

# Integrated Pest & Crop Management

## Farm Safety: Patience, Preparedness, Prevention and Practice

By *Bill Casady*

There's nothing more important to your family than your safety. They don't want to see you injured, lose your independence, or even lose your life. Farm Safety is a continuous journey.

Farming is one of the most hazardous occupations there is. Many things can be done to make the farm a safe place—from attitude to a focus on the four P's of safety.

### *Patience*

Patience is often the key to staying safe. Shortcuts are usually an accident waiting to happen. I recall jumping from a grain wagon to a combine instead of climbing down and climbing back up. I landed on the combine and hit my head just above the eye. An hour later, I ended up in an emergency room 30 miles away. A shortcut that might have saved 20 or 30 seconds cost me the rest of the day and a scar. I was just lucky it wasn't worse.

Shortcuts don't pay. Compare the time saved with a shortcut to even one lost day to repair equipment or to heal from an accident.

Patience is also about dealing with the unexpected without letting emotion take over. The unexpected is very common on the farm and usually causes lost time. The key is to plan for the unexpected. Be flexible and prepared to take the time necessary to deal with unexpected situations in a methodical and safe way.

### *Planning or preparedness*

Be prepared for emergencies. Use the technology that's available – whether it's a cell phone or a portable radio. When an emergency situation occurs, then you have some way to call for help.

Talk to your emergency responders about your farm ahead of time. Discuss your farm and any potential hazards that they should know about. Keep emergency phone numbers handy.

### *Precautions or Prevention*

Many accidents can be prevented, so prevention or precautions are a natural part of the list. Precautions are those measures taken in advance to help prevent dangerous situations from occurring in the first place.

Prevention can be as simple as making sure shields are properly in place. Prevention can be as simple as posting danger signs on potentially unsafe equipment.

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Prevention can also mean having and using Personal Protective Equipment also known as PPE. At harvest, the primary piece of PPE is a respirator. The little paper masks can also be helpful, but these paper masks are really only effective on nuisance dust, and sometimes, they can seem like a nuisance themselves. We often refer to these as nuisance masks, but wear them if that's all you have. A fitted mask with an exhalation valve is a lot more comfortable and will provide better protection. You can buy these for 30 to 40 dollars and there's no doubt that they are worth the investment.

Wear fitted clothing especially when working around moving parts. A PTO shaft can wrap you around it so quickly you never knew what hit you. Loose clothing is an accident waiting to happen. Always dress appropriately for the job.

### *Practice*

There are both safe and unsafe practices when trying to get the job done. Practice safety every day and every minute of every day. Just one unsafe practice can make the difference between a **productive and safe** day and a day lost to an accident or even a limb or a life lost to an accident. So, practice safety always. Do it for yourself. Do it for your family.

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# The Role of Nitrogen Fertilizer in Sustainability and Global Warming

By John Lory

Commercial nitrogen fixation to generate nitrogen fertilizers is an energy intensive process. It takes ~13,700 BTU to generate a pound of nitrogen in the most efficient fertilizer plants. Industry average internationally is closer to 23,600 BTU per pound of nitrogen fertilizer.

To put these numbers in perspective, this amount of energy is equivalent to 1.0 to 2.0 pounds of high quality coal or 14 to 24 cubic feet of natural gas or the energy in about two to three cups of gasoline. Fertilizing a field with 100 pounds of nitrogen uses the energy equivalent of 11 to 20 gallons of gasoline.

In the US, our surplus of agricultural production provides some opportunities for replacing fertilizer nitrogen with nitrogen fixed by legumes. For example, over seeding Missouri pastures with clover can nearly eliminate the need for nitrogen fertilizer applications. Legume forage crops can be inserted into crop rotations to provide nitrogen to subsequent grain crops while providing feed for ruminants such as dairy and beef cows. Missouri's primary row crop, soybean, is a legume that does not

require supplemental nitrogen fertilizer to maximize yield.

Complete conversion away from nitrogen fertilizer would inevitably substantially reduce the productivity of US agriculture. Grain production would decrease because grain crops would need to be grown in rotation with forage legumes to fix the nitrogen needed for grain production. There would be a shift away from mono-gastric animal agriculture (pigs and chickens) to ruminant animal agriculture (cows, sheep and goats) that could use forage as a feedstuff. Human diets would shift to utilize more leguminous grain crops such soybean.

Critics claim nitrogen fertilizer production contributes to global warming and is not a sustainable practice. On the specifics of global warming they are correct. Creating a pound of nitrogen generates about 3.0 lbs of carbon dioxide. Crops grown with this nitrogen frequently fix larger quantities of carbon dioxide but most of this carbon is ultimately released back into the atmosphere when the crop is consumed.

These small-scale arguments ignore the large scale realities of the role of

nitrogen fertilizer in the world energy and food balance. Fertilizer production represents a small fraction of fossil fuel use in the world (less than 2%). Furthermore, in many parts of the world nitrogen fertilizer provides critical increases in yield that allows limited land resources to continue to feed expanding populations. In poor countries, nitrogen fertilizer applications increase yields of grain crops directly consumed by people. This investment of our fossil fuel resources is defensible, using one limited resource, energy, to produce an even more limiting resource, nitrogen.

In the US we have the luxury of contemplating reductions in nitrogen fertilizer without jeopardizing our food supply. Worldwide, nitrogen fertilizers support 40% of the human food supply and in some areas that percentage approaches 75%. Without nitrogen fertilizer the world could not sustain its current population of 6.6 billion people.

Suggested reading: *Enriching the Earth* by Vaclav Smil. 2001. Massachusetts Institute of Technology.

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## Engine and Machinery Maintenance for Maximum Efficiency

By Bill Casady

With harvest in full swing, the dust is flying. Just as masks should be worn to protect lungs from excess dust, air filters protect your engine from it. Nothing is more important than personal health, but engine health and performance are important to the bottom line.

All internal combustion engines need adequate air for complete combustion and fuel efficiency. Air must be free of dust and other particulates to protect the engine. Air filters protect the engine by collecting those particles, but they must be cleaned or replaced when they have done their job. A dirty filter starves the engine of air and leads to poor

performance, poor fuel efficiency and increased emissions.

In the same way, engines need proper lubrication to protect precision components from premature wear. Potentially damaging particles are suspended in engine oil. Timely oil changes remove those particles and fresh oil better protects the engine and keeps components in top operating condition.

Spark plugs provide an engineered spark to ignite the fuel air mixture inside the combustion chamber. Not just any spark will do. As spark plugs deteriorate, so does that precise spark and engine efficiency.

Injectors on diesel engines also provide an engineered fuel pattern inside the combustion chamber with properties to ignite the fuel air mixture. Change fuel filters at regular intervals or at the first sign of a misfiring engine. Fuel filters also need to be replaced to prevent premature wear and poor performance. Fuel cleaning starts at the farm tank. Buy only quality fuel and keep it clean.

Any of these simple maintenance items can be a weak link in efficiency, but their effects can also be additive. Routine engine maintenance increases power, fuel efficiency and the life of

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# Harvest Safety on the Farm and on the Road

By Bill Casady

As seasons change, so do hazards. With harvest in full swing, there's a lot of grain being moved from field to storage. No matter which route you take, there's potential danger around every corner.

Harvest is no place for children. They tend to want to play, and there are no safe places to play around harvesting equipment. Children should never be allowed to climb into trucks or wagons. Children have been lost to grain-drowning or a stream of flowing grain. Remember that neither children nor adults can escape flowing grain.

Other hazards include power lines and augers. Both can be dangerous independently, but the combination can cause an electrocution hazard. Electrocutions from moving an auger still occur every year. Electric lines are often lower than surrounding bins and other structures. The same thing can happen with larger grain carts and combines. These accidents often cause multiple injuries or death as a second person appears on the scene to attempt a rescue. Call an experienced professional to conduct the rescue.

The same problem of **multiple injuries or fatalities** can occur in stored grain. The force required to free a trapped worker in grain is often as much as four times the weight of the person. For example, a 200-pound man may require 800 pounds of force to pull from the grain. There is no footing to pull from and even if you could exert 800 pounds of pull, the victim can't hold on tightly enough to be freed from the grain. A rescue attempt can claim an additional life especially in flowing grain.

Never enter a bin alone. Wear a full body safety harness and an approved rope. Have a responsible and informed person on the ground who can get help. Lock out any controls that could potentially start the equipment if you need to be inside a bin.

Public highways are another source of danger for operators of farm machinery and other vehicles on the road. Both have a legal right to use the roadway, but farm machinery and personal vehicles travel at vastly different speeds. Even the fastest farm machinery usually cannot travel more than about 20 mph. Use all safety features at your disposal to warn others of slow-moving vehicles. These include flashing lights as well as a slow-moving vehicle emblem or SMV. Replace old SMV signs with newer, improved ones. Run with **lights on** whenever traveling on public roadways.

Watch out for other people. Many people just do not understand the dynamics of large machinery. I also continue to be a proponent of courtesy. Many public highways cannot accommodate passing. If possible, pull off the road once in awhile to allow passenger vehicles to get around.

Accidents can also be caused by both miscommunications and misunderstandings. For example, if there is a potentially broken part on a piece of equipment, it is sometimes necessary to watch the mechanical parts to observe where the problem is. It's only safe to do this from a distance. Use as many people as necessary to communicate effectively. Never start the equipment when someone is too close.

It's also common for people to work long hours and neglect personal health

while trying to get the job done. Eat, drink and rest. All are necessary for your body to function correctly. Drink water and avoid more than one or two caffeinated beverages during the day. Eat a balanced meal. If nothing else, peanut butter sandwiches and fresh vegetables and fruit will make a decent meal. Take short breaks or rotate out with someone else, especially when running a combine for several hours at a time.

Never get out of the combine without shutting off the header. If there is even a remote chance of needing to work on some part, idle down and shut off the threshing components. There's a lot of crop lying flat on the ground in some locations this year. Twenty-three years ago, I picked a good deal of a farm that had been flattened by intense winds. The header is very likely to plug sometime. I shut the combine down sometimes every hundred yards or so, and I never had a problem. These machines are designed to withstand cycling on and off. The only thing worn out was me, but I walked away from that difficult season without a scratch.

Never work on unplugging a header until the header safety support has been installed and the machine has been shut down. Many people have lost one or both arms or legs to working on a live machine. Reaction time is not even anywhere near close enough to let go of a stalk or a slug of green material before it pulls you in. Be safe and think of the four P's of safety: patience, preparedness, prevention and practice.

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## Engine and Machinery Maintenance for Maximum Efficiency *continued from page 138*

your engine. University of Missouri research has consistently demonstrated the significance of timely maintenance.

Change or clean air filters at least as often as suggested by the maintenance manual. Significant improvements to performance and efficiency can occur

when maintenance is performed even earlier than suggested intervals. Keep good records by marking filters with a due date for maintenance. Keep a duplicate maintenance record in the cab next to the hour meter.

Finally, nearly all engine maintenance activities either directly or indirectly reduce your impact on the environment. A properly maintained engine reduces emissions and reduces the fuel needed to get the job done efficiently.

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# Weather Data for the Week Ending September 23, 2007

By Pat Guinan



Station	County	Weekly Temperature (oF)						Monthly Precipitation (in.)		Growing Degree Days‡	
		Avg. Max.	Avg. Min.	Extreme High	Extreme Low	Mean	Departure from long term avg.	Sep 1-23-Sep	Departure from long term avg.	Accumulated Since Apr. 1	Departure from long term avg.
Corning	Atchison	85	60	92	46	73	10	1.03	-1.99	3716	556
St. Joseph	Buchanan	84	63	86	53	72	9	3.12	-0.48	3609	400
Brunswick	Chariton	87	62	89	56	74	10	0.82	-1.81	3627	365
Albany	Gentry	85	59	88	48	71	8	2.07	-1.06	3516	319
Auxvasse	Audrain	91	64	93	60	76	12	0.44	-2.45	3678	398
Columbia	Boone	90	65	93	60	77	12	0.47	-2.29	3777	369
Sanborn Field	Boone	89	67	92	62	77	11	0.64	-2.12	3956	466
Williamsburg	Callaway	91	62	94	57	76	11	0.78	-2.35	3718	481
Novelty	Knox	88	59	91	55	73	9	0.74	-2.03	3398	191
Linneus	Linn	88	61	91	53	73	10	0.98	-1.82	3504	381
Monroe City	Monroe	90	62	93	58	76	12	0.18	-2.58	3537	265
Versailles	Morgan	89	66	92	62	76	10	2.24	-0.54	3872	416
Green Ridge	Pettis	87	64	90	62	75	10	2.02	-0.75	3714	470
Lamar	Barton	86	64	88	60	74	7	3.32	0.09	3753	130
Cook Station	Crawford	87	58	88	55	71	5	4.69	2.04	3552	62
Alley Spring	Shannon	87	56	89	53	70	5	2.89	0.36	3503	174
Round Spring	Shannon	87	56	89	54	69	4	2.62	0.11	3529	198
Delta	Cape Girardeau	90	57	93	54	73	5	1.15	-1.42	3919	93
Cardwell	Dunklin	90	60	93	57	74	4	1.93	-0.42	4238	117
Clarkton	Dunklin	91	59	93	56	75	5	0.29	-2.24	4225	145
Glennonville	Dunklin	90	61	92	57	75	5	1.09	-1.39	4204	148
Charleston	Mississippi	90	61	93	58	75	7	0.63	-1.73	4146	354
Portageville-Delta Center	Pemiscot	89	63	92	59	76	6	2.55	-0.19	4390	340
Portageville-Lee Farm	Pemiscot	88	63	92	60	75	6	6.56	3.87	4374	351
Sleele	Pemiscot	90	64	92	59	77	7	2.24	-0.27	4473	425

\* Complete data not available for report

‡ Growing degree days are calculated by subtracting a 50 degree (Fahrenheit) base temperature from the average daily temperature. Thus, if the average temperature for the day is 75 degrees, then 25 growing degree days will have been accumulated.

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