Biological Systems Engineering

Engineering Update **Winter 2009**

BSE Receives ASABE Blue Ribbon for Newsletter

In this issue...

Engineering Update

VirginiaTech *Invent the Future*

Biological Systems Engineering
December 2009

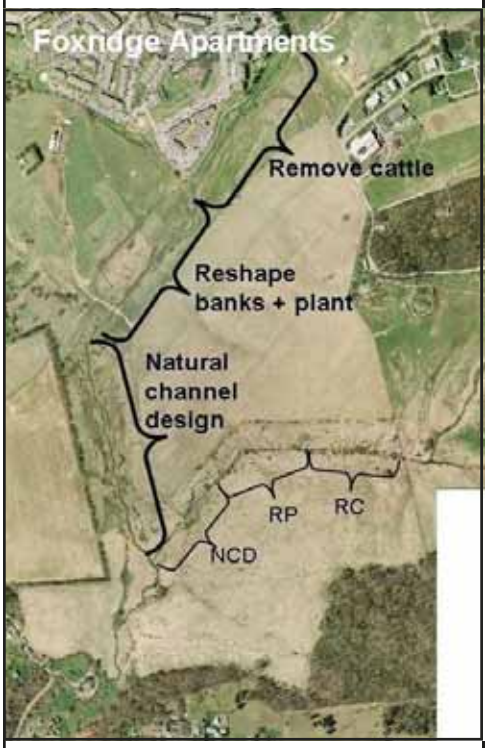
To: Extension Unit Directors, Extension District Directors, Extension Program Leaders, and ANR Agents

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

Volunteers working on the Stroubles Creek Stream Restoration Project

Drs. Cully Hession and Tess Wynn are leading a stream restoration project to improve stream health by regrading eroding streambanks and planting native vegetation (see plans on aerial photo). This project is supported by a grant from the Virginia Department of Conservation and Recreation. This project will establish a long-term, full-scale research project on stream restoration techniques (see below).



How? Cattle access to the stream was restricted this summer. The upper third of the stream is recovering without active intervention. Along the middle third of the stream, actively eroding streambanks are being regraded to a stable angle and replanted with native vegetation. In addition to regrading and planting the streambanks along the lower third of the stream, a designed floodplain is being constructed to serve as a "relief valve" for urban stormwater runoff from Blacksburg. Volunteers from campus and the local community have contributed over 500 hours of labor to install erosion control materials and to plant vegetation.

Photo of the work can be seen at: **http://www.stroublescreek.bse.vt.edu/restoration.htm**

More about the project: The StReAMS (Stroubles Research and Management Site) Lab is an outdoor research laboratory located on Stroubles Creek, just downstream of the Virginia Tech campus. The headwaters of Stroubles Creek are in the Town of Blacksburg. Stroubles Creek flows through (mainly under) the Virginia Tech campus and is currently listed as impaired on Virginia's Section 303(d) list, due to bacteria and impairment of the stream benthic macroinvertebrate community (due to excessive sediment). Precipitation and stream stage and water temperature are measured continuously. Previous research documented streambank retreat rates using a network of erosion pins, scour chains, and routine topographic surveys. Due to its proximity to campus and (ultimately) long term monitoring record, the StReAMS lab provides a unique opportunity for field research, teaching, and community outreach. Look for real time, online water quality data and video from Stroubles Creek in the near future…

Dr. Hession in wonderment while students look on...

Off-Road Vehicles: Impact on Drainage Systems and Wetlands

Operators and property owners are key to reducing environmental damage. Many people enjoy the outdoors. In an effort to get back to nature, All Terrain Vehicles (ATVs), Off-Road Motorcycles, and 4-Wheel Drive Vehicles (4WDV) have grown in popularity. With responsible use of these vehicles, users can enjoy the thrill of traveling the backwoods in comfort while still protecting the environment. Improper use can cause significant damage to wetlands and to drainage ways. Improper use destroys the outdoor experience that everyone seeks. Operators of these vehicles have a responsibility to respect the environment. They have a duty to use their vehicles responsibly and with minimum impact to protect our wetland areas from harm.

IMPORTANCE OF OUR NATURAL WETLAND AREAS

Wetland areas are an important part of our ecosystem. Wetlands reduce flood levels due to their ability to store rainwater. By controlling runoff, wetlands play an important role in reducing the buildup of sediment in our rivers and bays.

Wetlands enhance water quality by acting as filters. Wetlands often act as buffer zones by temporarily holding floodwaters and filtering materials such as excess nutrients from surface waters. When a wetland is lost, its buffering function is also lost.

RESULTS OF MISUSE

Misuse of ATV's and 4WDV's in the outdoors can cause the following results:

◊ Destruction of vegetation.
◊ Loose, unstable soil and sediment buildup seriously impacts fish and wildlife habitat downstream. Ultimately this sediment ends up in the York River and the Chesapeake Bay, negatively impacting fish and crab habitat.
◊ ATV activity in drainage ditches and flood plains can cause major blockages and sediment problems which can result in flooding during major rain events.
◊ Excellent breeding grounds for mosquitoes in ruts left behind in wetlands and drainage basins.
◊ Damage to septic system drain fields could cause disease and harm the oyster crop and other bay life.

WHAT DO RESPONSIBLE RIDERS DO?

◊ There are numerous ways to minimize the impacts of Off-Road Vehicles. Here are just a few recommendations for responsible operators:
◊ Use only roads, trails, or other areas designated for ATV use, and don't create new trails.
◊ Obtain permission from landowners for ATV use on privately owned land.
◊ Stay in the middle of the trail to avoid widening it.
◊ Avoid riding in wetland areas, on steep slopes or in drainage ways.
◊ Avoid doing "doughnuts" in wet areas.
◊ Moderate the throttle on slick trails.
◊ Avoid muddy trails, and save them for future trips when they are dry.
◊ Don't litter.
◊ Ensure vehicles are properly maintained and not leaking fluids.

LANDOWNER RESPONSIBILITIES

Property owners can be held responsible for environmental damage on their property, regardless of who causes the damage. Landowners can help protect the environment by restricting access, controlling damage, and reporting violators. Federal and State regulations that apply in the case of damage to wetlands, streams and ditches include: the Clean Water Act, the Virginia Wetland Protection Act, and the Chesapeake Bay Preservation Act. If a trespassing rider gets hurt or damages private property, the landowner may be held liable. As a landowner:

◊ Restrict unauthorized vehicle access.
◊ Post "No Trespassing" signs.
◊ Notify the Sheriff's Department if you see Off-Road Vehicles trespass on private property.

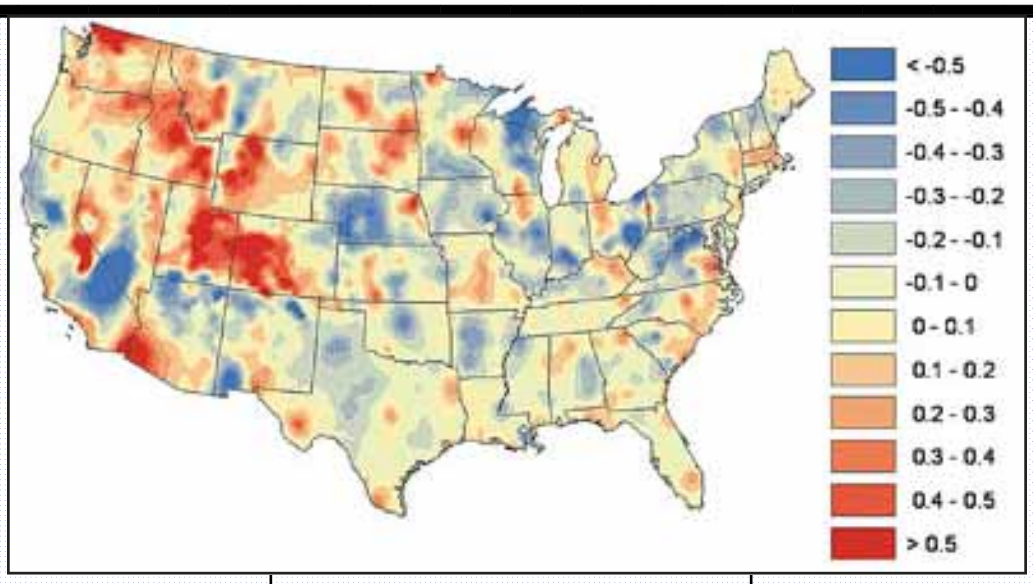
WHERE TO GET MORE INFORMATION

There are numerous organizations that support both responsible use of Off-Road Vehicles/All Terrain Vehicles and the preservation of our environment.

For more information:
Tread Lightly www.treadlightly.org/
Virginia Department of Environmental Quality www.deq.state.va.us/wetlands/mitigate.html
Natural Trails and Waters Coalition www.naturaltrails.org/issues/fieldguide2vehicles.html
Americans for Responsible Recreational Access www.arra-access.com/arra/home.html
National Off-Highway Vehicle Conservation Council www.nohvcc.org

(Source: www.yorkcounty.gov/stormwater)

Land-use study: greener land means cooler temperatures



Researchers say regional surface temperatures can be affected by land use, suggesting that local and regional strategies, such as creating green spaces and buffer zones in and around urban areas, could be a tool in addressing climate change.

A study by researchers from Purdue University and the Universities of Colorado and Maryland concluded that greener land cover contributes to cooler temperatures, and almost any other change leads to warmer temperatures. The study is further evidence that land use should be better incorporated into computer models projecting future climate conditions.

There is a significant trend, particularly the warming trend in terms of temperatures, that can be partially explained by land-use change.

The idea that land use helps drive climate change has been poorly understood compared to factors such as greenhouse gas emissions. But that is changing.

Land use cover also is an important force and not only at the local but also at the regional scale. The researchers used higher resolution temperature data than previous studies, meaning the data was more detailed. They also employed dynamic data on land-use changes from 1992-2001, which was derived from satellite imagery.

An understanding of land use's effects on climate change could have climatic and other benefits. For instance, creating green spaces and buffer zones in and around urban areas also could be aesthetically attractive.

Among the study's findings:

◊ In general, the greener the land cover, the cooler surface temperature will be.

◊ Conversion to agriculture results in cooling, while conversion from agriculture generally results in warming.

◊ Deforestation generally results in warming, with the exception of a shift from forest to agriculture. No clear picture emerged from the impact of planting or seeding new forests.

◊ Urbanization and conversion to bare soils have the largest warming impacts.

◊ In general, land use conversion often results in more warming than cooling.

The study took an approach called "observation minus reanalysis," or OMR. Through this process, the researchers used temperature data from local ground observations, observation and computer modeling, Geographic Information Systems (GIS) and statistical methods. They were able to separate the effects of land use or cover from greenhouse warming and isolate the impact from each land use or cover type. The more detailed data provided a clearer picture of the effects of land surface properties on near-surface temperature trends.

The results indicate that unless these landscape effects are properly considered, the role of greenhouse warming in increasing surface temperatures will be significantly overstated.

The work was supported by the U.S. Department of Energy Atmospheric Radiation Measurement program, NASA, the National Science Foundation, and the National Oceanic and Atmospheric Administration.

http://www3.interscience.wiley.com/journal/122572433/abstract?CRETRY=1&SRETRY=0

Integrating Education and Development of a Biodegradable Litter Amendment to Mitigate Ammonia Emissions from Poultry Houses

Project Investigators: Jactone Arogo Ogejo; Nancy Franz; Kurt Stephenson; Bill Pierson; Foster Agblevor; Richard Gates

Background: Emissions from agricultural operations include gases such as ammonia (NH3), hydrogen sulfide, volatile organic compounds, green house gases (methane - CH4, nitrous oxide – N2O, carbon dioxide – CO2) and dust (particulate matter). Sources of air emissions include barns, manure treatment and storage facilities, land application of manure/litter, dead animals/mortalities, and dust generated from crop production and feed making operations.

Ammonia emitted from animal feeding operations (AFOs) has been identified as an air quality concern. While NH3 is not listed as a pollutant under the Clean Air Act, it is a precursor to formation of particulate matter in the atmosphere. Ammonia may impact the health of humans, poultry, and livestock. It may also cause haze in the air when it reacts with acidic compounds in the atmosphere and thus cause haze – which reduces visibility in the atmosphere. When deposited on the ground or water bodies, ammonia from the air will increase the nitrogen (N) content of these ecosystems, leading to excess N related issues e.g. eutrophication. One other common impact is odor nuisance to neighbors.

According to US EPA estimates, for the period 1990 to 2002, about 65 to 77% of the total ammonia emitted came from livestock and poultry production.

US EPA and the livestock and poultry producers signed an air consent agreement and are supporting a national ammonia emissions measurement study (NAEMS) to: quantify air emissions from livestock and poultry production; provide reliable data for developing and validating barn and lagoon emission models; and develop national consensus on methods of measuring, calculation, and reporting emissions.

We have proposed to conduct an integrated research and extension agricultural air quality project. The research includes development of a: new biodegradable litter amendment (BLA) to be used as a best management practice (BMP) to reduce NH3 concentration inside poultry houses and consensus based collaborative evaluative model to analyze economic, behavioral, cultural, and/or policy barriers to adoption of BMPs to mitigate NH3 emissions. The extension aspect focuses on the development of a sustainable agricultural air quality education program.

Project Objectives

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 NH3 emissions from poultry houses.
5. Develop an agricultural air quality extension education program to enhance understanding of air quality issues arising from NH3 in the State of Virginia.

Extension Component

Question: Can a continuing air quality education in animal agriculture motivate producers to implement BMPs to control NH3 emissions associated with animal production in

(Continued on page 6)

Biodegradable Litter Amendment (cont)

(Continued from page 5)

the State of Virginia?

While our research focuses on mitigation of NH3 emission from broiler houses, our extension program is targeted to the following stakeholders: county extension educators, poultry producers, dairy farmers, local community leaders, state and federal government officers, technology providers, elected officials, and other interest groups. We plan to develop a sustainable agricultural extension air quality education program covering:

1. Basic concepts of agricultural air pollutants: how they are formed, measured, and controlled.
2. How the pollutants affect the human, poultry, and animal health.
3. How the pollutants affect the environment
4. Best management practices to mitigate air emissions from agricultural sources
5. Federal and state regulations that apply to agricultural emissions

The education materials to be developed include:

- *Web page* – to provide 24-hour access to information on agricultural air quality. Included in the web site will be topics in air quality developed in modular format for the stakeholders to use at their pleasure. The modular lessons will be developed both as power point and micro breeze presentations. We will also make available electronic fact sheets on air quality that can be downloaded as PDF files. The web site will also have links to other sites with pertinent information on air quality.
- *Fact sheets* – We will prepare fact sheets dealing with several agricultural air quality topics of interest. Where possible, we will use factual information based on studies in Virginia or other geographical zones such as Virginia.
- *News bulletins, commodity magazines* – write articles about air quality and send for publication in local newsletters, news bulletins and commodity magazines e.g. Virginia Dairymen.
- *Producer accessible*, user friendly computer model to evaluate NH3 mitigation BMPs

Stakeholder Involvement We would like to work with three groups of stakeholders: a general group - open to all stakeholders to participate in listening sessions; (2) project advisory group of no more than 30 people identified from the stakeholder to participate the development and implementation of the collaborative consensus based adaptive evaluation protocol to identify and analyze economic, behavioral, cultural and other barriers to implementing BMPs; and (3) county extension educators who work with local communities and may need to develop and conduct air quality education as part of their programming in the future.

Listening Sessions: We would like, as a first step to engage local communities in our program. To achieve part of this we will hold listening sessions across the state of Virginia in the following regions (locations): Southwest (Abingdon), Central (Rocky Mount), East Virginia, and Shenandoah Valley (Harrisonburg). The listening sessions will be conducted more like town meetings. The purpose of these meetings is to gather information from the community about their perceptions and concerns about of agricultural air quality. We will make a short presentation to introduce the subject and then solicit public reaction.

These meetings will be very informal but regulated and will be conducted

(Continued on page 7)

Listening Sessions Dates Set

Rocky Mount: December 7, 2009, 11:30 am to 1pm

Abingdon: December 9, 2009, 11:30 am to 2 pm

Eastern Shore: December 10, 2009. 11:30 to 2 pm. Eastern Shore AREC

Northwest District: December 16, 2009, 11:30 to 2 pm. Northwest District Office, Harrisonburg

You are welcome to join us at any of these meetings. Please let us know ahead of time that you are coming so that we can include you in the lunch count.

Biodegradable Litter Amendment (cont)

(Continued from page 6)

in the afternoon or evenings. Meals will be served.

At the listening sessions, we will hand out a short one to two page survey to the participants to get background information about knowledge and interest in agricultural air quality and their preferred methods of getting educational material. The information from the survey will be used in developing education materials and evaluating our program.

Project Advisory Group: This team will be involved heavily in the development of the evaluative model for assessing BMPS, we will also survey them to find out their preferred methods of learning. We will keep this group as our advisory committee and engage them in our project planning, implementation, evaluation and reporting throughout the project period through a website, phone conferences, and other methods.

Extension educators: The sustainability of this program beyond the life of the project will depend on educators who work with farmers and the larger communities on a regular basis. We plan to conduct workshops to cover various hot topics and emerging areas in air quality research. We will develop Power Point presentations and factsheets on several topics county extension educators can use to deliver their programs. The county extension educators will also be used to test the evaluative model for assessing BMPs developed.

Contact: Jactone Arogo Ogejo
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Virginia Tech, Email: arogo@vt.edu

This project is sponsored by: National Research Initiative Competitive Grant no. 2009-55112-05214 from the USDA/NIFA Air Quality

EPA Mandatory Reporting of Green House Gases Rule

The US EPA issued the Final Mandatory Reporting of Greenhouse Gases Rule. The rule was published in the Federal Register (http://www.regulations.gov). The intention of the rule is to collect accurate and timely emissions data to make informed future policy decisions. The rule requires reporting of greenhouse gas (GHG) emissions from large sources and suppliers in the United States, of which some may be animal feeding operations.

The green house gases covered by the proposed rule are carbon dioxide (CO2), methane (CH4), nitrous oxide (N2O), hydrofluorocarbons (HFC), perfluorocarbons (PFC), sulfur hexafluoride (SF6), and other fluorinated gases including nitrogen trifluoride (NF3) and hydrofluorinated ethers (HFE).

Under the rule, suppliers of fossil fuels or industrial greenhouse gases, manufacturers of vehicles and engines, and facilities that emit 25,000 metric tons or more per year of GHG emissions are required to submit annual reports to EPA.

Starting January 1, 2010, the US EPA will, for the first time, begin requiring collection and reporting of GHG by large emitters. This new program will cover approximately 85% of the nation's GHG emissions and apply to roughly 10,000 facilities.

The information will be used to better understand the sources GHGs and guide the development of the best possible policies and programs to reduce emissions. The data will also allow businesses to track their own emissions, compare them to similar facilities, and provide assistance in identifying cost effective ways to reduce emissions in the future. It is hoped that the emissions data will help in the fight against climate change.

With respect to animal feeding operations, EPA will require annual reporting if the average annual inventory is:

- 29,300 head - Beef cattle
- 3,200 head - Dairy cattle
- 34,100 head - Swine
- 723,600 head – poultry (layers)
- 38,160,000 head – Broilers
- 7,710,000 head – Turkeys

EPA has defined many of the inputs use to calculate GHG such as nitrogen excretion rates, maximum methane potential, and nitrous oxide emissions. They have also provided methods to use to calculate the number of heads of livestock and poultry on a farm.

The final report is about 700 pages and can be found at http://www.epa.gov/climatechange/emissions/downloads09/GHG-MRR-Full%20Version.pdf
(J. Arogo Ogejo)

Solutions to World's Worst Pollution Problems

Collection, Removal, Capping
One of the most basic solutions available is the collection and removal of contaminated materials. This is relatively simple but may still require the use of equipment that is not available or affordable locally, such as earthmoving equipment. In any such project, the final disposal of the contaminated material is always a concern but in many cases an acceptable solution can be found.

In other cases, covering or "capping" of contaminated material may be a good option. For example, in abandoned mining areas, the materials contained by the "tailings dams"(fine waste material from processing) may be left to dry out, and then they are often picked up in windy conditions to form clouds of toxic dust. Covering these areas with soil and vegetation or other material can essentially eliminate the problems.

Bioremediation
The use of additives to encourage the growth of microbes to speed biodegradation is a well-established technology. The challenge often is the cost of specific engineered additives and the solution is frequently the use of local substitutes, which may be considerably less effective than their high tech counterparts but can be a very small fraction of the cost. Diluted cow manure has been used very effectively in some cases. Molasses or other sugar byproducts can be used as a cheap substitute for electron donor compounds, in certain applications.

Bioaccumulation
Bioaccumulation of heavy metals is a well-known phenomenon. It is perhaps best known in the context of fish, where mercury in tuna is the classic concern. This concentration of certain heavy metals occurs in plants as well. Using plants that have particularly high absorption of the metals can gradually remove the contamination from the soil. Solutions are typically quite location specific and so local knowledge (through agricultural and other institutes) is critical and field trials are essential.

Another, somewhat unusual application of bioaccumulation is the use of vermiculture (worms) to deal with sites contaminated with organics and metals. One successful project combined the removal (to a secure landfill) of a large quantity of dumped hazardous waste with a vermiculture treatment of the moderately contaminated surface that was left. The application, over several seasons, of a simple microbial accelerator together with introduction of a large community of specially bred earthworms, resulted in major improvement in soil condition and fertility, together with large reductions in remaining heavy metal concentrations when the worms were harvested and removed.

Wetland Systems
Natural wetlands purify wastes (especially domestic waste) through a number of mechanisms. Various forms of artificial wetlands have been developed and can be very effective, especially for smaller flows. An innovation which is now emerging and has significant potential is the use of designed wetlands to improve the quality of wastewater streams containing high levels of metals. These systems function by a mixture of biochemical mechanisms, which alter the solubility of metals and physical (filtering) mechanisms that trap and hold the particles. The capacity and lifetime of such systems is limited but they may be a cost effective way for dealing with run-off from polluted sites while efforts are underway to remove the sources. Monsoon seasons pose a particular challenge for wetlands and other bioremediation approaches in many tropical countries. Intense seasonal rains can cause havoc with systems designed for relatively stable conditions.

Superfund-Type Solution
Despite being criticized for the high legal costs associated with its early days, the U.S. Superfund system provides a practical approach to these challenges. The government can proceed to deal with the most urgent and hazardous sites, using the resources provided in the Fund, while working to identify the responsible parties and using legal proceedings and public pressure to recover the costs from them. In 2008, for example, Superfund secured commitments of close to 2 billion USD from private companies to reimburse the government and to provide funds for dealing with specific identified sites.

http://www.worstpolluted.org/solutions-2009.html

Pesticide Labeling to Control Spray Drift

US-EPA has rolled out proposed guidance for new pesticide labeling to reduce off-target spray and dust drift. The new instructions, when implemented, will improve the clarity and consistency of pesticide labels and help prevent harm from spray drift. EPA is also requesting comment on a petition to evaluate children's exposure to pesticide drift.

The new label statements will help reduce problems from pesticide drift. The new labels will carry more uniform and specific directions on restricting spray drift while giving pesticide applicators clear and workable instructions.

The new instructions will prohibit drift that could cause adverse health or environmental effects. Also, on a pesticide-by-pesticide basis, EPA will evaluate scientific information on risk and exposure based on individual product use patterns. These assessments will help the agency determine whether "no-spray" buffer zones or other measures such as restrictions on droplet or particle size, nozzle height, or weather conditions are needed to protect people, wildlife, water resources, schools and other sensitive sites from potential harm.

In addition to the draft notice on pesticide-drift labeling, EPA is also seeking comment on a draft pesticide drift labeling interpretation document that provides guidance to state and tribal enforcement officials. A second document provides background information on pesticide drift, a description of current and planned EPA actions, a reader's guide explaining key terms and concepts, and specific questions on which EPA is seeking input. These documents and further information are available in docket HQ-OPP-2009-0628 at *http://www.regulations.gov.*

In a second Federal Register notice, EPA

is also requesting comment on a petition filed recently by environmental and farm worker organizations.

The petitioners ask EPA to evaluate children's exposure to pesticide drift and to adopt, on an interim basis, requirements for "no-spray" buffer zones near homes, schools, day-care centers, and parks. EPA will evaluate this new petition and take whatever action may be appropriate after the evaluation is complete. For further information and to submit comments, please see docket EPA-HQ-OPP-2009-0825 at http://www.regulations.gov.

More information:
http://www.epa.gov/pesticides/factsheets/spraydrift.htm

More Details: EPA has developed and issued for public comment a draft Pesticide Registration (PR) Notice on Pesticide Drift Labeling. The purpose is to provide guidance to registrants and applicants for registration on labeling statements concerning pesticide drift, and to inform the public of EPA's policies with regard to pesticide drift. The draft PR Notice proposes labeling statements and formats intended to improve communication of drift management requirements to pesticide applicators and as a result, to improve protection of people and other non-target organisms and sites from potential adverse effects that may be caused by off-target pesticide drift. The recommended statements should appear on products whose application may result in drift.

The draft PR Notice contains:

1. A general drift statement that varies according to product type. The general drift statement prohibits drift that could cause an adverse effect to people or any other non-target organism or site.
2. Examples of risk-based, product-specific drift use restrictions, along with formats for presenting these statements on product labeling. On a pesticide-by-pesticide basis, based on individual product use patterns, EPA will evaluate scientific information on risk and exposure from pesticide drift. These assessments will help the Agency determine whether product-specific use restrictions are needed to protect people, wildlife, water resources, schools, or other sensitive sites from potential harm. These restrictions could include no-spray buffer zones, or requirements related to droplet or particle size, nozzle height, or weather conditions at the time of application.
3. Guidance to applicants and registrants about the process for implementing the new statements and formats on product labeling.
4. The Agency believes the use of these statements and formats on labels will provide users with consistent, understandable, and enforceable directions about how to protect human health and the environment from harm that might result from off-target pesticide drift.

The draft generic test protocol for the verification of pesticide spray drift reduction technologies is available from the Environmental and Sustainable Technology Evaluations (ESTE) Web page (*http://www.epa.gov/etv/este.html#pdrt*).

(R. Grisso, P. Hipkins)

Farm Safety Association Manuals

Canada's Farm Safety Association has several manuals that are available for download. Included are:

- Silo Safety and Incident Prevention
- Preventing Farm Incidents Caused by Moving Parts
- Stretches & Postures at Work (English & Spanish)
- ATV Safety for Agricultural Workers
- Safety in the Landscape Industry
- On Guard! -- Machine Guarding and Shielding

http://www.farmsafety.ca/pages/manuals.html

Forklift Safety…

More than 200,000 forklift related injuries occur in U. S. workplaces each year according to a recent article in the California OSHA Reporter. Violations of the powered industrial truck standard rank in the top 10 most frequently violated standards each year. Why? To learn more, let's look at the benefits and the potential problems.

Forklifts are beneficial because they assist in the movement of materials and they reduce employee lifting injuries. Like anything else, there are potential problems. Problems include pedestrians, blind spots, narrow aisles, indoor and outdoor use, columns in buildings, and the forklift's turning radius. The biggest challenge is pedestrians around forklifts. Pedestrians contribute to accidents by trying to "beat" the forklift and not understanding stopping distances.

What can be done to reduce forklift accidents? Areas of operation need to be kept clear of obstructions and free of pedestrian traffic. The equipment needs to be properly maintained and inspected regularly. Most importantly, operators need to be properly trained. When an accident occurs, the employee operating the forklift is not the only one affected. The employer suffers damage to the equipment, loss of productivity, and far too many times, loss of life or permanent injury to the employee. Is it worth it? Never…

Every employee operating a forklift needs to properly trained.
(R. Grisso)

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 access these files. Please visit: ***http://www.ext.vt.edu/vce/anr/bse/index.html***

Ag Safety and Health Challenges

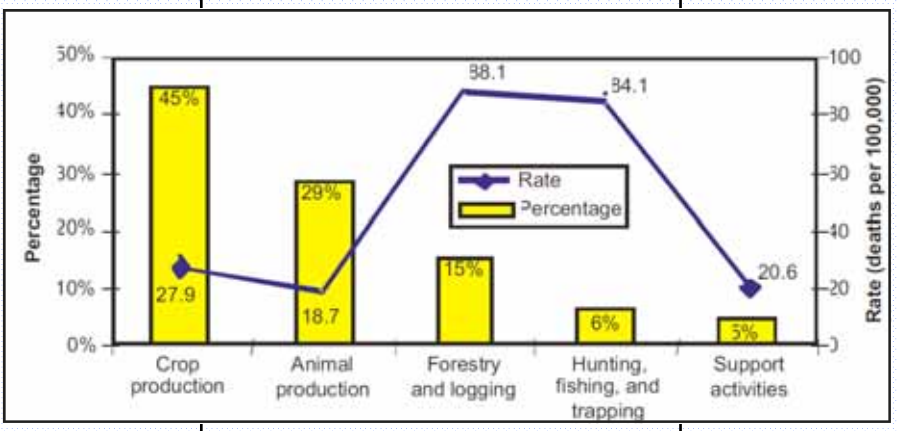
Safety specialists led the way to reduce a tremendous fatality problem facing farmers in the 1960s. The challenge was large, because the fatality rate among farmers was extremely high. In 1964, ASAE established standards for slow-moving vehicle (SMV) emblems for farm equipment traveling on roadways, rollover protective structures (ROPS) for tractors, and other standards, including guards for power take-offs (PTOs).

Most states adopted the SMV emblem as a requirement on public roads. OSHA adopted the ROPS and other standards in 1976. However, the OSHA standards only applied to employees and not to farmers without full-time, paid employees; thus, unsafe equipment and conditions remained on farms. The imperative for reducing the huge toll of farm-related deaths remains today, even though an early initiative to abate this toll was mounted by the USDA's Cooperative Extension Service (CES), followed later by NIOSH.

The Imperative

The problem of occupational fatalities has not gone away. Data reported by the Bureau of Labor Statistics for the year 2007 indicate that the agricultural sector has the highest rate of occupational fatalities among high-rate sectors, at 28 deaths per 100,000 workers. This includes the self-employed and is more than seven times the average rate for all occupations (3.8 deaths per 100,000 workers).

To put it another way, the agriculture sector was responsible for 11 percent of the 5,112 fatalities in private industry while representing only 1.6 percent of national employment. Preliminary data for 2008 indicate a worsening of the fatality problem among agricultural workers, with a 10 percent increase to 651 deaths. This represents an increase to 14 percent of the fatalities in private industry, which otherwise declined to 4,549 total deaths. The high rate of agriculture-related fatalities changed little from 2003 to 2007. The principal sources of agricultural fatalities are tractors, non-tractor machines, confined spaces, livestock, and electrocution. Crop and animal production accounts for 45 percent and 29 percent, respectively, of the fatalities, while the remaining 26 percent of deaths occur in forestry and logging, hunting, fishing, and trapping, and agricultural support activities.



Extension Successes

In 1971, Secretary of Agriculture appointed a task force to explore ways to improve agricultural safety. As a result, in 1974, the USDA and the U.S. Department of Labor (including the newly created OSHA) signed a memorandum of agreement establishing cooperative efforts in farm safety education.

Employing the extension system, the U.S. Congress appropriated $1,020,000 for fifty-one $20K formula grants under the Smith-Lever Act to the CES to support safety programs in each of the 50 states and Puerto Rico. Indexed for inflation, the original appropriation was equivalent to $3.9 million in 2009 dollars. Level funding existed through 2006. The immediate effect was that Virginia had extension safety leadership. However, the funding for extension farm safety programs was never increased, and inflation diminished the value of the funds. In 2006 Congressional appropriations were dropped.

Safety engineering research is needed to arm state and local practitioners with controls that provide an impact on fatality reduction by freeing workplaces of occupational hazards in agriculture, forestry, and fishing. Tragically, the fatality rate remains high, and funding has not kept pace with the challenge to prevent unnecessary deaths as well as nonfatal injuries and occupational diseases. Engineers have a significant role to play in preventing these injuries and diseases.

(Source: ASABE Resource)

Proper Lifting for Awkward Loads

Key Points

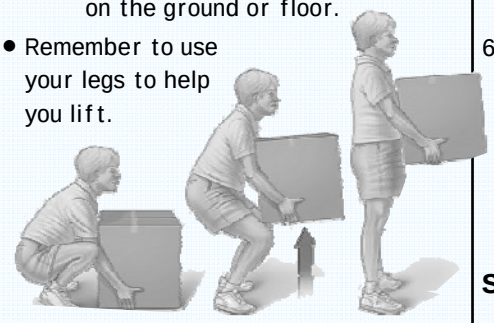
- Establish a wide base of support before picking up a load.
- Use your shoulder to help support a light-weight, odd-sized load.
- Ask for help if you can't safely lift or move a load by yourself.

Back injuries can be costly

- If you've ever hurt your back, you know how painful it can be.
- Back injuries can result in lost work time, costly medical bills, long-term chronic pain, and decreased quality of life.
- Improper lifting is a common cause of back injuries. Each pound of weight you lift puts close to 7 1/2 pounds of pressure on your lower back.
- While you may be familiar with some of the standard "safe lifting" tips, it's not always possible to follow them when you need to pick up a large but lightweight box of cotton, a piece of lumber, a long pipe, or another odd-sized load.

Lifting odd-sized loads

- The general rule of safe lifting is to carry the load as close to your body as you can. But this is not always possible, depending on the size and configuration of the load.
- An alternate way to lift odd-sized, lightweight objects is to carefully lift the object up to your shoulder and support it on your shoulder while you move it. If the object is long, keep the front end higher than the rear, and never block your field of vision.
- Before you pick up the load, be sure you:
  - √ Establish a wide base of support. Do this by parting your feet. Put one foot slightly in front of you and the other slightly in back.
  - √ Straighten your back. Then squat down to pick up the load, keeping your back straight. You'll know you have a good base of support if your front foot heel remains on the ground or floor.
- Remember to use your legs to help you lift.



Difficult to reach loads

- There are times when you can't lift perfectly, no matter how hard you try.
- One example is when you need to reach into a bin, container or other storage area.
- In these situations you can use the assisted one-hand lift.
  - Rest your non-lifting hand on top of the container.
  - Bend over to grasp the object. Then push down with your hand that's on top of the container to force your upper body back to a vertical position.
  - Be sure to let your non-lifting hand - not your back do the work.

More safe lifting tips

1. *Avoid overreaching*. If you must pick up an object higher than shoulder level, use portable stairs or a height-adjustable platform if possible. Slide the object as close to you as you can.
2. *Use your arms and legs* to help you lift, rather than your back. Keep your back straight.
3. *Never bend from the waist* to pick up any type of load.
4. *Ask for help* if an object is heavier than you can safely lift alone. Even if an object is light-weight but bulky, it may be better to get a co-worker to help you. It's especially important to get help with odd-sized loads because your center of gravity can easily be displaced.
5. When moving a long object with a co-worker, be sure each person supports the object with the same shoulder, and that both people keep in step.
6. *Avoid twisting* your body while lifting or carrying a load.
7. *Plan ahead* before you move a load. Be sure you have a clear path and know where you are going to set the object down.

Summary

DO's

1. Establish a wide base of support before picking up an odd sized load.
2. Be sure your front foot heel remains on the floor or ground when you squat down.
3. Ask for help if a load is too heavy or bulky to handle alone.

DON'T

1. Overreach to pick up a load.
2. Lift if you are in poor physical shape.
3. Bend from the waist to pick up a load.

from: http://intra.ext.vt.edu/anr/bse/lifting.html
(R. Grisso)

Taking Multiple Medications

From a survey of 308 Virginia farmers, 63 participants took multiple medications and 13 were likely to have a moderate negative side effect. Of the 13, one individual's medication could produce major negative side effects. Even though this is only 0.3% of the population surveyed, the improper combination of multiple medications could be a significant health issue that can be easily avoided with a pharmacy's assistance.

The study showed that four primary possible side effects of drug interactions are: hypertension, hypotension, hyperglycemia, and hypoglycemia. These results can vary the extremes of blood pressure or blood glucose level. Symptoms often include dizziness, headache, nausea, and often shortness of breath. Individuals experiencing these symptoms can be at a high risk of causing secondary injuries during their normal tasks on the farm. Special consideration needs to be given to the types of medications being taken together and whether or not these are producing adverse side effects.

Information for potential drug interaction is at the following website:
www.drugdigest.org

The interactions were then found by clicking on the tab "check interactions." For example, one survey participant indicated taking Coumadin injections in addition to Lopressor HCT tablets. After inputting these two medications into the designated site, the result is three potential interactions. For example, Coumadin may have moderate negative interactions when taken with certain foods and/or with alcohol. The third potential interaction involves Coumadin with Lopressor HCT tablets which can result in excessive bleeding due to a decrease in blood clotting (see below the advice from web site).

The website also has available the degree to which this interaction has been documented and the degree of severity to be expected. For the example above, the interaction between Coumadin injections and Lopressor HCT tablets is poorly documented with a moderate potential severity.

(Kristen Pevarski, R. Grisso)

WARFARIN SODIUM (in Coumadin Injection) may interact with HYDROCHLOROTHIAZIDE (in Lopressor HCT Tablets)

Blood clotting normally occurs in response to a cut or other types of injuries to protect the body from excessive bleeding. Many substances are involved in the clotting process including platelet cells and various proteins that are produced in the body. Water is one of the main components of the blood, along with red and white blood cells, platelets, and proteins. Hydrochlorothiazide promotes the removal of sodium and water from the body by the kidneys. When this happens, substances in the blood become more concentrated meaning that the same amount is now contained in less fluid. Because the platelet cells and proteins are more concentrated, the blood may be more likely to clot. Warfarin is generally used to prevent your blood from "coagulating" or forming blood clots. When these drugs are used at the same time, hydrochlorothiazide may diminish the ability of warfarin to prevent blood clots. If warfarin and hydrochlorothiazide are taken together, your doctor may want to monitor you closely for signs of a clotting disorder. Blood tests can be used to make sure that you are getting the right amount of warfarin. If you are experiencing problems, it may be necessary to adjust the dose of warfarin.You may want to ask your healthcare provider about this potential interaction if you think you are having problems.

www.drugdigest.org

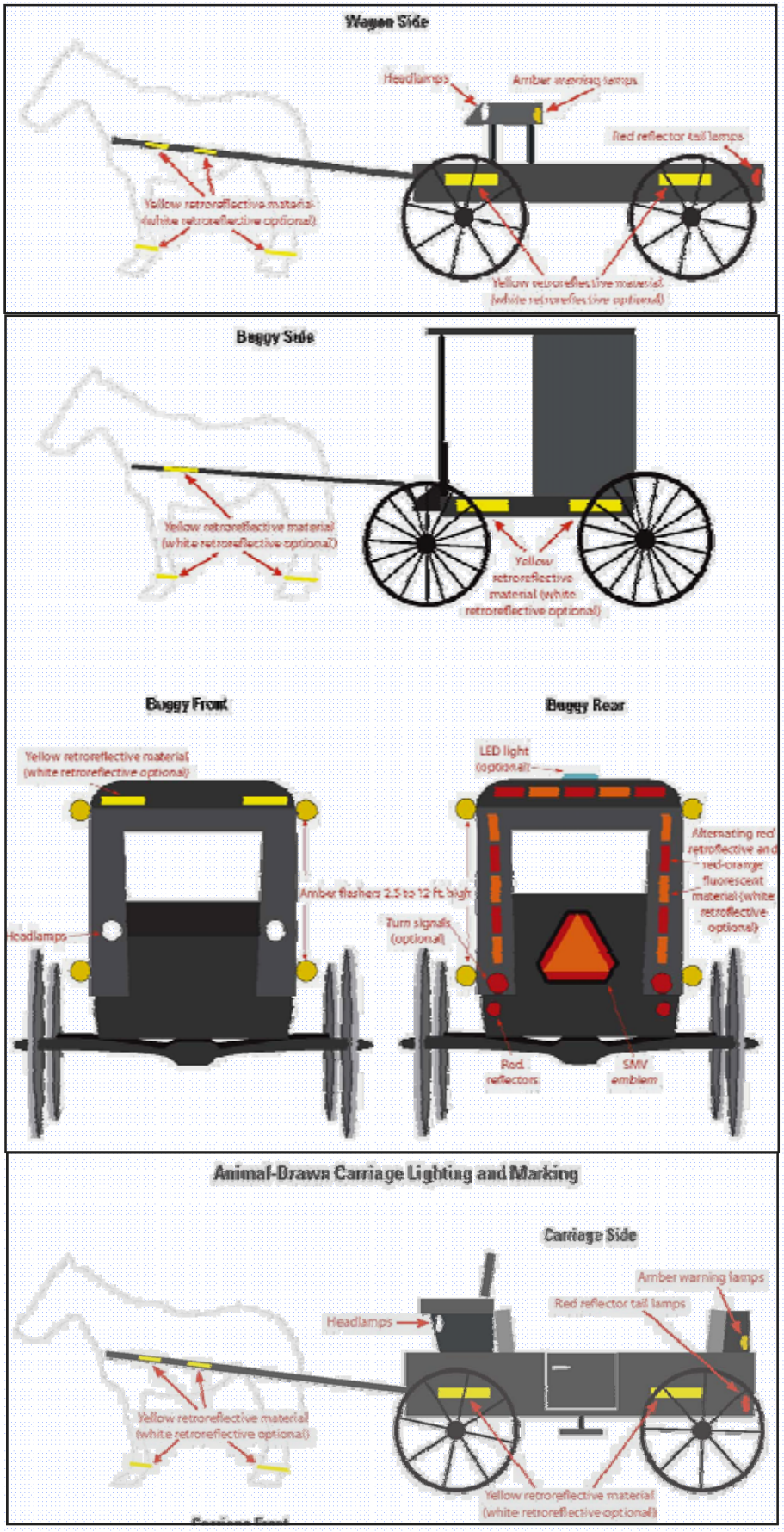
Animal-Drawn Carriages: Lighting and Marking Recommendations

Horse-drawn buggies or wagons and other animal-drawn carriages have been used by the Plain Communities as the primary means of transportation for generations.

While the use of buggy transportation has remained constant, rural populations have grown, and tourism in these communities has increased. This leads to many more motorists sharing the same roads as buggies. Acceptance of a universal buggy lighting and marking practice may be encouraged as one way to increase public awareness of buggies on the roadway and decrease buggy/motor vehicle crashes.

The SMV emblem is a unique identifying marker indicating a vehicle traveling slower than 25 mph. Studies show that two out of three highway crashes involving slow-moving vehicles are rear-end collisions. Of these rear-end collisions, nine out of ten occur during daylight hours. During the day, the bright, fluorescent orange triangle of the SMV emblem gains the attention of approaching motorists from more than 1,000 feet. This provides motorists ample time to slow down before it is too late.

ANSI/ASAE, EP576.1 July 2008, Lighting and Marking of Animal-Drawn Equipment, ASAE Standards, American Society of Agricultural Engineers (ASAE), St. Joseph, MI 49085.



Specialized Harvest Cart for Harvesting Vegetables

Stooping or kneeling and crawling to harvest salad greens requires a lot of time and energy. Lifting and moving your harvest container many times as you fill it adds to the work load. An alternative is to build a simple cart which allows you to sit and roll while you harvest. This is less tiring for the knees, back, hamstrings, and torso. The cart also holds your harvest container, so it rolls along with you.

How does it work?

The cart straddles the crop bed or rows, so that the wheels are on the paths between the beds. A seat is mounted low to the ground, between the rear wheels, allowing you to work directly over the bed without stooping. The seat swivels so you can harvest all parts of the bed without twisting your body. Move the cart forward by pushing the rear wheels with your hands, wheelchair fashion, or scoot along with your feet on the ground. Prop your harvest container on the front corner of the cart frame, within easy reach. The front wheel swivels for easy steering.

Harvest cart benefits:

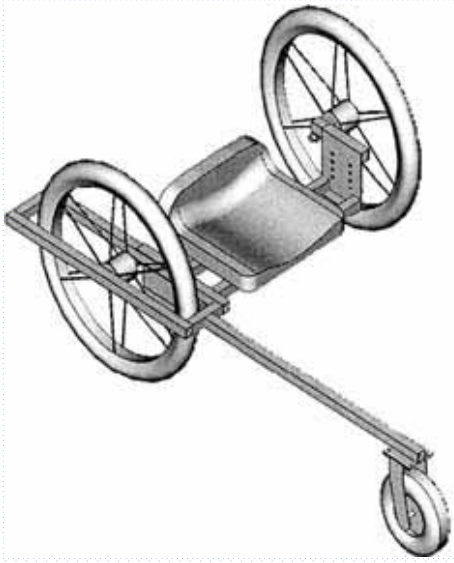
Less fatigue and discomfort. Prolonged kneeling to harvest, transplant, or weed puts small-scale growers in one of the highest risk groups for occupational injuries. Harvesting from a seated position eliminates knee strain, and is less tiring for the back, hamstrings, and torso. Kneeling requires at least 25% more energy, and stooping requires at least 45% more energy than sitting does.

Improves profits. Cutting harvest time can save labor costs. A typical scenario might be that your labor costs are $7.00 per hour, and you harvest 4 days a week. If you saved 30 minutes per harvest day by using the cart, in 11-18 weeks the cart will have paid for itself. If the harvest cart prevents back or knee pain, you might also save money on medical bills.

How much will it cost?
The parts for this cart cost about $150. Labor costs, custom welding or welding shop rental times will vary.

Steel: (1-1/4" square tubing, 1/8" wall thickness. 3/32" flat stock for gussets and supports) $15
Seat: (small tractor replacement) $28
Rear Wheels: (26" pneumatic) $28 /ea
Front Wheel: (10" swivel caster) $36
Swivel: (boat seat) $15
Total: $150

Cart width should be 6 to 12" wider than beds so that wheels will roll in the paths. Overall cart length is 42-1/2".



Plans: *http://www.bse.wisc.edu/hfhp/tipsheets_html/cartplans.htm*

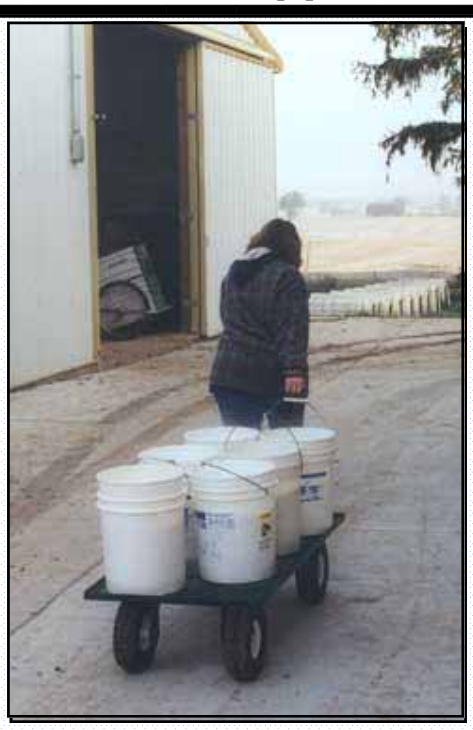
Move calf feed and supplies by pull wagon

It's inefficient to transfer milk, containers and supplies in several trips by hand. A simple cart or wagon can dramatically improve your calf feeding system.

Benefits:

Save time. When you carry milk, feed and supplies for 15 pre-weaned calves by hand, you may make 10 round trips a day between the milkhouse and the hutch area. At a distance of 50 yards, this means carrying loads in buckets for a total of 10-15 minutes each day. Using a simple cart can cut the number of trips and the total travel time in half and save more than an hour each week.

Improved working conditions. Hand-carrying heavy 5 gallon buckets strains the back, arms, wrists and shoulders. Over time this can result in injury and lost work time. The narrow bucket handles can cause pain by cutting into your hands. Using a cart or wagon greatly reduces the amount of lifting and carrying you do. Therefore, it cuts down on the risk of back pain and injuries. What's more, you can mix and pour milk right on the wagon, which means you don't have to do as much stooping as you would if you were mixing on the floor.



This worker is able to carry six buckets of milk at once. Without the cart it would take her three round-trips to deliver this much feed.

Easy to implement. All you need is a wagon or cart, and a relatively smooth and level path from the barn or feed preparation area to the calves' hutches. A wider wheelbase and wider tires will make it easier to pull the cart across unpaved surfaces.

Easy to use. Carts and wagons can be easily managed by all calf care workers, both young and old.

Where can I get one?
There are many different types of carts and wagons on the market. Look for a cart that is well-made and durable, and that will hold the containers that you use to deliver milk to pre-weaned calves.

The following list of sources is provided as a convenience for our readers. It is not an endorsement by Virginia Tech, nor is it exhaustive.

Your local Farm Supply or Farmer's Coop.

Amity Carts
301 East Washington Street, Shenandoah, PA 17976
Phone 1-800-262-6489
Fax 570-462-4942
E-mail amity@ptd.net
www.amitycarts.com

Gempler's
Belleville, WI
Phone 1-800-382-8473
www.gemplers.com

TekSupply
1395 John Fitch Blvd., South Windsor, CT 06074
Phone 1-800-835-7877
Fax 1-800-457-8887
E-Mail sales@teksupply.com
www.teksupply.com

(R. Grisso)

Affordable Person-Lifts for Disabled Farmers

The agricultural working population is aging and some of these workers are disabled. About 50% have significant mobility problems, and are unable to get on and off of agricultural vehicles, easily and safely.

When addressing the need of aging or disabled farmers, seeking assistance to get off and on agricultural equipment, a key step is a preassessment. The preassessment establishes the client's level of need by seeking an evaluation from vocational rehabilitation (Dept. of Rehabilitative Services (DRS) **http://www.vadrs.org/**).

In conjunction with AgrAbility personnel and county extension agent, DRS specialists and rehab engineers can offer suggestions so that the needs of the individual are properly met both from the medical and farm productivity sides of the business enterprise. A farmer, who can survive economically and emotionally without operating farm production vehicles, would be making significant contributions to their safety and the safety of those around them. In cases where vehicle operation is necessary, the next best option is to seek funding to purchase proven but expensive commercial lifts for vehicles.

Many farmers cannot afford such lifts and cannot obtain funding to purchase them. The only options left to such workers are homemade lifts employing off-the-shelf, poorly selected components like cable winches from local hardware stores. Use of these lifts frequently leads to secondary injuries.

The current project was aimed at replacing the last option which clearly is not acceptable. Affordable off-road vehicle lifts were designed. A version of two designs was constructed and troubleshooting is continuing on the installation and checkout process. The lift is an electric-actuator-lead screw system and current costs of such electric actuators are moderately high because only a few actuator suppliers are willing to certify their systems for human lifting.

The client is a highly functional and motivated paraplegic. He had a vehicular accident in 1996 and has been using a wheelchair ever since. He has a 15 acre farm and he is developing the farm to raise livestock. He has a Kubota 34-hp tractor, which he operates. However, his method of mounting the tractor has ranged from having someone lifting and pushing him into the seat, to devising a stationary harness lift to move him (very uncomfortable for him), to transferring from a platform deck. All of these methods have been risky and have resulted in some difficulty in continuous use. AgrAbility chose to work with him as a test case for development of a small-tractor automated lift.

This approach for granting vehicle access to disabled farmers is expected to have broad applications as soon as the troubleshooting phase is completed. An attempt will be made to reduce equipment costs and also to implement alternate designs. Meanwhile, disabled farmers who appear to have mobility needs, should be encouraged to seek DRS evaluation.

(Source: D. Ohanehi, R. Grisso, AgrAbility Project)

Portable Ladder Safety Important During Holidays

When families start decorating for the holidays, odds are pretty good that at least one family member is going to spend time on a portable ladder. Portable ladders are one of the handiest, simplest tools we use. But even though they are uncomplicated, planning and care are still required to use them safely.

Each year in the US, accidents involving ladders cause an estimated 300 deaths and 130,000 injuries requiring emergency medical attention. Ladder accidents usually are caused by improper selection, care or use, not by manufacturing defects. Some of the more common hazards involving ladders, such as instability, electrical shock, and falls, can be predicted and prevented.

Prevention requires proper planning, correct ladder selection, good work procedures and adequate ladder maintenance. Some common safety tips for ladders are worth repeating:

- Do not hand-carry loads on a ladder
- Do not reach so far that you lose your balance
- Do not stand on the ladder's top three rungs
- Use non-skid feet or spurs on the ladder
- Set up the ladder so that the base is spaced one foot away for every four feet in height
- Extend the ladder at least 3 feet beyond that used to reach a walking surface or roof

(R. Grisso)

Compact Spill Kit Helps Drivers

The new Oil Eater Transportation Spill Kit is an all-in-one professional grade emergency clean-up system for hazardous spills that helps drivers comply with DOT requirements.

The system comes in a water-resistant storage bag that fits easily inside the vehicle. It includes everything needed to handle the first response to a hazardous spill situation — gloves, instructions, universal pads, snakes, and high-temp disposal bags.

Also included is a quart of Oil Eater Cleaner/Degreaser formulated to clean surfaces after absorption of a spill.

COMMERCIAL DUTY SPILL KIT

For information: www.oileater.com

CDC on H1N1 Vaccine

As of Oct. 29, there were 24.8 million doses of H1N1 vaccines available for U.S. states to order, and while that was 1.6 million more doses than were available, it still is not enough to meet current demand. The Centers for Disease Control and Prevention (CDC) held a press conference, focusing on issues surrounding the availability and distribution of the vaccine. The agency said that although a dearth of the medicine in some areas is creating "challenging circumstances" across the country, increasingly more doses will be readily available in coming weeks.

The vaccine is hard to find in many places and people do want to be vaccinated. Over the next several weeks it should become more easily available. Expect a lot of vaccination efforts in a number of places.

While many state and local health departments have had to adapt their plans based on projected distribution numbers not being met, CDC expects the situation to improve soon. Hopefully things will be getting better,

CDC is aware of reports that antiviral medication, particularly for children, is, in places, also difficult to find, A few weeks ago 300,000 courses of the liquid Tamiflu for children were ready to be shipped out to the states, and these were going out to the states through the strategic national stockpile. The manufacturers understand the supply horizon and understand what is out there in the commercial sector. They are working closely with the states who are managing their stockpiles of these antivirals to get them to the places that don't have them.

Pharmacists can use the capsule form of the medicine and adapt it to a dose that is appropriate for children through a process called compounding, which essentially involves breaking up the capsules and mixing them with a syrup. More pharmacists and national chain pharmacies are getting on board with the process and performing the compounding procedure. Tips on Flu.gov can help parents when the family doctor prescribes capsules for children who cannot tolerate capsules.

The formulation from your doctor may not be the one you were expecting, but kids can take the capsules mixed in with the syrup and that should be just fine.

Most people who get infected with the H1N1 virus will recover with just a few days bed rest and "TLC," staying home from work or school; others will need to receive the antiviral medicines that are an important part of the nation's response to the virus. Parents should visit Flu.gov for warning signs to look for when deciding if a child needs professional care.

(R Grisso)

Dispelling Myths: Seasonal Flu Shot Cannot Give You H1N1

With two separate flu viruses threatening people right now, some doctors fear that those who acquire the H1N1 virus after receiving a seasonal flu shot will blame the shot for their illness and not come back next year.

One has absolutely nothing to do with the other, but if people think the seasonal flu shot gave them H1N1, they are going to be less likely to get the shot in the coming years. This could lead to thousands of additional people coming down with the seasonal influenza virus.

Between five and 20 percent of the population gets the flu every year. More than 200,000 people are hospitalized with flu-like symptoms and more than 35,000 people die from the seasonal flu every year. Flu season runs from November through March. It is important to get a shot as soon as possible because it takes about two weeks for the vaccine to take effect. For children who are afraid of needles, a nasal-spray flu vaccine has been proven to provide protection against strains of the flu.

http://eden.lsu.edu/Topics/HumanHealth/PandemicFlu/Pages/default.aspx

(R Grisso)

Talking Tractors

Farm equipment is already pretty smart. It can turn spray nozzles or planter clutches on and off automatically. It can tell you how much it is harvesting. It can even steer itself.

Now it can learn to use a cell phone to talk to your office computer.

AGCO calls its system AGCOMMAND. It will remotely access information from a piece of farm equipment -- for example, a tractor in a distant field -- so that a farmer sitting at his office computer can know:

- Where the tractor is
- What tasks it is doing and how close it is to finishing
- How often it is idling versus working
- When implements are on the ground and how often in transport mode
- How often it is on the road
- When it will next need service.

This is just the surface of how equipment managers can use the technology.

Chart Equipment Efficiency

Customers will be able to chart their equipment's efficiency and apply that knowledge to make better use of the machine. For instance, sensors could alert the farm office when a spray rig's tank is nearly empty, so a manager could send a nurse truck to the field with a refill. It could be used to alert the farm office if a tractor has entered an area where it is not supposed to go.

Or, the system could tell a spouse where everyone is and when they will be ready for lunch.

The system is based on GPS positioning. Onboard sensors monitor machine performance. A cell-phone based system relays that information to a server, which relays it to the farm office via the Internet. If a farmer chooses, he can have his equipment's information posted on a secure website, so that suppliers can access the data to provide timely services.

Target markets are likely to include large farms with precision farm practices, farm service cooperatives and custom applicators.

Telemetry could be "the missing link" in precision agriculture because it could ensure that the valuable data collected in the field actually makes it to the farm computer, where it can be processed and put to use.

AGCOMMAND system will be available this winter. A small amount of hardware, including the AM50 black box, which connects onboard equipment systems to a server via a cell phone connection, will be needed for the basic service. AGCOMMAND can be plugged into CANBUS outlets to monitor vehicle and implement functions.

Customers will have to buy a subscription to the service. Little estimates entry-level subscriptions will be less than $2,500 for two years of service. A menu of services will come in basic and advanced levels. On a basic level, the onboard system will collect data and send it to a server in periodic "dispatches." If a vehicle is outside cell service coverage areas, these bursts of information will occur when reception improves. Advanced levels will function in real time, and depending on the complexity of equipment functions it monitors, will cost more.

A customer can have a mixed fleet. Some equipment could have basic service but other vehicles would require more advanced features. The system also is not brand dependent, so equipment from different manufacturers could be included in a farm's account.

Long History

Telemetry tracking has a long history in trucking, construction, mining and forestry industries. Also think about aerospace, where telemetry systems help spacecraft and control centers "talk" to each other. (R Grisso)

Exploring Waste Plastic Management Alternatives

RECORDED WASTE PLASTIC WEBINAR NOW AVAILABLE

In 1960 plastics comprised only about 0.4% of the total wastestream; however, in 2007 plastics comprised more than 12% of the total municipal solid wastestream. The US EPA estimates that less than 4% of the plastic used is recycled, with the majority of this originating from plastic bottles and grocery bags. The Virginia nursery and greenhouse industry is one of the fastest growing sectors of agricultural production in the commonwealth. One of the many challenges faced by this industry involves the disposal of plastics. Plastics are used in plant containers, flats, and as films in greenhouses.

A new webinar series exploring waste plastic management alternatives began on November 18th. This first session highlighted Plastofuel research underway at Penn State University with presentations from John Ignosh (VCE), Jim Garthe and John Shea of PSU. This pilot-scale technology explores the densification of a variety of waste agricultural plastics for later use as a high Btu fuel source in a specialized boiler to supply heat to a commercial greenhouse in the Pittsburgh, PA area. Stack emission tests show that this fuel burns cleanly in the optimized combustion system, potentially providing a viable utilization alternative to plastics that typically are not suitable for conventional recycling programs due to photodegradation and soil residue of the material. The recorded webinar is available online at: www.bse.vt.edu/green under the "Web Meeting" tab.

(Sources: J. Ignosh & US EPA Waste Management Reports: 2007 & 2004)

Webinar on the Biomass Crop Assistance Program

On Friday, December 18th from 12-2 (EST) Virginia Cooperative Extension, in collaboration with the Virginia Forestry Association and USDA's Farm Service Agency (FSA), will host a webinar focusing on FSA's Biomass Crop Assistance Program (BCAP). "BCAP provides financial assistance to producers or entities that deliver eligible biomass material to designated biomass conversion facilities for use as heat, power, biobased products or biofuels. This assistance is in the form of a $1 to $1 match for eligible material limited to a maximum of $45 per dry ton and limited to a 2-year payment duration. Initial assistance will be for the collection, harvest, storage and transportation costs associated with the delivery of eligible materials (BCAP)." For more information and registration details please visit: www.bse.vt.edu/green where you will find information under the "Web Meeting" tab.

(Sources: M. Yancey, J. Ignosh & BCAP website below)

http://www.fsa.usda.gov/FSA/webapp?area=home&subject=ener&topic=bcap

New BSE Extension Factsheets

Selection and Location of Poultry and Livestock Manure Storage, VCE Publication 442-307 found at: http://pubs.ext.vt.edu/442/442-307/442-307.html

Abstract: If you raise dairy cows, broilers, layers, turkeys, horses, beef cattle, sheep, goats, alpacas, or swine for income or a hobby, you will have to deal with the manure they produce. The amount of manure produced by the birds or animals you keep depends on their type, age, size, and diet. The factsheet presents the manure characteristics of various animal types that can be used to assist in planning and designing manure handling and utilization systems if values for local farms are not available.

Poultry and Livestock Manure Storage: Management and Safety, VCE Publication 442-308 found at: http://pubs.ext.vt.edu/442/442-308/442-308.html

Abstract: Storing manure is a common practice on farms and for those who keep animals. A well-designed manure storage facility must also be well managed in order to prevent environmental concerns from developing. In most cases, manure storages are used when cold weather, wet conditions, and/or a lack of time do not allow field application. To get the most benefit out of the manure, good management practices and observation of safety practices that minimize manure hazards on the farm are important. This publication provides guidelines for good management and safety practices for manure storage.

Preventing Secondary Injuries in Agricultural Workplaces, VCE Publication 442-085 found at: http://pubs.ext.vt.edu/442/442-085/442-085.html

Abstract: The intention of this fact sheet is to reduce the number of secondary injuries by familiarizing the readers with secondary injuries and the steps they can adopt to minimize them. In addition to identifying common secondary injuries and the most vulnerable groups, the publication discusses steps that can be taken to prevent such injuries. The fact sheet also provides a list of agencies that farmers can contact for assistance when they experience secondary injuries.

Factsheet Coming Soon:

Manure Management & Environmental Stewardship

Assistive Technology in Agricultural

Visit our website: http://www.bse.vt.edu