

Purdue University

Agricultural Safety and Health Program

2007 Indiana Farm Fatality Summary

Compiled by the Purdue University Agricultural Safety and Health Program

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The 2007 Indiana farm fatality report was compiled by Purdue's Agricultural Safety and Health Program through a variety of sources, including a contracted news clipping service, Web searches, voluntary reporting from Extension educators and individuals, and personal interviews. In addition, fatality data gathered by the Indiana Department of Labor were made available, and they yielded one additional fatality that the regular surveillance methods did not. No cases were identified from sources outside of the state, including the Federal government. Neither were any cases identified using official death certificates due to the lack of access to these records at the Indiana Department of Health.

In 2006 only eight farm work-related fatalities were recorded— exactly one half of the lowest number ever previously reported (16); however, that uncharacteristically low number of fatalities was not sustained for 2007. In fact the 2007 total (24) was triple that for 2006. Relatively wide variations in the fatality rate from year to year have historically occurred in the past, but nothing of this magnitude has been seen since 1996. This report includes a summary of those 24 farm work-related fatalities¹ that occurred in 2007. For over 30 years there has been a steady downward trend in the number of farm work-related fatalities, and the 2007 total is not substantially larger than would be expected from that continuing downward trend. The average age for farm work-related fatality victims in 2007 was 50.1 (Table 1) while the average age over the past ten years was 54.3. All but two documented cases involved males. The two female fatalities were children ages four and 13, and there were two fatalities of males under the age of 18; their ages were four and 12. Those four incidents involving children accounted for 16.7% of the total number of fatalities reported in 2007. Only one or two fatalities of children or adolescents under age 18 have been reported annually, since seven occurred in 2000. The four cases that occurred in 2007 reflect an unwelcomed reversal in the declining frequency of children being involved in fatal farm-work incidents. Victims over the age of 60 accounted for over 40% of all documented cases, and that is consistent with a continuing trend of older individuals being involved in a disproportionate number of fatal incidents.

¹ A farm work-related fatality is defined as any fatal injury to a farm or ranch worker (or bystander) occurring in the course of performing an agricultural work-related task, or as a result of exposure to hazards in the agricultural workplace. Motor vehicle incidents not clearly involving agricultural equipment or vehicles are excluded.

Gender	Age Distribution					Total	%
	1-17	18-35	36-59	60+	Unknown		
Males	2	3	6	10	1	22	91.7
Females	2	0	0	0	0	2	8.3
Total	4	3	6	10	1	24	100
%	16.7	12.5	25.0	41.6	4.2	100	-
Average Age	8.3	30.0	49.5	73.2	-	50.1	-

Table 1. Age distribution of Indiana farm work-related fatalities in 2007.

Tractor related incidents were the leading category of fatalities in Table 2 and accounted for seven (29.1%) of the recorded fatalities; but when the three roadway fatalities involving a farm tractor and the one front-end loader (machinery) crushing incident are included, the total fatalities involving a tractor were eleven or 45.8%, and that percentage approaches the historical average. Roadway collisions and machinery-related incidents were the other leading types of farm-related fatalities in the state--each accounting for four (16.7%) of all identified fatalities. Tractor overturns accounted for three (12.5%) of the fatalities and continue to be the leading cause of farm work-related fatalities nationally accounting for approximately 25% of all fatalities. There were two ATV/Utility Vehicle fatalities included in the “Other” category, and one ATV fatality included in the “Tractor Runovers” category for a total of three farm-work related fatalities involving ATVs or utility vehicles—a category of incidents that has also seen a rapid increase in fatalities and injuries in the recreational sector. The three cases represent the highest number of work-related ATV/Utility vehicle fatalities ever recorded during a single year.

Table 2 summarizes the specific types of incidents associated with Indiana’s farm fatalities in 2007. Note that roadway collisions involving tractors or machinery are listed in the “Roadway” category instead of the “Tractor” or “Machinery” categories. Figure 1 displays the distribution of farm-related fatalities by general type of incident.

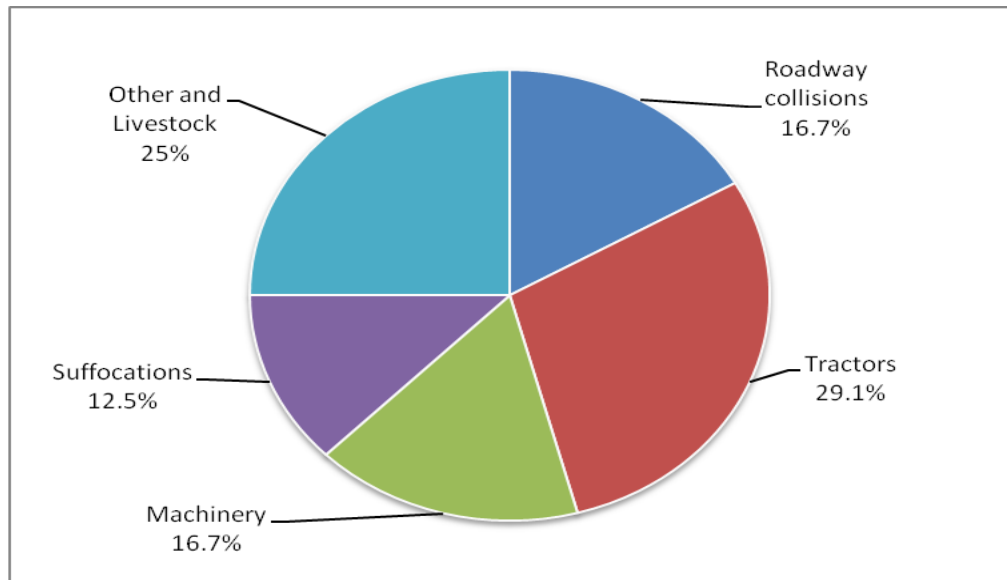


Figure 1. Distribution of 2007 Indiana farm work-related fatalities by general type of incidents.

Type of Incident		Fatalities
Entrapments, suffocations, or asphyxiation	Grain entrapments	1
	Drownings	-
	Buried in trench	-
	Gas asphyxiation (manure pit)	-
	Anhydrous ammonia	1
	Fire	1
Livestock-related incidents	Trampled by livestock	-
	Kicked by horse	-
	Horse-drawn wagon incidents	1
Machinery-related incidents	Entanglements	-
	Crushings/pinnings	3
	Runovers	1
Tractor-related incidents	Overturns	3
	Runovers	3
	Crushings/pinnings	1
Roadway collisions	With livestock	-
	With combine	1
	With tractor	3
	With pull-behind machinery	-
	With agricultural truck	-
Other incidents	ATV or Utility Vehicle	2
	Crop duster airplane crash	1
	Fall from grain bin	1
	Heat stroke while baling hay	1
	Heat stroke	1
Total		24

Table 2. 2007 Indiana farm work-related fatalities by specific type of incident.

Table 3 provides a more detailed listing of fatalities that occurred in Indiana counties in 2007. Fatal farm work-related incidents are described here by (1) date of incident, (2) county of incident, (3) age of victim, (4) gender of victim, (5) description of circumstances surrounding the incident, and (6) the Farm and Agricultural Injury Classification (FAIC) Code. The FAIC code is used to facilitate consistent and accurate classification of farm and agriculture-related injuries. Additional information on the FAIC code is available from the American Society of Agricultural and Biological Engineers (ASABE²) or by contacting Purdue's Extension Safety Specialist.

²ASABE Standard S575.1, 2002. ASABE, 2950 Niles Road, St. Joseph, MI 49085. Tel: 616-429-0300

The FAIC code system:

- parallels, to the extent appropriate, current nationally established methods for classifying and assigning work-related injury cases to an industry;
- provides a systematic scheme for separating farm production work cases from non-farm-production work cases; and
- permits the identification of cases that uniquely reflect the situational exposures predominate to the agricultural industry.

Figure 2 represents a geographic distribution of Indiana's documented farm-related fatalities in 2007. Four counties had two fatalities in 2007 (Lake, Kosciusko, Cass, Greene), but only LaGrange and Perry had fatalities in both 2006 and 2007. Figure 3 represents a geographic distribution of 710 of Indiana's 783 documented farm-related fatalities in the years 1980 through 2007 where the county of incident was known. Interestingly, only Howard County has not had a documented farm-related fatality in the past 28 years. Counties where relatively few fatalities had occurred in the past 28 years added to their low totals this year. Lake County went from a total of two to four; Kosciusko from six to eight; Union from two to three; and Blackford from three to four. The counties with 12 or more identified fatalities over the past 28 years are as follows:

Elkhart	22	Allen	12
LaGrange	21	Franklin	12
Dubois	16	Huntington	12
Greene	17	Jefferson	12
Adams	14	Morgan	12
St. Joseph	14	Randolph	12
Jennings	13	Ripley	12

Date	County	Age	Sex	Description of Incident	FAIC ^a
1/6/07	Union	38	M	Ran over while jump starting tractor	1
4/3/07	Warren	56	M	Loader tractor overturn	1
5/20/07	Sullivan	13	F	Tractor overturn when ran off road	1
5/26/07	Wabash	59	M	Found in anhydrous ammonia cloud	1
5/28/07	Gibson	62	M	Pinned under combine corn head	1
6/18/07	Kosciusko	4	F	Skid steer runover, fell from bucket while riding in bucket, watering trees	1
6/21/07	Hamilton	33	M	Tractors bale spear hit pickup truck, killing passenger in pickup truck	9
7/1/07	Perry	75	M	ATV overturn while checking fences	1
7/7/07	Kosciusko	4	M	Passenger on tractor fell off and ran over by tractor	NA
7/14/07	LaGrange	12	M	Operator jumped off runaway horse-drawn rake, hit head on pavement	1
7/15/07	St. Joseph	24	M	Crop duster airplane crash killing pilot	1
7/23/07	Cass	86	M	Operator crushed by front-end tractor loader	1
8/25/07	Harrison	80	M	Utility vehicle overturned while herding cattle	1
8/27/07	Johnson	80	M	Grain bin entrapment, suffocation	1
8/27/07	Lake	47	M	Semi truck collision on roadway, killing farmer in backhoe	1
8/27/07	Greene	48	M	Tractor overturn when ran off road	1
8/28/07	Marshall	49	M	Tractor ran over ATV operator on silage pile	NA
9/1/07	LaPorte	33	M	Baling hay—heat stroke and/or health related problem	1
9/28/07	DeKalb	64	M	Pinned under combine grain head	1
9/28/07	Wells	72	M	Victim's vehicle collided with combine on roadway	9
10/10/07	Cass	71	M	Fell off grain bin	1
10/25/07	Lake	60	M	Died in barn fire with 22 horses	1
10/30/07	Greene	UNK	M	Semi truck collision with farm tractor on roadway, killing tractor operator	1
11/13/07	Blackford	82	M	Pinned between tractor and overhead fuel tank while jump starting	1

Table 3. Listing of 2007 Indiana farm work-related fatalities.

^aFAIC-1 Farm Production Work, Victim engaged in work activity related to agricultural production.

FAIC-9 Farm Hazard Exposure: Roadway collision. Victim not actively engaged in a work activity but injured as a result of collision with agricultural hazard on roadway.

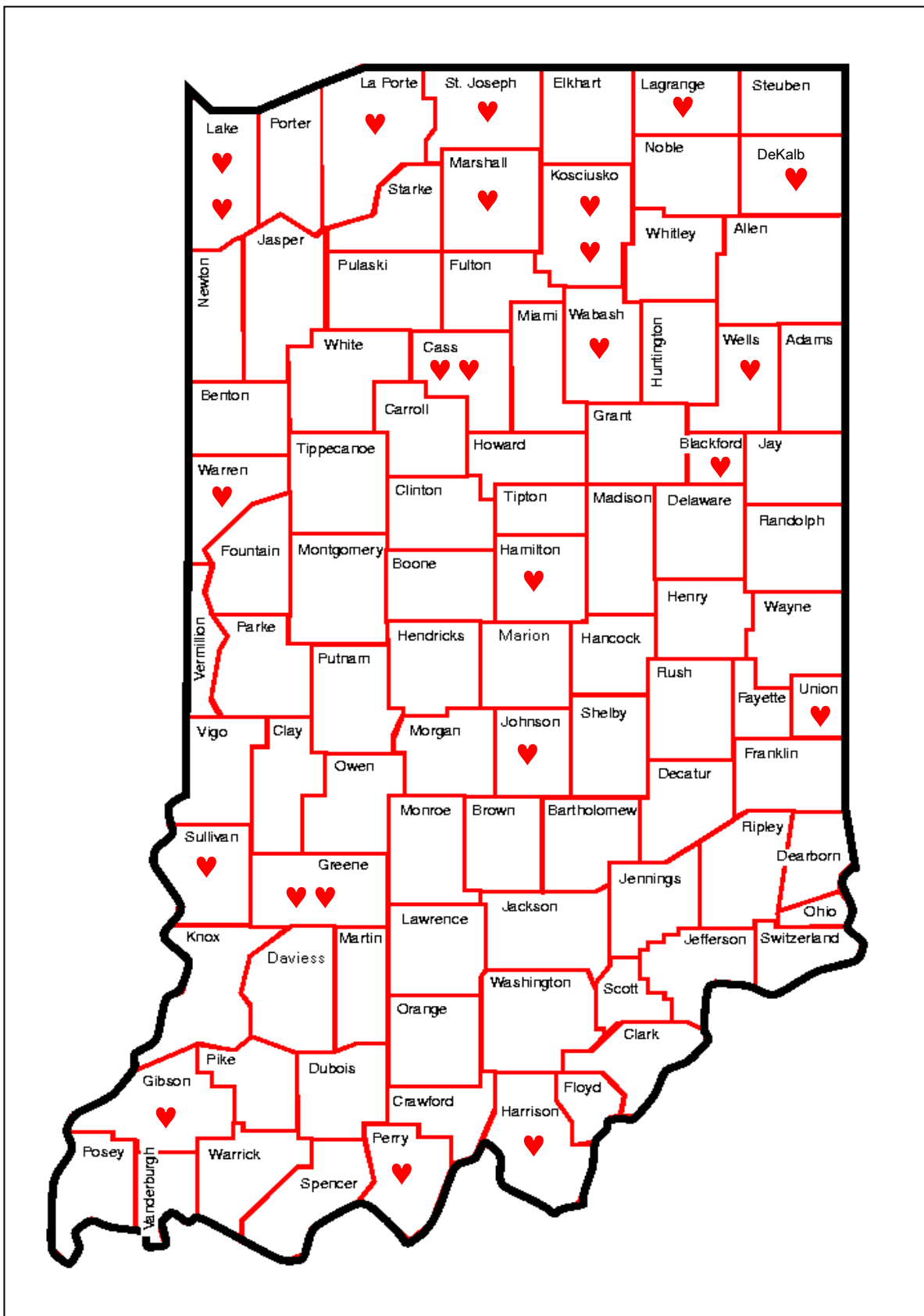


Figure 2. Geographic distribution of 2007 Indiana farm work-related fatalities. N=24

Figure 4 displays the general downward trend of identified farm-related fatalities over the past 38 years. The 1998, 2004, and 2005 years each recorded the second lowest number of fatalities (16) while 2006 recorded only eight fatalities, the lowest since Purdue’s Agricultural Safety and Health Program has been keeping records. The number of identified fatalities increased in 1999 and 2000 then continued the general decreasing trend from 2001 through 2006; however the 24 fatalities in 2007 again falls above the general downward trend.

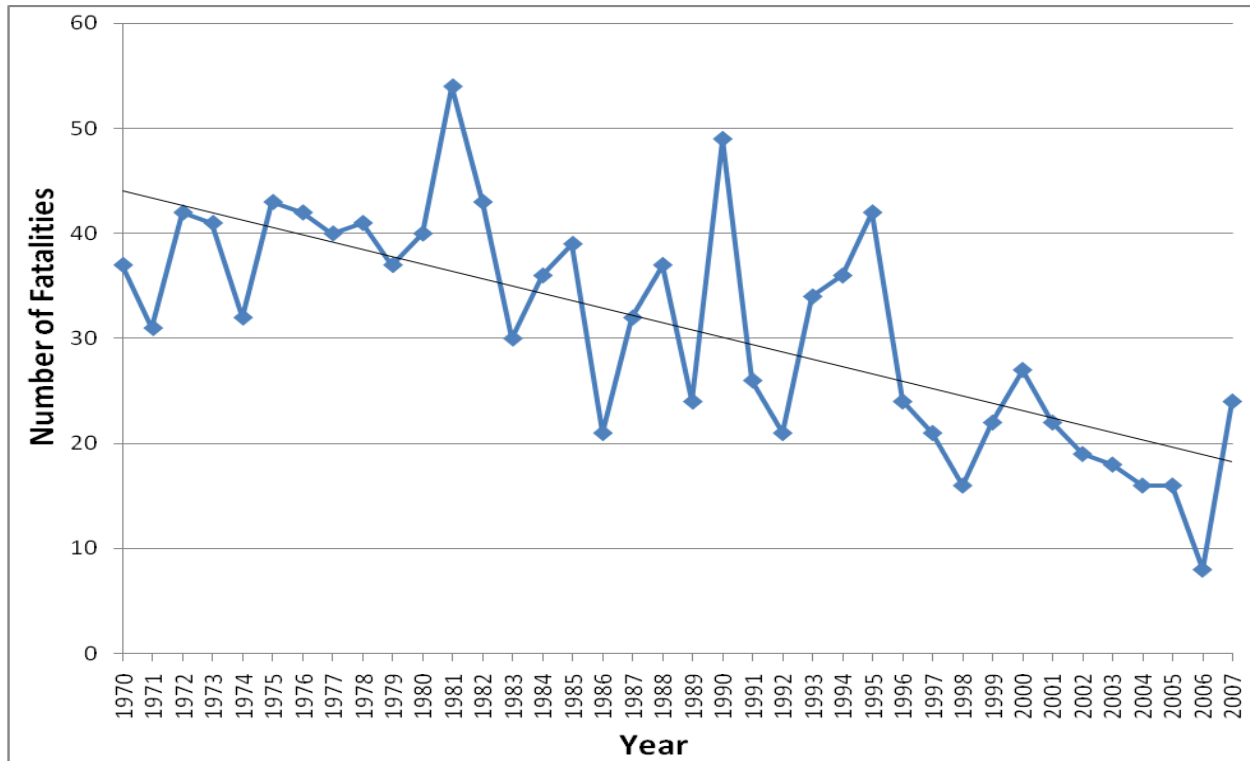


Figure 4. Annual summary of farm work-related fatalities.

Using the number of 60,296 productive farms in Indiana with sales of over \$1,000, it was estimated for 2007 that one out of every 2512 farms experienced a farm-related fatality³. Using a population of 143,000 operators and hired workers on farms in Indiana, the death rate was approximately 16.8 per 100,000 farm workers⁴. That rate compares to an estimated national death rate of 3.5 per 100,000 for workers in all industries and 31.6 per 100,000 for those engaged in agricultural production nationwide⁵. It is believed, however, that the Indiana and national agricultural rates would be lower if unpaid family labor were included in the population of those exposed to farm hazards on a regular basis. Furthermore, the National Safety Council data does not include children under 16 in their calculation of rates while Purdue’s Agricultural Safety and Health Program does if the children were involved with or exposed to farm-work activities.

³ Estimated number of farms from the final report of the 2002 US Census of Agriculture.

⁴ Estimated farm population of operators and hired workers on farms from the final report of the 2002 US Census of Agriculture.

⁵ Estimated death rates from the National Safety Council Injury Facts, 2007 edition.

Summary of Indiana's Farm-Related Non-Fatal Injuries and Their Economic Impact

While the Purdue Agricultural Safety and Health Program's surveillance of farm-related fatalities is rather comprehensive, farm-related non-fatal injuries are not well documented by any source in the state; therefore, there is little data on the frequency and severity of injuries that occur annually during farm work. However, many of Indiana's non-fatal farm-related injuries that were identified in 2007 were severe. The reported incidents included: one silo auger and two grain auger entanglements with severe injuries; two grain entrapments; tractor runover of a dismounted operator; silo-gas poisoning; severe head injury caused by a run-a-way 4-H steer; crushing from tractor overturn; head injury from falling equipment. Ten barn fires, an unusually large number, were reported; injuries and losses from the fires included: a broken arm from a horse kick; hundreds of hogs; two million dollars and 150,000 eggs lost at a duck facility; \$200,000 of hay and equipment lost in one fire; and 22 horses lost in another. Yet another disaster occurred when a furnace failed and 5500 turkeys froze to death.

In addition to the four roadway fatalities reported in Table 2, seven nonfatal collisions between vehicles and farm tractors, trucks, equipment, and commodities were reported: three farm tractor-truck collisions; car-manure spreader collision; ATV-farm tractor collision; car-Terra Gator collision; farm truck-coal truck collision. Several incidents involving fertilizer and manure transport and spills included: semi truck overturn with 2500 gallons of manure spilled; manure spill at a dairy; semi-truck tanker of nitrogen fertilizer overturn; anhydrous ammonia wagon broke loose from its tow truck; another anhydrous ammonia wagon released ammonia gas on a roadway causing an evacuation of four square miles and facial burns to one motorist and four fire fighters.

From all of the nonfatal incidents, at least four of the victims had to be airlifted to regional trauma centers. These nonfatal incidents resulted in extremely severe disabling conditions, such as paralysis from spinal cord injury, leg amputations and brain trauma. Historically, many of these injuries would have been fatal but were not, due to rapid access to emergency medical services. All of the known injury victims were males except for one, and the ages of recorded victims ranged from 16 to 68.

It is estimated, based upon prior research, that approximately 1 out of every 9 farms annually experiences a farm-related injury requiring medical attention. Based upon the estimated 60,296 farms in the state, it can be projected that in 2007 there were approximately 6,700 treated injuries. Prior research by the National Safety Council indicated that 2% of reported farm injuries result in permanent disabilities which suggests that approximately 134 such cases occurred in the state in 2007.

Other incidents were reported which were not directly farm-work related but involved circumstances similar to those encountered with farm work. These included fatal roadway collisions involving: semi truck and a pickup truck; semi truck and several vehicles, killing eight people including four Amish workers; and a single vehicle crash of a semi truck hauling farm products. Other nonfarm work incidents included: fatal utility vehicle overturn; fatal lawn tractor overturn; serious-injury collision between a car and a lawn tractor; entrapment in a gravel bin; collision between a train and semi-truck load of soybeans; and a fatal runover of a three year old who fell out of the cab of a bulldozer.

To gain a perspective of the potential economic impact of farm injuries to the state, a conservative estimated medical treatment cost of \$1200 per injury⁶ would result in an economic loss of \$8.0 million excluding the costs of transportation to receive medical services, replacement labor,

⁶ Estimated cost per injury based upon research conducted at the University of Illinois

property damage, emergency services, and long-term rehabilitation services. This estimated total, however, would be substantially increased if both the direct and indirect costs associated with the 24 fatalities and the 134 permanent disabilities were included. For example, the estimated cost of medical and rehabilitation care for a person experiencing a permanent spinal cord injury now exceeds \$1 million.

Even though the general trend for the total number of fatalities and injuries has been on the decline, it is believed that the economic impact on the state is on the rise due to the significant increase in medical and rehabilitation costs. This is especially problematic considering that a disproportionate number of farm families do not carry or cannot afford sufficient health care insurance. A single serious injury can result in almost insurmountable financial disaster for an otherwise successful farm family which is further emphasized by the fact that Indiana leads the nation in the rate of bankruptcies filed for medical reasons.

Another issue that can create significant hardships for both Indiana farm families and hired farm labor is that most are not covered by nor can they afford state workers compensation insurance programs that nearly all employees of other industries have available to them. Therefore, an on-the-job injury can result in both excessive personal debt due to medical costs and long-term loss of income. The lack of both affordable health care insurance and insurance for lost wages due to injury are complex issues that need attention to ensure that the economic impact of work-related injuries on the state's farm families and agricultural workforce is minimized.

National Agricultural Statistics Service (NASS), 2006 Farm and Ranch Safety Survey

These NASS farm injury findings were based on a random telephone survey of 25,000 U.S. farm operations where farm operators were asked questions associated with their 2006 activities. Survey estimates indicated that there were 6700 farm tractor overturns in the U.S. And a large majority involved tractors without a ROPS which is not surprising, since tractor overturns are historically the number one cause of farm-work fatalities.

From 84% to 93% of PTO driveline guards were in place on balers, mowers, and augers, and 92% of portable augers had intake chute guards in place, but the missing and damaged guards are the problem. Research at the Purdue Agricultural Safety and Health Program has shown that those missing and damaged guards are responsible for almost all of the PTO incidents causing traumatic injuries and death.

Only 60% of manure pit openings were covered with a grate, lid, or guard, and 19% of farmers with manure pits stated they entered their pits six or more times in the previous 12 months. It appears that the dangers of manure pit gases are being disregarded despite the reports of multiple fatalities in manure pits, such as the 2007 incident in Virginia where four family members and one hired worker died.

Only 66% of farm workers, who reported working around loud noises, used hearing protection even some of the time. It is no wonder that 75% of farmers suffer hearing loss compared to 10% on the general public according to the New York Center for Agricultural Health.

An estimated 1.1 million ATVs were reported as used for farm work tasks some of the time which helps explain why three farm work-related fatalities in Indiana in 2007 involved ATVs or utility vehicles. These highly maneuverable and go-any-where vehicles are rapidly becoming valuable farm-work equipment as well as prized recreational vehicles.

The Changing Agricultural Workforce

Over the past 30 years, the agricultural workforce in Indiana has changed dramatically. In 1976, when the Occupational Safety and Health Act (OSH Act) was passed by Congress, the US Census

of Agriculture showed there were fewer than 100 farm operations in Indiana that were required to comply with the workplace safety and health provisions of the act due to their workforce exceeding 10 non-family member employees. In 2007, the estimated number that could be interpreted as needing to be in compliance has grown to around 850. It is assumed that this number will continue to increase with additional farm consolidation. Many of the farms have grown slowly and quietly, and their owners may not even realize that they should be in compliance with the Occupational Safety and Health Administration (OSHA) regulations.

Another major change has been the rapid growth in the number of Hispanics that are now employed in agricultural production operations on a full-time basis. This trend is especially notable on dairy, poultry, and hog operations. Many of these workers have limited English speaking skills and lower literacy levels that make traditional agricultural safety and health resources ineffective. To address the workplace safety and health needs of this new workforce, attention must be given to developing new and innovative instructional material that addresses the hazards of newer and more complex farm operations. That material needs to be culturally sensitive and delivered in a format that can be interpreted by the target audience.

Farm-related Injuries in the Amish/Old Order Communities

Amish are a part of the Old Order Anabaptist subculture, and Indiana is home to the third largest Amish community in North America. This group is closely associated with agriculture, has a larger than average number of children per household, and is doubling in population approximately every 20-22 years. In 1996 one third of all documented farm-related fatalities occurred in Amish communities. Elkhart, LaGrange, Adams, and Allen counties, home to some of the largest Amish communities, are also counties with the largest number of farm-related fatalities over the past 30 years.

There are several contributing factors to the larger number of cases being reported from these communities. These include the widespread use of horses and horse drawn vehicles and equipment, more labor intensive farm practices, greater use of children in completing farm work, and the recent acceptance of certain hybrid equipment that is engine powered yet still horse drawn.

Purdue Agriculture Safety and Health Program identified 203 farm-related injuries and 14 deaths that occurred in 2002 to Anabaptist children and youth under the age of 18 in the U.S. and Canada.⁷ Direct animal contact, hay-hole falls, and horse-drawn equipment runovers were the most common causes of incidents, and the injuries occurred most frequently at ages 3-4 and 13-15.

Over the past 10 years, Purdue Extension has undertaken an aggressive effort to raise the awareness level within the Amish community of the hazards being identified by the injury data collection efforts and has facilitated over 20 family safety days that have attracted several thousand Amish family members. Intervention strategies have been developed and presented which include new safety material that is more culturally acceptable.

Impact on Agriculture from Natural Disasters

An ongoing review of reports from across the state indicates that farmers are also regularly impacted by a variety of environmental forces including flooding, tornadoes, winter storms, lightning and high winds. In most cases, the bulk of these losses are absorbed by the farm operation due to a lack of adequate insurance coverage, high levels of deductibles, and policy coverage limitations. Though not always preventable, some of these losses can be mitigated through adequate planning and more effective response strategies. A good example is the damage caused by frozen

⁷ "Farm-Related Injuries Among Old Order Anabaptist Children ...," Gilliam et. al., Journal of Agromedicine, Vol. 12(3) 2007.

pipes, a significant source of insurance claims. Utilizing appropriate design criteria, recognizing the need to protect vulnerable pipes and providing short-term but safe supplemental heating could save farm families hundreds of thousands of dollars annually that are spent to repair broken pipes and water damage.

Motor Vehicle Safety

The most frequent cause of work-related deaths for Indiana farm families and farm labor are, and always have been, motor vehicle crashes. The total number of deaths may be lower, but the rate is just as high as and probably higher than other segments of the population due to the exemption in the past that farm truck operators had from having to comply with the state motor vehicle seatbelt law (that exemption was rescinded effective July 1, 2007). It may be that the single most important step that could be taken to reduce work-related fatalities among farmers is to encourage them to buckle up every time they get behind the wheel and head out on the highway.

Diminishing Resources

As budgets have tightened and legislators at the state and federal levels have explored ways to reduce expenditures, farm safety efforts have not gone untouched. In Indiana, reduced travel budgets and increased fuel costs for Extension staff have made coordination and participation in local safety initiatives more difficult. Educational material that was once free and readily available is now expensive and restricted to on-line access. Most commercially available farm safety videos and DVDs have become so expensive that they are now out of reach to most public schools and groups such as 4-H and FFA. The Purdue Audio Visual Library, once a major source for borrowing safety-related videos has closed its doors to non-Purdue related organizations. The Indiana Rural Safety and Health Council, the only non-profit group in the state with its sole mission being to promote agricultural safety and health, has a budget of only a few thousand dollars per year to spend on exhibits, displays, and information dissemination. To make matters worse, USDA eliminated all earmarked farm safety funds for the states from the budget for the past three years leaving several states with no, or greatly diminished farm safety programs. Due to the foresight of Purdue's earlier Extension directors, Purdue's commitment to farm safety and health had already been incorporated into line item budgets and was not impacted as much as most states.

Farm safety and health is not, nor will it ever be, a topic that will make the front page of the paper, turn the heads of legislators or generate an outpouring of public support. However, if you belonged to one of the 783 Indiana farm families that experienced the loss of a family member over the past 28 years, including the 24 in 2007, you know personally the impact these events can have. In some cases, the effects last a lifetime.

If you are interested in supporting the work of Purdue's Agricultural Safety and Health Program or the Indiana Rural Safety and Health Council, please feel free to call 765-494-1191.

For additional information, contact 765-494-1191 or visit www.farmsafety.org.