowed on less than 2 percent of the society's members. According to ASABE, a Fellow is "… a member of unusual professional distinction, with outstanding and extraordinary qualifications and experience in, or related to, the field of agricultural, food, or biological systems engineering." Fellows have at least 20 years of experience in the engineering or engineering education field and have been a member of ASABE for at least 20 years.

Grisso's Extension programming focuses on improving the accuracy of pesticide application through sprayer calibration, enhancing tractor performance, and using precision technology to optimize farm machinery, safety, and productivity. Grisso is also involved in interdisciplinary research on the optimization of harvesting and handling operations of biomass for energy production. He has received numerous awards from ASABE, including two paper awards, the Nolan Mitchell Young Extension Worker Award, and 21 Educational Aids Blue Ribbon Competition awards.

Grisso earned his BS & MS degrees from Virginia Tech and his Ph.D. from Auburn University and is a registered professional engineer. He has provided leadership for both college and Extension programming since joining Virginia Tech as a professor in 2001. Additionally, Grisso has authored more than 60 scientific publications and more than 100 Extension publications.

H1N1 Flu Outbreak

Human cases of an influenza A H1N1 have been identified in many states and countries. This is a new influenza A virus that has not been identified in people before, and human-to-human transmission of the virus is widespread and appears to be ongoing.

The government has issued recommendations on priorities for fall vaccination against the novel H1N1 flu strain.

Hospitalizations - 5,514

Deaths – 353

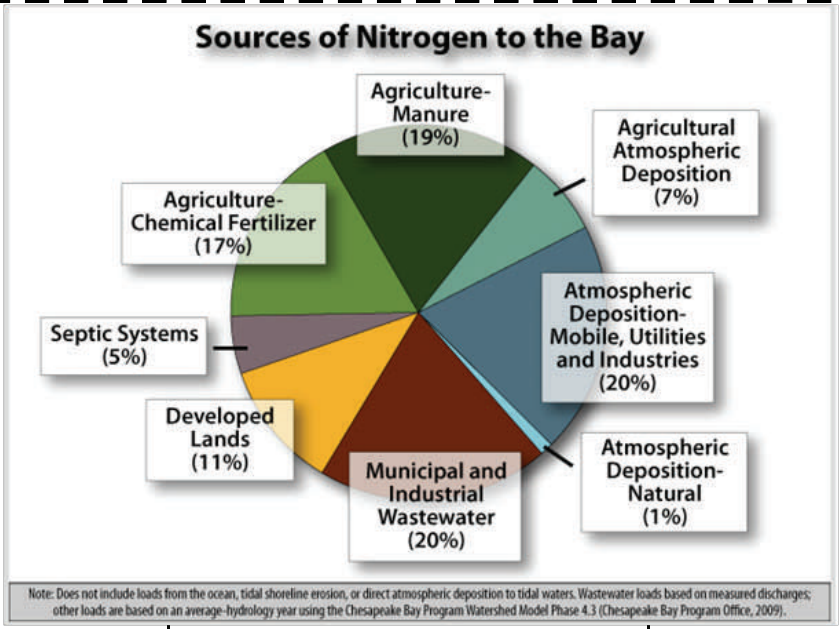
Includes 47 states, the District of Columbia, Puerto Rico, Guam, American Samoa, and U.S. Virgin Islands in the count. For state specific information see: *http://www.cdc.gov/h1n1flu/*

If you have not prepared, "***Pandemic.gov***" has checklists to assist individuals, families, schools, businesses, child-care facilities, and community groups plan and prepare for pandemic influenza.

From EDEN: *http://www.eden.lsu.edu*
Under Issues

Air Quality Research: Addressing Atmospheric Nitrogen Deposition to the Chesapeake Bay

Nitrogen (N) is one of the nutrient pollutants to the Chesapeake Bay. The Chesapeake Bay Program Office estimates the amount of pollution the Bay can receive annually and still meet water quality standards is 175 million pounds of N and 14.1 million pounds of phosphorus (P). For the year 2008, the Chesapeake Bay Program Office estimated that sources within the Bay watershed delivered 311 million pounds of N and 19 million pounds of P to the Bay. The sources of N to the Chesapeake Bay include among others agricultural manure, agricultural fertilizer, and agricultural atmospheric deposition as shown in the figure.



There are concerted efforts in reducing N loads to the Bay through the use best management practices. One area that is gaining interest is the deposition of N sources associated with agriculture – ammonia emissions.

Currently, BSE has a 4 yr research project focusing on mitigating ammonia emissions from poultry litter, funded through the USDA-NRI Air Quality program. The objectives of the project are to:

1. Develop a biodegradable broiler litter amendment to reduce NH3 emissions from broiler houses.
2. Evaluate the effectiveness of the organic biodegradable litter amendment on reducing NH3 volatilization from broiler litter.
3. Conduct pilot scale studies to evaluate the effectiveness of the biodegradable litter amendment on reducing NH3 concentration and emission from broiler house under production conditions.
4. Develop and implement a collaborative, consensus based adaptive evaluation protocol between researchers and poultry producers to identify and analyze economic, behavioral, cultural, and other barriers to implementing BMPs to manage NH_3 emissions from poultry houses.
5. Develop an agricultural air quality extension education program to enhance understanding of air quality issues arising from NH_3 in the State of Virginia.

This project provides us a good opportunity to engage in discussions and development of mitigation strategies to reduce that amount of nitrogen emitted from animal feeding operations.

While our research focuses on mitigation of NH_3 emission from broiler houses, our extension education program will target poultry producers, dairy farmers, VCE county educators, and other stakeholders. We plan to develop a sustainable, science based agricultural extension air quality education program covering the basic concepts of agricultural air pollutants - how air pollutants are formed, measured, and controlled. To sustain the air quality education program, we will focus on training county extension educators on air quality issues and develop education materials they can use to conduct their routine programming after the project is over.

We would like as a first step of our education efforts to engage the communities in Virginia to gather their views on agricultural air quality. We would therefore like to conduct listening sessions to hear from communities and also explain our project. We plan to conduct four town meetings across the state of Virginia in the following regions (locations): Southwest (Abingdon), Central (Rocky Mount), East Virginia (Hampton Beach), and Shenandoah Valley (Harrisonburg). We would like to conduct these sessions the later part of November/early December 2009 time frame.

The purpose of this note is make you aware that we will be sending requests to help us schedule these sessions and build this education program.

Please contact me if you would like to participate in the program or if you have any questions: My email and telephone contacts are listed below:

Email: arogo@vt.edu
Phone: (540) 231 6815

Project Investigators: Jactone Arogo Ogejo; Nancy Franz; Kurt Stephenson; F. William Pierson; F. Agblevor; R.S. Gates.

(Jactone Arogo Ogejo)

BSE Extension Materials Received 2009 ASABE Blue Ribbon

The American Society of Agricultural and Biological Engineers (ASABE) defines Educational Aids are those resource materials which contribute to the understanding of agricultural engineering subjects. When awarding ASABE Blue Ribbons, major emphasis is placed upon how well the needs of the intended audience are met. Nominated materials must receive an evaluation score of 90% or better to receive and ASABE Blue Ribbon Award.

Pub title: Water Reuse: Using Reclaimed Water for Irrigation found at: *http://pubs.ext.vt.edu/452-014/*

Authors: Kathryn Haering (CSES), Greg Evanylo (CSES), Brian Benham (BSE), and Mike Goatley (CSES)

Extracted from the ASABE awards nomination form.

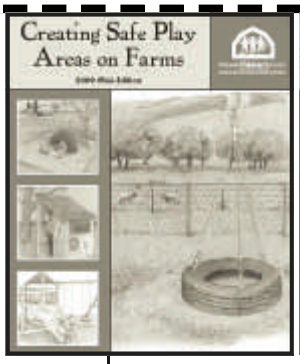
Purpose of entry: To inform those considering using reclaimed water for irrigation about applicable regulations and usage guidelines.

Intended audience: VCE clientele interested in conserving water – state and local governments, and professional landscapers/lawn care providers.

How does this educational aid meet a specific need? As water resources become scarce and water quality is at risk, conservation of potable water must increase. This publication addresses common concerns associated with irrigating with reclaimed water.

Abbreviated Version of "Creating Safe Play Areas on Farms"

Due to the overwhelming number of requests for an abbreviated resource to accompany its "Creating Safe Play Areas on Farms" Booklet, the National Children's Center for Rural and Agricultural Health and Safety has released a "Creating Safe Play Areas on Farms 2009 Mini-edition" in English and Spanish summarizing key elements to creating a safe place for children to play.



This new eight page-resource contains information on selecting a play area, fencing and ground surfacing and child development. This resource can be downloaded at: ***www.marshfieldclinic.org/safeplay*** along with other Creating Safe Play Area information, including the "Keys to Creating Safe Play Areas" site.

For more information on this and other child safety resources, please visit the Web site: ***http://www.marshfieldclinic.org/nccrahs/***

View the NEW 2009 Childhood Agricultural Injury Fact Sheet: ***http://www.marshfieldclinic.org/proxy/MCRF-Centers-NFMC-NCCRAHS-ChildAgInjuryFact-Sheet062009.1.pdf***

(R. Grisso)