



WISCONSIN LEGISLATIVE COUNCIL
REPORT NO. 8 TO THE 1993 LEGISLATURE

LEGISLATION ON FARM SAFETY

1993 ASSEMBLY BILL 821, Relating to Creating an Agricultural Safety and Health Center in the University of Wisconsin System, Farm Safety Programs, Content of Driver Education Courses, Sales of Farm Equipment, Liability Arising Out of Fabricating Safety Devices for Farm Equipment, Highway Operation of Agricultural Machinery, Requiring Amber Reflectors on Overwidth Implements of Husbandry, Making an Appropriation and Providing a Penalty

Legislative Council Staff
October 26, 1993

One East Main Street, Suite 401
Madison, Wisconsin

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WISCONSIN LEGISLATIVE COUNCIL
REPORT NO. 8 TO THE 1993 LEGISLATURE*

LEGISLATION ON FARM SAFETY

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PART I

KEY PROVISIONS OF LEGISLATION

1993 ASSEMBLY BILL 821, RELATING TO CREATING AN AGRICULTURAL SAFETY AND HEALTH CENTER IN THE UNIVERSITY OF WISCONSIN SYSTEM, FARM SAFETY PROGRAMS, CONTENT OF DRIVER EDUCATION COURSES, SALES OF FARM EQUIPMENT, LIABILITY ARISING OUT OF FABRICATING SAFETY DEVICES FOR FARM EQUIPMENT, HIGHWAY OPERATION OF AGRICULTURAL MACHINERY, REQUIRING AMBER REFLECTORS ON OVERWIDTH IMPLEMENTS OF HUSBANDRY, MAKING AN APPROPRIATION AND PROVIDING A PENALTY

1993 Assembly Bill 821 proposes the following changes in state law:

1. Agricultural Safety and Health Center

The Bill establishes an agricultural safety and health center in the University of Wisconsin (UW)-Extension and appropriates \$40,400 of general purpose revenue (GPR) in fiscal year 1993-94 and \$80,800 GPR in fiscal year 1994-95 to the UW System to operate the center. The Bill also appropriates \$20,000 GPR to the UW System in the 1994-95 fiscal year to fund a grant program for local sponsors of farm safety education, training or information programs, to be administered by the agricultural safety and health center established by the Bill.

2. Sales of Farm Machinery

The Bill prohibits persons in the business of selling farm machinery from selling such machinery unless, at the time of sale, it is equipped with certain safety equipment.

3. Highway Operation by Youthful Operators

The Bill prohibits the operation of agricultural machinery on highways by persons under the age of 16, other than to cross the highway, unless the person has completed a tractor and machinery operation safety training course.

4. Standard of Liability Applicable to Fabricated Safety Equipment on Farm Machinery

The Bill creates a statutory exception to the common law rule of strict liability in product liability cases for damages arising from the fabrication and retrofitting of safety equipment on used farm machinery.

5. Driver Education Courses

The Bill requires the three agencies regulating driver education courses in Wisconsin--the Department of Public Instruction (DPI) (courses offered by public and private schools), the State Board of Vocational, Technical and Adult Education (VTAE) (courses offered by VTAE district schools) and the Department of Transportation (DOT) (courses offered by licensed driver schools)--to ensure that courses regulated by them acquaint students with the hazards posed by farm machinery and animals on highways and provide instruction in safely dealing with such hazards.

6. Reflectors--Overwidth Equipment

The Bill requires an implement of husbandry extending four feet or more to the left of the centerline of its towing vehicle to be equipped with an amber reflector mounted on the left extremity and facing forward so as to mark the width of the implement to oncoming drivers.

PART II

COMMITTEE ACTIVITY

A. ASSIGNMENT

The Legislative Council established the Special Committee on Farm Safety by a June 19, 1992 mail ballot. The Special Committee was directed to study the underlying causes of farm accidents and injuries and to identify methods to reduce the incidence and seriousness of farm accidents and to protect the health and safety of farm operators and their families and employes.

The membership of the Special Committee consisted of two Senators, four Representatives and 13 Public Members. A Legislative Council membership list is included in **Appendix 1**; the Special Committee membership is included in **Appendix 2**.

B. SUMMARY OF MEETINGS

The Special Committee held six meetings at the State Capitol in Madison on the following dates:

October 29, 1992	March 18, 1993
December 3, 1992	April 16, 1993
January 7, 1993	May 24, 1993

At its October 29, 1992 meeting, the Special Committee received an overview of the status of farm safety in Wisconsin, activities of state agencies in the area of farm safety and citizen activities aimed at improving farm safety. Specifically, Terry Moen, Section on Occupational Health, Division of Public Health, Department of Health and Social Services (DHSS), described the OSHA's on-site consultation program as it relates to farmers and the farm safety recommendations within *Health Care 2000: A Public Health Agenda for the Year 2000*. William Sheeley, a DHSS public health educator, described how the agency works with local public health agencies promoting farm safety and the types of farm safety programs offered by local public health agencies. Lawrence Hanrahan, a DHSS epidemiologist, overviewed the causes of deaths and injuries suffered by agricultural workers and discussed the existing deficiencies in gathering data on farm-related injuries. Terry Wilkinson, Agricultural Safety and Health Specialist, UW-Extension, reviewed the activities of the UW-Extension in promoting farm safety. As part of his review, Dr. Wilkinson also discussed the preliminary results of the multi-state Regional Rural Injury Study, which identified handling of dairy animals and tractor rollovers as two major sources of farm injuries in Wisconsin. Dr. Paul Gunderson, Director of the National Farm Medicine Center, Marshfield, discussed causes of farm-related injuries to children, the experience of several European countries in improving safety on their farms and methods by which farm-related injuries to children can be reduced. Last, Professor Ronald Schuler, President of the private Farm Health and Safety Council of Wisconsin, described the composition of the Council, its various activities in promoting farm safety and presented statistics on farm-related deaths and injuries and the methods by which such data is currently collected.

At the December 3, 1992 meeting, the Special Committee received testimony from Gary Manke, Gary Antoniewicz and Jack Kohel, all representing the Midwest Equipment Dealers Association, who described the safety-related activities of farm equipment dealers, rollover protection structures (ROPS) on tractors and farmers' attitudes toward them and safety in general and obstacles and disincentives to upgrading used farm machinery with safety equipment. L. Dale Baker, product safety engineer for J.I. Case Company, Hinsdale, Illinois, described the great potential of ROPS for reducing farm fatalities and the difficulty in persuading farmers to install and keep ROPS on their tractors. Mr. Baker also described the safety features which have been designed into newer tractors and farm machinery. Linda Adrian, Director of the Grant County Health Department, described the evolution and content of Grant County's farm safety day camp for children, which reached 600 persons in 1992. Robert Beck, Onalaska, Professor Ronald Schuler, UW-Madison, and Gregg Westiggard, Wisconsin Farmers Union, described and supported a research proposal which would evaluate the impact of farm safety hazard audits by linking them to reductions in health insurance premiums. They also discussed the high costs for health insurance paid by farmers. David MacKenzie, Blue Cross and Blue Shield United of Wisconsin, described the underwriting and rating of farmers for purposes of health insurance. He noted that the percentage of policy benefits expended for accidents involving farmers is nearly three times as high as the accident-related benefits paid to the general Wisconsin working population. Michael Moschkau and Captain Robert Young, Division of State Patrol, DOT, provided statistics on highway accident rates, by age group, involving tractors and other farm-related machinery. They also viewed the specific statutes relating to farm machinery traveling on the highway.

The January 7, 1993 meeting of the Committee was devoted to Committee discussion of each problem and recommendation which had been made to the Committee in its first two meetings. The major topic groupings discussed were better educating persons working and living on farms about farm hazards and the creation of safe working conditions; increasing the use of ROPS on farm tractors; improving safety equipment on farm machinery used in Wisconsin; removing old, less safe farm machinery from use; reducing fatalities and injuries suffered by children on Wisconsin farms; improving emergency medical services training regarding farm-related injuries; and reducing highway accidents involving tractors and other farm equipment.

At its March 18, 1993 meeting, the Committee reviewed the results of an extensive survey of farm machinery dealers, UW-Extension agricultural agents and local public health agencies regarding farm safety education programs at the local level. The Committee also reviewed results of a related survey of farm equipment dealer practices related to safety equipment on machinery which they serviced or sold. Other topics discussed by the Committee included requiring ROPS on tractors operated by youthful employees; improving lighting of farm implements operated on the highway; developing incentives for retrofitting ROPS on older tractors; prohibiting passengers on implements of husbandry when operating on the highway; creating a council on farm safety; improving the availability of child care for farm children, as a means of removing them from the hazards of the farm workplace; and improving training of emergency medical technicians in responding to farm-specific emergency situations. A number of drafting requests resulted from the Committee's discussion.

At its April 16, 1993 meeting, the Committee heard from Dean Ayse Somersan, Cooperative Extension Division, UW-Extension, who discussed UW-Extension's current activities in the area of farm safety and those resources which would be necessary to develop a statewide tractor and machinery operation safety training course. The Committee also received the results of a survey of the farm safety education activities of the top 20 providers of farm insurance in Wisconsin. The remainder of the meeting was devoted to Committee review and discussion of draft legislation relating to farm equipment dealer practices relating to safety; content of driver education courses; requiring additional reflectors on overwidth equipment; highway operation of farm equipment by youthful operators; and gathering of additional data on farm-related injuries.

The May 24, 1993 meeting was devoted to completing work on a number of the drafts previously discussed by the Committee, as well as an extensive discussion of authorizing an agricultural safety and health center in the UW-Extension, farm equipment dealer safety practices and requiring safety certification of youthful operators before operating farm equipment on highways. The Committee reached tentative agreement on the remaining issues before it, pending a mail ballot on the resulting drafts.

C. COMMITTEE AND LEGISLATIVE COUNCIL VOTES

1. Agricultural Safety and Health Center

By a mail ballot dated June 11, 1993, the Special Committee recommended WLCS: 332/2, relating to creating an agricultural safety and health center in the UW System, farm safety programs and making an appropriation, to the Legislative Council for introduction in the 1993-94 Legislature by a vote of Ayes, 16 (Reps. Grobschmidt, Brandemuehl and Gronemus; Sens. Helbach and Lorman; and Public Members Austin, Breuer, Gerharz, Gunderson, Krisik, Leege, Scrivner, Schuler, Tessman, Urban and Zimmerman); Noes, 1 (Rep. Harsdorf); and Not Voting, 2 (Public Members Bauknecht and Kluetzman).

2. Sales of Farm Equipment

By a mail ballot dated June 11, 1993, the Special Committee recommended WLCS: 250/2, relating to sales of farm equipment, to the Legislative Council for introduction in the 1993-94 Legislature by a vote of Ayes, 17 (Reps. Grobschmidt, Brandemuehl, Gronemus and Harsdorf; Sens. Helbach and Lorman; and Public Members Austin, Breuer, Gerharz, Gunderson, Krisik, Leege, Scrivner, Schuler, Tessman, Urban and Zimmerman); Noes, 0; and Not Voting, 2 (Public Members Bauknecht and Kluetzman).

3. Highway Operation by Youthful Operators

At its May 24, 1993 meeting, the Special Committee recommended WLCS: 265/2, relating to operation of tractors and self-propelled implements of husbandry by youthful operators, to the

Legislative Council for introduction in the 1993-94 Legislature by a vote of Ayes, 12 (Reps. Grobschmidt and Harsdorf; Sens. Helbach and Lorman; and Public Members Austin, Gunderson, Klutzman, Krisik, Leege, Scrivner, Schuler and Urban); Noes, 4 (Reps. Brandemuehl and Gronemus; and Public Members Tessman and Zimmerman); and Absent, 3 (Public Members Bauknecht, Breuer and Gerharz).

4. Standard of Liability Applicable to Fabricated Guards on Farm Equipment

At its April 16, 1993 meeting, the Special Committee unanimously recommended WLCS: 186/3, relating to ordinary negligence, to the Legislative Council for introduction in the 1993-94 Legislature.

5. Driver Education Courses

At its April 16, 1993 meeting, the Special Committee unanimously recommended WLCS: 266/1, relating to the content of driver education courses, to the Legislative Council for introduction in the 1993-94 Legislature.

6. Reflectors--Overwidth Equipment

At its April 16, 1993 meeting, the Special Committee unanimously recommended WLCS: 280/2, relating to requiring forward-facing amber reflectors on overwidth implements of husbandry, to the Legislative Council for introduction in the 1993-94 Legislature.

At the direction of Chairperson Grobschmidt, the drafts were combined into one draft, LRB-4196/2, for presentation to the Legislative Council.

At its October 6, 1993 meeting, the Legislative Council voted to introduced LRB-4196/2 by a vote of Ayes, 15 (Sens. Risser, Lorman, Burke, George, Jauch, Leean and Rude; and Reps. Schneider, Carpenter, Deininger, Kunicki, Linton, Potter, Prosser and Travis); and Noes, 4 (Sens. Drzewiecki, Ellis and Farrow; and Rep. Brancel); and Absent, 2 (Reps. Gruszynski and Vergeront).

D. STAFF MATERIALS

Appendix 3 lists all of the materials received by the Special Committee on Farm Safety. The following document, prepared by the Legislative Council Staff, may be of particular interest to persons interested in the work of the Committee.

- Staff Brief 92-17, *Farm Safety: An Overview* (October 23, 1992).

PART III

DESCRIPTION OF 1993 ASSEMBLY BILL 821

This Part provides background information on and describes 1993 Assembly Bill 821.

A. BACKGROUND

In 1991, there were 40 and, in 1992, 50 farm-related fatalities in Wisconsin. There have been an average of 54 farm-related fatalities in Wisconsin during each year from 1972 to 1992. Generally, accidents involving tractors and farm machinery account for over half of the farm-related fatalities in Wisconsin each year, with the single greatest cause of death being the overturn of tractors which are not equipped with ROPS. Although there is no mechanism in place to identify the sources of injuries suffered by persons receiving health care in Wisconsin, anecdotal information from farmers, health care providers and others indicates that, in addition to fatalities, a high number of injuries occur each year on Wisconsin farms. Of special concern are deaths and injuries suffered by children; the report of the Lieutenant Governor's Trauma and Injury Prevention Task Force for Wisconsin Children, released in June 1990, stated that trauma to children on Wisconsin farms is occurring in epidemic proportions.

Several factors unique to agriculture combine to make farming one of the most dangerous occupations in the United States. People working on farms generally do not receive any formal training regarding the operation, maintenance and dangers of the myriad of machinery, equipment and chemicals which they must use on a regular basis. Despite the prevalence of dangerous machinery and equipment, chemicals and large animals, in general, Wisconsin's farms are not subject to the regulation and inspection requirements of the Occupational Safety and Health Act (OSHA) of 1970, because OSHA applies only to agricultural operations having more than 10 employees or those maintaining temporary labor camps. The majority of Wisconsin farms do not fall into either of these categories. Also, none of Wisconsin's laws governing the employment of minors apply to the employment of a minor engaged in farm work performed outside school hours in connection with the minor's own home and directly for his or her parent or guardian. Finally, because the farm workplace also serves as a home, nonworkers, including small children, are often exposed to the hazards identified above. [A detailed description of the application of OSHA and child labor laws to Wisconsin farms is set forth in Staff Brief 92-17.]

During the course of its study, the Special Committee received extensive public testimony regarding farm safety in Wisconsin. A prevailing theme in that testimony was concern over the fact that although various safety features, such as ROPS for tractors, have been designed for farm machinery, those features are often not used as intended or are removed from the equipment by the farmer, for various reasons. Persons addressing the Committee expressed the belief that if farmers were made more aware of the risks posed by the improper use or removal of safety devices, and by engaging in other common practices such as allowing children to "ride along" on tractors, their behavior would change and many farm accidents would be avoided. In addition, the Committee

agreed that educational programs for children and youth could be especially effective by instilling an early appreciation for and understanding of safe farming practices.

To better ascertain the extent of current educational efforts regarding farm safety, the Special Committee conducted a survey of local public health departments, UW-Extension agriculture agents, farm equipment dealers and major providers of farm liability insurance and reviewed the farm safety-related educational activities of various state agencies. Based on this information, the Committee concluded that the educational efforts currently underway appear to be effective, but are provided on a random, patchwork basis and that additional resources are needed to reach greater portions of the farming population. Thus, the Bill recommends the establishment of an agricultural safety and health center in the UW-Extension, to serve as an educational resource, and a grant program to fund local farm safety educational programs, to be administered by the center.

Current law does not require safety devices and features of farm equipment be intact at the time of sale. The Bill creates such a requirement. In addition, in response to concerns raised by farm equipment dealers, the Bill changes the current law's standard of strict liability as it applies to persons who fabricate and retrofit safety shields and devices on farm equipment. It has been claimed that the current standard deters dealers from attempting to provide such replacements when the original safety devices are no longer available. The Bill applies a rule of ordinary negligence to lawsuits for damages allegedly caused by negligence in the design, fabrication or installation of such replacement devices.

The Bill also addresses several safety concerns related to the operation of farm implements on the highway. The draft contains provisions which: limit the operation of farm implements on the highway by youthful operators unless they have received appropriate safety training in the operation of farm machinery; require reflectors on certain overwidth equipment; and require driver's education courses to contain instruction on safely dealing with the hazards posed by farm machinery and animals on highways.

B. 1993 ASSEMBLY BILL 821, RELATING TO CREATING AN AGRICULTURAL SAFETY AND HEALTH CENTER IN THE UNIVERSITY OF WISCONSIN SYSTEM, FARM SAFETY PROGRAMS, CONTENT OF DRIVER EDUCATION COURSES, SALES OF FARM EQUIPMENT, LIABILITY ARISING OUT OF FABRICATING SAFETY DEVICES FOR FARM EQUIPMENT, HIGHWAY OPERATION OF AGRICULTURAL MACHINERY, REQUIRING AMBER REFLECTORS ON OVERWIDTH IMPLEMENTS OF HUSBANDRY, MAKING AN APPROPRIATION AND PROVIDING A PENALTY

1. Agricultural Safety and Health Center

The Bill establishes an agricultural safety and health center in the UW-Extension and directs the center to:

- a. Perform instructor training and coordination necessary to provide a statewide program of tractor and machinery operation safety training to minors and certification of minors successfully completing such training;
- b. Develop curriculum and materials for the statewide tractor and machinery operation safety training program;
- c. Develop and disseminate educational and informational materials and present programs on farm safety and health topics; and
- d. Beginning in 1994-95, administer the farm safety grant program described under 2, below.

The Bill appropriates \$40,400 of GPR in fiscal year 1993-94 and \$80,800 GPR in fiscal year 1994-95 to the UW System to operate the agricultural safety and health center created by the draft.

2. Farm Safety Grant Program

The draft creates a farm safety grant program to be administered by the agricultural safety and health center described above. Under the program, grants totaling not more than \$500 per county may be provided to local sponsors of farm safety education, training or information programs. To be eligible for a grant, a sponsor must:

- a. Secure or provide equal matching funds from private or public sources;
- b. Demonstrate the need for the program; and
- c. Demonstrate that the program for which a grant is sought was developed in consultation with UW-Extension personnel, public health personnel, vocational agriculture instructors or other persons with expertise or interest in farm safety topics.

The Bill appropriates \$20,000 GPR to the UW System in the 1994-95 fiscal year for farm safety program grants. The Bill also authorizes county boards to appropriate funds for, and to sponsor, farm safety programs.

3. Sales of Farm Equipment

Current law does not require safety equipment to be in place on farm equipment at the time of sale.

The Bill prohibits persons in the business of selling farm equipment from selling any item of farm equipment, either new or used, unless at the time of sale that item is equipped as specified below:

- a. Any tractor must be equipped with a power takeoff master shield;
- b. Any item of equipment powered by a tractor must be equipped with a power takeoff driveline shield extending to the second universal joint; and
- c. Any equipment that can be operated on the highway must be equipped with lights and reflectors meeting the statutory requirements applicable to operating that machinery on the highway and a slow-moving vehicle emblem meeting statutory requirements.

In addition, if, at the time of sale, an item of farm equipment is equipped with a power takeoff shield that is not equivalent to the shield that was installed at the time of manufacture, that fact must be disclosed to the buyer in writing.

The requirements described above do not apply to sales by dealers to other dealers or to sales of farm equipment for purposes of salvage.

Under the Bill, any person in the business of selling farm equipment who sells equipment which does not meet the requirements set forth above is subject to a forfeiture not to exceed \$500 per violation. This provision will be enforced by the Department of Agriculture, Trade and Consumer Protection.

4. Rule of Ordinary Negligence Applied to Fabricated Guards

Under Wisconsin common law, the rule of strict liability applies in product liability cases. Under that rule, a product manufacturer or seller can be held liable for the payment of damages for an injury caused by a defective product without any evidentiary showing of specific acts of negligence on their part. It has been asserted that the rule of strict liability acts as a disincentive to persons in the business of selling or repairing farm equipment to fabricate and retrofit replacements for missing safety shields and guards on farm equipment which they sell or repair. Rather, they will sell machinery on an "as is" basis.

The Bill creates a statutory exception to the common law rule of strict liability and applies an ordinary negligence rule to claims for damages arising from the fabrication and retrofitting of any safety guards, shields or other devices for the purpose of preventing injury to humans, which are fabricated and installed by a person who is in the business of selling or repairing farm equipment. Under the rule of ordinary negligence, a person who fabricates and installs a safety shield, guard or other device will not be liable for damages unless the claimant proves, by a preponderance of the evidence, that the cause of their harm was the failure of the person fabricating and installing the guard, shield or device to use reasonable care with respect to the design, fabrication, inspection, condition or installation of, or warnings relating to, the guard, shield or other device.

The rule applies only if the person fabricating and installing the guard, shield or device first ascertains that the guard, shield or device, if original equipment, is no longer available from the

original or replacement manufacturer of the farm equipment and if that person gives notice of the fabricated shield, guard or other device to the owner or purchaser of the farm equipment.

5. Highway Operation by Youthful Operators

Current law contains no restriction on the operator of a farm tractor or an implement of husbandry being operated on the highway.

The Bill provides that no person may direct or permit a child under the age of 16 years to operate a farm tractor or self-propelled implement of husbandry on the highway unless the child has been certified as successfully completing a tractor and machinery operation safety training course. The Bill does permit uncertified persons under the age of 16 to operate farm equipment solely for the purpose of crossing the highway. The Bill provides that any person who violates this prohibition, by directing or permitting an uncertified child under the age of 16 to operate agricultural machinery on the highway, may be required to forfeit an amount not to exceed \$20 for the first offense, and an amount not to exceed \$50 for each subsequent offense.

6. Driver Education Courses

The Bill requires the three agencies which regulate driver education courses in Wisconsin to ensure that courses they regulate acquaint students with the hazards posed by farm machinery and animals on highways and provide instruction in safely dealing with such hazards. The agencies affected are the DPI, which regulates courses offered by public and private schools; the State Board of VTAE, which regulates courses offered by VTAE district schools; and the DOT, which regulates courses offered by licensed driver schools.

7. Reflectors on Overwidth Equipment

The Bill creates a new requirement that any implement of husbandry which extends four feet or more to the left of the centerline of the vehicle towing the equipment must be equipped with an amber reflector mounted on the left extremity of the implement and facing forward, so as to mark the width of the implement to oncoming drivers.

MM:DJS:rjl:las:jt;kja;kjf

WISCONSIN LEGISLATIVE COUNCIL

APPENDIX 1

s. 13.81, Stats.

OFFICERS

Chairperson

FRED A. RISSER
Senator
206 South, State Capitol
Madison 53702-0002

Vice-Chairperson

MARLIN D. SCHNEIDER
Representative
3820 Southbrook Lane
Wisconsin Rapids 54494-7548

Secretary

BARBARA K. LORMAN
Senator
1245 Janette Street
Fort Atkinson 53538-1526

SENATORS

BRIAN BURKE
2029 North 51st Street
Milwaukee 53208-1747

GARY F. DRZEWIECKI
419 Washington Street
Pulaski 54162-0313

MICHAEL G. ELLIS
1752 County Road GG
Neenah 54956-9730

MARGARET FARROW
14905 Watertown Plank Road
Elm Grove 53122-2332

GARY R. GEORGE
3874 North 42nd Street
Milwaukee 53216-3033

ROBERT JAUCH
Route 1, Box 635
Poplar 54864-9801

JOSEPH LEEAN
N2390 South Tammy Trail
Waupaca 54981-9729

BRIAN D. RUDE
307 Babcock Street
Coon Valley 54623-9801

REPRESENTATIVES

BEN BRANCEL (1)
R.R. 1, Box 229
Endeavor 53930-0229

TIMOTHY W. CARPENTER
713 East Norwich Street
Milwaukee 53207-4447

DAVID DEININGER
2116 11th Street
Monroe 53566-1848

STAN GRUSZYNSKI
2272 Stanley Street
Stevens Point 54481-1955

WALTER KUNICKI
1550 South 4th Street
Milwaukee 53204-2961

BARBARA J. LINTON
Route 1 Box 299
Highbridge 54846-9713

ROSEMARY POTTER (2)
3006 South Delaware Avenue
Milwaukee 53207-3062

DAVID PROSSER
2904 North Meade Street #3
Appleton 54911-1561

DAVID TRAVIS
4229 Mandrake Road
Madison 53704-1653

SUSAN B. VERGERONT
390 Vista View Drive
Cedarburg 53012-9122

- (1) Replaced Rep. Mary Panzer, who was elected to the state Senate on September 21, 1993.
(2) Appointed to replace Rep. Peter Barca, who resigned from the Legislature on June 8, 1993.

FARM SAFETY,
SPECIAL COMMITTEE ON

OFFICERS

Chairperson

RICHARD A. GROBSCHMIDT
Representative
1513 Mackinac Avenue
South Milwaukee 53172-3045

Secretary

BARBARA K. LORMAN
Senator
1245 Janette Street
Fort Atkinson 53538-1526

Vice-Chairperson

DAVID HELBACH
Senator
2344 Sims Avenue
Stevens Point 54481-3128

REPRESENTATIVES

DAVID BRANDEMUEHL
13081 Pine Road
Fennimore 53809-9619

SHEILA HARSDORF
Route 4, Box 219
River Falls 54022-9804

BARBARA GRONEMUS
1634 West Street
Whitehall 54773-9505

PUBLIC MEMBERS

DONALD AUSTIN
Farmer
1503 Austin Road
Platteville 53818-9321

JAMES KLUETZMAN
Licensed Emergency Medical
Technician
832 Canal Road
Waterloo 53594-1302

RONALD T. SCHULER
Professor, Department of
Ag-Engineering
UW-Madison
460 Henry Mall
Madison 53706-1502

JOHN BAUKNECHT
Attorney
United Migrant Opportunity Services
2317 International Lane
Madison 53704-3129

ANN KRISIK
Project Director for Farm Vehicles
WI Association of Women Highway
Safety Leaders
1327 80th Street
Amery 54001-2514

ANN TESSMAN
Member, Wisconsin Farmers Union
622 Saddle Ridge
Portage 53901-9777

JEFFRY R. BREUER
UW-Extension Agriculture Agent,
Adams County
402 North Main Street, P.O. Box 217
Friendship 53934-0217

ROBERT A. LEEGE
Director of Member Relations
WI Farm Bureau Federation
W9528 Highway B
Waterloo 53594-9416

MARY URBAN
Farmer
11218 Mayflower Road
Milladore 54454-9608

TIMOTHY GERHARZ
Customer Relations Manager
Patz Company
301 T Avenue
Pound 54161-9716

JAMES SCRIVNER
Vice President
Rural Mutual Insurance Company
P.O. Box 5555
Madison 53705-5555

PAUL ZIMMERMAN
Legislative Representative
National Farmers Organization
825 Water Street
Sauk City 53583-1596

PAUL D. GUNDERSON, PH.D.
Director
National Farm Medicine Center
1000 North Oak Avenue
Marshfield 54449-5772

STUDY ASSIGNMENT: The Special Committee is directed to study the underlying causes of farm accidents and injuries and to identify methods to reduce the incidence and seriousness of farm accidents, and to protect the health and safety of farm operators and their families and employes. The Committee is directed to report to the Legislative Council by March 1, 1993. [Based on 1991 Senate Joint Resolution 62; and an April 6, 1992 letter from Sen. Barbara K. Lorman.]

Established and Chairperson appointed by a June 19, 1992 mail ballot; Vice-Chairperson, Secretary and members appointed by an October 7, 1992 mail ballot.

19 MEMBERS: 2 Senators; 4 Representatives; and 13 Public Members.

LEGISLATIVE COUNCIL STAFF: Mary Matthias, Staff Attorney and Lisa Struble, Support Staff.

APPENDIX 3

COMMITTEE MATERIALS

Staff Materials

1. Staff Brief 92-17, *Farm Safety: An Overview* (October 23, 1992).
2. MEMO NO. 1, *Age-Based Restrictions on Operating All-Terrain Vehicles* (November 25, 1992).
3. MEMO NO. 2, *Problems Identified and Recommendations Made to the Special Committee on Farm Safety* (December 30, 1992).
4. MEMO NO. 3, *Local Farm Safety Education Programs; Safety-Related Business Practices of Farm Equipment Dealers in Wisconsin* (March 11, 1993).
5. MEMO NO. 4, *Responses--Various Committee Requests* (March 12, 1993).
6. MEMO NO. 5, *Farm Safety Education Activities of Farm Insurers* (April 9, 1993).
7. MEMO NO. 6, *Data--Occupants of Tractors Involved in Crashes* (April 15, 1993).

Other Materials

1. *A Guide for Safety Day Planning*, The North American Equipment Dealers Foundation (undated).
2. *Farm Children At Risk*, by Lori Schieldt, Wisconsin Agriculturist (July 3, 1990).
3. Testimony of Mike Moschkau, Wisconsin State Patrol, Department of Transportation (December 3, 1992).
4. Preliminary Project Proposal, *Improving Safety on Wisconsin Farms Through Audits and Economic Incentives*, Ronald T. Schuler, University of Wisconsin-Madison (December 1, 1991).
5. Packet of articles and other materials relating to farm safety activities of farm equipment dealers from Jack Kohel, Kohel Implement, Inc. (1991-92).
6. Letter to the Special Committee on Farm Safety from Committee Member Timothy Gerharz (January 6, 1993).

7. Letter to the Special Committee on Farm Safety with newspaper articles relating to farm injuries from Committee Member Timothy Gerharz (January 14, 1993).
8. *Farm Equipment Dealers Promote Farm Safety*, Wisconsin Agriculturist (March 1993).
9. Letter, with attachments, relating to farm safety activities of farm equipment dealers and *Safety Bulletin*, from Charles Scharine, Scharine's Farm Systems, Inc. (March 12, 1993).
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22. Letter to David J. Stute from David R. Hewett, Vice President, Governmental Affairs, Wisconsin Hospital Association, relating to requiring hospitals to provide certain information to the Office of Health Care Information (May 14, 1993).

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September 26, 2001

My name is Mark Purschwitz. I am an associate professor in the Department of Biological Systems Engineering, UW-Madison, and the Extension Agricultural Safety and Health Specialist. The University of Wisconsin was the first university in the nation to hire a farm safety specialist, back in 1943, and I am just the fourth person here to hold that position. I have personally been involved in farm injury prevention full time since 1985.

My work, and the work of others in the country, has been focused on educating the farming community and those who work with farmers on how to prevent farm-related injuries and illnesses. We also conduct research, and we also educate emergency responders about farm injury incidents, but the primary aim is prevention. Our educational efforts cover behavioral change, how to do farm work in a safe manner, and more importantly, the elimination or minimization of hazards, how to provide as safe a work place as possible, so that when behavior is inadequate, or circumstances occur which are beyond a persons control, people will not get injured, at least seriously. This latter method of prevention, the identification and control of hazards, is by far the most effective way to prevent injury, and is accepted as such by injury prevention professionals in all areas of society, work-related or not.

Over the years these efforts have had some effect, as people's knowledge of safe behaviors and of farm hazards is better than ever. Farm machines and systems have become safer as safety features have been added. The media has greatly increased the attention it gives to farm safety. But still we have many deaths and serious injuries, and nationally agriculture is ranked a close second to mining as the most hazardous industry in America, based on deaths per 100,000 workers, the accepted measurement. The death rate for mining is 23.1, for agriculture 22.5, and for all industries combined 3.8. If you were to look at the list of Wisconsin fatalities by occupation, put out by the Department of Workforce development, you would see that farmers are right near the top.

In Wisconsin, over the past 10 years (1991-2000) we have seen the following:

Total farm-related fatalities, all ages:	360
Children age 14 or younger:	46
Children age five or younger:	22
Deaths involving tractors and machinery:	238
Deaths involving tractor rollovers:	75

In other areas of society, education alone has been considered inadequate for the prevention of injuries, and another tool is regulations, to force changes in behaviors or environments. Our system of public roads is perhaps the best example where numerous regulations, from speed limits to required equipment on vehicles, are imposed in the interest of safety. Roads are constructed with safety in mind. In the workplace, OSHA touches most industries in the U.S.; the mining industry has its own version of OSHA, the Mine Safety and Health Administration, MSHA. However, an estimated 95% of farms in

the U.S. are not under OSHA jurisdiction, based on an exemption for farms with fewer than 10 employees, and even for those larger farms, the number and extent of the applicable regulations is only a fraction of those applied to general industry, the equivalent of a pamphlet compared to a thick book.

Over the course of my career, I have been a fairly vocal defender of personal freedom for farmers to conduct their business the way they see fit, and of parental rights for farm parents to raise their families the way they see fit, free from government interference, and thus have been mostly against the idea of imposing regulations to promote farm safety. I believe my farm safety colleagues will verify that.

However: I have come to the conclusion, and I am here today to tell you, that in my opinion the prevention of farm injuries, especially the many deaths occurring annually, is no longer an educational or even a scientific issue. It is a political issue. There is no mystery here, not like a disease needing a cure; we know how to solve this problem. We know how to prevent farm injuries, and farmers know how because we have told them over and over. What I conclude is that the prevention of farm injuries depends simply on whether we have the will to take the actions needed. Until we do, the improvement over time will be very slow, a case of attrition, as older farmers die off, older farms go out of business, older farm tractors and equipment are used less and less, and younger people who have grown up in a more safety and health-oriented culture take over. This is discouraging to a farm safety professional like myself, but we can educate until we are blue in the face and unless farmers take the necessary steps needed to prevent injuries, or are forced to do so through regulation, progress will be very slow. Even though injury prevention education will always be needed, and is just as important as education for improved crop and livestock production, I am no longer optimistic about voluntary change and believe regulations are necessary. This is a very profound change in my thinking, and I do not believe I am alone among farm safety professionals in this change. Many of us are wondering when society will say, "Enough is enough."

Twenty or thirty or forty years ago, farms were not the subject of environmental regulations, for the most part. Erosion control was a major goal, and along with education, policies such as cost-sharing by the old Soil Conservation Service (now the Natural Resources Conservation Service) were implemented, and tremendous improvements were achieved. Then the non-farm public, our society as a whole, became concerned about such things as groundwater contamination by pesticides and the runoff of manure and fertilizers into streams. Society did not try to educate these problems away, although education and research has played and will continue to play an important role. Society, through state and federal regulations, implemented policies that forced change, and I think we are all better off for it.

In my opinion, if we are to make serious progress in lowering the number of farm-related fatalities, and by extension the number of serious non-fatal farm injuries, we need to implement policy changes. We need to decide, here in Wisconsin if not nationally, what these policies might be and whether or not to implement them. That is your role, not mine.

Let me give you an example. The single most common way people get killed on farms is by the tractor rollover, where the tractor rolls over – overturns – on top of the operator, and any passenger that might be present. Here in Wisconsin it is a major source of fatality. Rollover Protective Structures (ROPS), the roll bars you see on newer tractors and the crush-proof cabs also seen, are the only real way to prevent these fatalities; being a safe operator is not enough, because as human beings we are not capable of being perfectly safe operators at all times, and because circumstances outside the operator's control will occur. ROPS were introduced as options in the 1960's, but few farmers bought them. In 1985 they became standard on tractors, but an estimated 1/2 to 2/3 of tractors in Wisconsin do not have them, since tractors seem to last forever and older tractors abound. ROPS are available to retrofit on many older tractors, and increasing numbers of farmers are doing so because of educational efforts, but the number is still quite small in comparison, and the small numbers manufactured mean the unit cost is relatively high. However, European countries, with I believe Sweden being the first, required ROPS on all tractors years ago, and have essentially eliminated the rollover fatality problem. Until we require ROPS on the vast majority of tractors, we will still have this fatality problem. We could mandate ROPS retrofitting over some 10 or 15 year period, phase it in, with the goal of eliminating these deaths. This is not a unique idea; there have been consensus-building meetings among some safety professionals and others to develop something similar to propose to federal legislators.

Another problem, much less in number but incredibly tragic, involves children being carried as passengers on tractors, falling off, and getting run over. We know this is a dangerous practice, but of course most people who ride on tractors do not fall off, and so this is considered by many to be an acceptable risk. However, the issue of child endangerment, of negligence, is beginning to rear its ugly head. It is even being discussed in the nation's largest farm magazine. Parents who put their children at risk, such as leaving them in a hot car in a parking lot, or not buckling their seat belts, get charged with endangerment if their child is seriously injured or dies. People are wondering why farmers are not treated the same way. I know for a fact that discussions of negligence have been held in Wisconsin between county coroners and county prosecutors, and I feel sooner or later some farmer in Wisconsin whose child falls off and gets run over will be charged with a crime. A recent case in Pennsylvania, involving a farmer carrying two young children in the bucket of a front-end loader on a public road, and one child bounced out and was run over, resulted in criminal charges being filed. These charges were later dropped, but traffic-related violations and other penalties were still assessed. This case got a lot of coverage and focused the attention of Pennsylvania farmers on this danger not because a child was killed – this has happened many times before -- but because charges were filed. If Wisconsin were to make it illegal to carry a child on a tractor, just like it is illegal to carry your child on the hood of your car while you go down the road, this would get people's attention and reduce if not eliminate the problem. Knowing you can get charged with a crime if your child gets hurt is a signal that your society means business, and people generally respond to such signals with safe behaviors.

I should point out this does not only apply only to active farmers, but retired farmers and also the many rural non-farm residents out there who have tractors. Grandparents, farm or not, love to give the grandkids rides on the tractors, which is why I held in my hand the death certificate (in Indiana, where I got my doctorate) for a nine-month old toddler, who was being given a ride by a grandparent and fell off. I have a great interest in antique tractors, but I note that collectors are some of the worst offenders when it comes to extra riders.

There are many other areas that could be discussed, many questions that could be raised. Why, for example, is it well-established that if you keep a mean dog in your yard, you must warn people of its presence, but a dairy farmer can have a bull on his farm (bulls killed four people last year) and there is no requirement to post a warning for the feed salesman, the hoof trimmer, the county Extension agent, or anyone else who comes on the farm? Why are over-width vehicles and trailers, like mobile homes and trucks transporting construction equipment, required to have warning flags and sometimes even accompanying vehicles, but not farm equipment? Why can we be ticketed for having a broken turn signal or not using a turn signal during a turn, resulting in a collision, but farm tractors are not required to have turn signals (they are found on newer tractors and available for older ones) and farm tractors can make left turns without warning? Many car-tractor collisions occur when a tractor is making a left turn at the same time somebody has decided to pass. Why are tractors not even required to use their amber flashers when going down the road?

Regulations cannot and will not solve all problems, and they should be imposed with care. The geographic dispersion of farms makes them difficult to enforce. But they get people's attention, send a clear message, and are followed by that vast majority of citizens who try to abide by the law. We may choose not to implement regulations that would prevent injuries, in the name of personal freedom, and I can accept that. We rescinded our motorcycle helmet law, which I do not agree with, but this is democracy, and that is the way it should be. It is illegal to carry children in the open bed of a pickup truck, although farm trucks are essentially exempted, but this was a political decision made because we thought it necessary to prevent deaths from children being thrown out of pickups. My guess is that many more farm children have been run over by tractors than have been thrown from pickups. The same is true for potential regulations aimed at preventing farm injuries. We need to ask questions and have an open discussion of this problem, which I do not think we have had, and in my opinion the time is right for that discussion in Wisconsin. Regulations of course can have serious financial implications, which is why these are not simple decisions, but when you boil it down, we must essentially make a decision on how much the saving of human life is worth. We have made this decision in other workplaces and other areas of life, so it can be done. The key thing is to raise the issues and make decisions, one way or another.

There are other non-regulatory policies that might be considered and implemented, some of which might be needed to make regulations work. For example, I have no doubt that some parents bring their children on the tractor or into other hazardous areas because they do not know what else to do with them. They must do farm work, and do not want to

leave the child in the house alone. The issue of availability of rural day care should be addressed, especially with more and more spouses working off the farm, leaving the parent at home to work and watch the kids at the same time. There was a case in Minnesota this year of a 17-month old who was being watched by his father while his father worked in the barnyard, but managed to toddle off around the corner and drown in a shallow drainage gutter. Maybe safe play areas should be subsidized. Either way, other Wisconsin workers cannot work in hazardous work places with their children along, and we should not expect farmers to do so.

There is one more issue I would like to raise, regarding regulation, and that is farm equipment on public roads. This is one area where the general public faces risks as well as the farmer, and has a vested interest in safety. Our state regulations for safety equipment for farm tractors and other equipment taken on public roads have fallen well behind the state of the art in safety standards, and I believe we should look at updating our laws, maybe not to the state of the art, but to something closer. Illinois is trying to do this right now. We need to look at our enforcement as well; I know this is a local issue, but I certainly see many tractors on roads without even the mandated slow-moving-vehicle sign.

Also, we have already mandated training for youth operating farm equipment on public roads, and by setting a minimum age of 12 to get into the training, we have by default said you must be at least 12 to operate farm equipment on public roads. We might want to look at that as well, since it does not apply to children taking a machine across a public road, even though that puts a motorist at risk – last year in Wisconsin a car was struck by a seven-year-old operating a skid-steer loader coming out of a field. There are those who would argue that anyone operating on a public road should have a motor vehicle operator's license. There is legislation in Congress right now raising by two years, from age 14 to age 16, the minimum age for receiving the same training, a federal labor regulation requiring such training in order to work for hire on another farm. Its passage is doubtful, at least for now, but USDA is already studying how these training programs may have to be upgraded.

If the legislature does not change laws regarding farm equipment on public roads, no great catastrophe will occur. But there are mini-catastrophes out there. I recall after giving a presentation that a man came up to me and explained how his employee had been killed in a collision with a combine. This man was in agribusiness and was not anti-farmer. This employee came over a hill and came face-to-face with a combine with a corn head, taking up the full width of the road, and he ran head on into it, the snouts coming through the windshield. The man telling me was bitter because nobody was found at fault and nothing could be done; the farmer had the right to be there and take up the entire road, without any warning vehicles ahead or anything that might have prevented this from occurring. In Europe they have for years limited the width of farm equipment on public roads to 3.3 meters, about 10 feet, period. The governments mandated it, the machinery companies made their equipment to comply, and farmers go about their business.

Our rural roads are now being used heavily by people commuting to villages and cities, especially where rural subdivisions have been built, and this puts them in conflict with farmers who have always operated slow, sometimes wide equipment on the road. The road rage already being exhibited toward farmers will increase, and who knows what that will lead to. I have heard of an incident which ended in fists pounding on a car hood, and I know obscene gestures are common. I do not know how to solve this conflict short of more and wider roads, which is not practical, but we need to look at everything we can to minimize collisions.

These are highly controversial areas, sometimes emotional areas, and not easily decided. I certainly do not know the answers. But like the old saying, "A journey of a thousand miles begins with the first step," I think we need to look closely at that first step now, so that years from now we are not in the same situation. Who would have thought in the 1980's that airbags in cars would be the norm, and yet because steps were taken to mandate their use over time, looking toward the future, they are common today. We need to think of our farm injury and fatality problem in the same way.

Thank you for your attention and your consideration.

Sweden's Thirty-year Experience with Tractor Rollovers

B. Springfeldt, J. Thorson, B. C. Lee

Abstract

The purpose of this study was to analyze Sweden's experience of farm tractor rollover injuries over three decades during which policy requirements for safety features on tractors were first introduced and then later strengthened. The incidence of fatal and nonfatal tractor rollover injuries was compared with the proportion of farm tractors with and without rollover protective structures (ROPS) at different times from the late 1950s up to 1990.

From the period 1957-1964 to the period 1986-1990 rollover fatalities decreased from 12 to 0.2 per 100,000 farm tractors. During that same period, the total number of Swedish farm tractors rose by 275% and the proportion of those tractors equipped with ROPS increased from 6% to 93%. The Swedish approach for prevention of fatal and nonfatal tractor rollover injuries was successful, emphasizing the value of public policy requiring ROPS on farm tractors.

Keywords. Farm tractors, Tractors, Agricultural injuries, Tractor rollover, Rollover Protective Structures, ROPS.

Farm tractors are associated with fatal and nonfatal injuries, especially when tractors roll over and drivers are trapped underneath the vehicles. The mounting of a protective frame or crushproof cab (known as rollover protective structures or ROPS) can prevent personal injuries to the driver of a tractor. Karlson and Noren (1979) emphasized that voluntary safety standards claiming such a protection failed to reduce the problem. Related issues have been discussed in several Swedish and U.S. papers. The idea of rollover protection started during the 1920s, as tractor rollovers became prevalent in the agricultural community (Ross and DiMartino, 1982). Homemade cages and roll bars were mounted on the tractors. In 1939 the Dooley safety device, an engine cutoff switch, was introduced, but the device reacted too slowly and did not stop the rollover movement. Rollover protections of sufficient strength were developed by agricultural and military institutions (McCollum, 1984). However, users of tractors did not accept such protections and the intervention was delayed (Springfeldt and Thorson, 1987; Etherton et al., 1991; Kelsey and Jenkins, 1991; Kelsey et al., 1994, 1996; Centers for Disease Control, 1993, 1995).

The authors are Bengt Springfeldt, Department of Public Health, Karolinska Institute, S-171 76 Stockholm, and Royal Institute of Technology, Department of Industrial Economy, S-100 44 Stockholm, Sweden; Jan Thorson, The Swedish Institute of Public Health, S-103 52 Stockholm, and National Insurance Hospital, S-149 25 Nynäshamn, Sweden; and Barbara C. Lee, Behavioral Scientist, National Farm Medicine Center, Marshfield, Wis., USA. Corresponding author: Dr. Barbara C. Lee, National Farm Medicine Center, 1000 N. Oak Ave., Marshfield, WI 54449-5790; voice: (715) 389-4999; fax: (715) 389-4996; e-mail: leeb@mfldclin.edu.



Beginning 1 July 1959, the Swedish National Board of Safety and Health (NBOSH) required ROPS on all newly manufactured farm tractors (NBOSH, 1959). This standard was intended to be a passive, rather than active measure and, thus, would be effective regardless of the purchaser's initiative (Haddon, 1974). Despite opposition by farmers, Swedish regulations were later expanded to all existing tractors so that from 1965 it was required that all employees be protected by ROPS regardless of the tractor's age. In 1970 the standards were further expanded to require rollover resistant cabs on new tractors. By 1981 safety cabs were mandated for all tractors. Cabs provide better protection to the driver during overturning than ROPS alone, since the operator may not always be secured with a seat belt. That is, the cabs do not resist rollovers per se, but protect the occupant from ejection during a rollover. Because of effective policy enforcement by Sweden's central and local authorities, the regulations were extensively followed. By the 1990s it was estimated that about 93% of Swedish tractors in use were equipped with ROPS (National Central Bureau of Statistics, 1992).

Objective and Scope

The aim of this study was to describe fatal and nonfatal injuries associated with farm tractor rollovers in relation to the proportion of farm tractors equipped with ROPS in Sweden from 1957 to 1990.

In the study the following terms are defined:

- Farm tractors—wheeled vehicles used in agricultural, forestry, and related work.
- Farm owners—owners of the agricultural enterprise including adult male relatives.
- Farm laborers—full-time, part-time, and seasonal hired workers.

Method

The number of Swedish farm owners, hired laborers, and registered farm tractors at four intervals over 30 years was obtained from official government reports. The numbers of tractors in farming and other occupations are reported in the Central Vehicle Register (National Central Bureau of Statistics, 1992). Registered tractors were recorded as being operational, but there is the possibility that some of these tractors were not being utilized. After 1972 it was possible to differentiate the primary use of the tractor when used for agricultural work only (in contrast to combined forestry and farming use prior to that time).

The proportion of farm tractors with ROPS in sequential four-year intervals was estimated from statements on time of manufacture and claims on ROPS, which are based on rules of compulsory registration at the National Central Bureau of Statistics, a system that is used for all motor vehicles. Furthermore, sales of ROPS for mounting on old tractors are reported for government records.

Sweden's fatal and nonfatal tractor rollover injuries from 1957 to 1990 were obtained with data from NBOSH and other authorities (Karlson and Noren, 1979; Springfeldt and Thorson, 1987; Springfeldt, 1993; NBOSH, 1972, 1992). Injury statistics were compiled related to tractors used in agriculture and forestry from 1957 through 1971 and tractors used solely in agriculture from 1972 to 1990. Rates of fatal and nonfatal rollover injuries per 100,000 tractors were calculated during these same two time intervals (1957-1971 and 1972-1990).

Trends in ROPS-related events were calculated by analyzing rates of fatal and nonfatal rollover injuries per 100,000 farm tractors and per 100 million driving hours. In Sweden there are government records of all registered tractors which denote the status of each vehicle as a primary or secondary (reserve) tractor. For example, in the late 1950s about 8% of tractors were a secondary vehicle; then, by 1978 there were nearly 300 000 registered tractors of which 40% were reported as secondary tractors. Driving hours of Swedish farm tractors have previously been estimated from statements on fuel purchase. Records regarding use of fuel on farms were used to estimate that primary tractors were driven 500 h and secondary tractors were driven 100 h annually (Johansson, personal communication; Persson, personal communication; Springfeldt, 1993; Lundqvist and Springfeldt, 1989). Tractor rollover fatalities per 100 million driving hours were calculated based upon reports of the proportion of primary and secondary tractors during seven different time periods from 1957 to 1990 (refer to "NOTE on method for calculating fatalities per million driving hours").

Results

Over three decades, the work force on Swedish farms diminished notably. The number of farm owners dropped by 65% and the number of farm owner spouses declined by 78%. Meanwhile, the number of hired farm laborers increased. The total number of owners, spouses, and laborers on farms was reduced by nearly one-half. During the same period, the number of farm tractors increased by 275% (table 1). The proportion of tractors equipped with ROPS increased from approximately 3% in 1951 to an estimated 88% in the 1980s (table 1) and up to about 93% by the 1990s (National Central Bureau of Statistics, 1992).

The continuous decrease of fatal and nonfatal rollover injuries in farming is shown in table 2. From 1957 to 1964, there was an average of 23 fatalities annually

Table 1. Swedish farm operators and farm tractors per Swedish government inventories for the years 1951, 1961, 1972, and 1981

Year	1951	1961	1972	1981
Farm owners*	369,000	263,000	167,000	130,000
Spouses of farm owners	304,000	193,000	94,000	68,000
Hired farm laborers	69,200	148,200	169,000	190,000
Farm tractors	NA	194,000	248,000	303,000
Estimated proportion of tractors with ROPS	3%	26%	68%	88%

* Includes adult male relatives.

NA = not applicable.

Table 2. Occupational injuries associated with farm tractor rollovers according to reports from the Swedish Labour Inspectorate (forestry and farming data were combined before 1972, only farming data were used from 1972-1990)

Period	Average Number of Injuries			Average Number of Tractors		Fatalities per 100,000 Tractors		
	Fatal	Non Fatal	Total	Farming	Forestry & Farming	Fatal	Non Fatal	Total
1957-1964	23	19	42		190,000	12	10	22
1965-1971	9	10	19		246,000	4	4	8
1972-1977	6	8	13	177,000		3	4	7
1978-1983	1	5	6	190,000		0.5	2.6	3
1984-1990	0.4	4.6	5	196,000		0.2	2.3	2

associated with tractors used in farming and forestry. Three decades later, Sweden reported less than one tractor-related fatality per year. The annual number of nonfatal tractor rollover injuries during those three decades declined by nearly 90%.

Analysis of fatal and nonfatal injury rates revealed there were 12 fatal rollover injuries per 100,000 tractors in forestry and agriculture during the period 1957 to 1964, which decreased to 4 in the period 1965 to 1971 (table 2). The combined fatal and nonfatal rollover injury rate decreased from 22 to 4 per 100,000 tractors during that time. In later years, when details on farm tractors alone were available, it was calculated there were three fatal rollovers per 100,000 farm tractors between 1972 and 1977. This frequency decreased to 0.2 in the period 1984-1990. In total, the fatal and nonfatal farm tractor rollover injuries decreased from seven to two per 100,000 farm tractors from 1972 to 1990.

As noted in table 3, side flips were nearly four times as common as rear overturns. However, the latter were more dangerous. Nearly half the 488 rollovers from 1959 through 1978 were fatal. Side flips were associated with 88% of the nonfatal injuries and 72% of the fatalities. Yet, when a rear overturn occurred, the outcome was likely to be fatal 68% of the time, compared with 44% of the time with side flips.

According to investigations in agriculture and forestry, the life span of Swedish tractors in active use is about 15 years. Previously they were used for 20 years (Lundqvist and Springfeldt, 1989). Assuming a 15-year life span for farm tractors, 1 per 388 was involved in a fatal rollover injury during 1957-1960 (Springfeldt, 1993). Corresponding figures were 1 per 21 505 during the period 1986-1990. As noted in table 4, annual tractor rollover fatalities decreased from 25 to less than 1 from 1960 through 1990 which corresponds to a drop in the fatality rate per 100 million driving hours from 25 down to 0.3. Meanwhile, between 1957 and 1990

Table 3. Occupational fatal and nonfatal injuries associated with farm tractor rollovers in the years 1959-1968 and 1969-1978 according to reports from the Swedish Labour Inspectorate (forestry and agriculture data were combined before 1972 and only agriculture data were used from 1972)

Period	Side Flips			Rear Overturns			Side and Rear Events Combined		
	Total	Fatal	(% Fatal)	Total	Fatal	(% Fatal)	All	All	
							Total	Fatal	(% Fatal)
1959-1968	298	131	44	64	43	67	364	174	48
1969-1978	93	41	44	33	23	70	126	64	51
Total	391	172	44	97	97	68	488	238	49

Table 4. Farm tractor rollover fatalities, number of tractors, and exposure

Period	Average Number of Farm Tractors	% with ROPS	Average Number of Fatalities		
			Official Statistics	Per 100,000 Farm Tractors	Per 100 million Driving Hours
1957-1960	169,787	6*	25	15	25*
1961-1965	214,451	26*	20	9	2.1*
1966-1970	248,838	49*	9	3.6	9*
1971-1975	253,544	68*	9	3.5	10*
1976-1980	289,620	80*	4	1.4	4*
1981-1985	311,913	88*	2	0.5	1.3*
1986-1990	336,785	93*	0.2	0.1	0.3*

* Estimation.

the number of farm tractors in use per each fatality rose from 388 to more than 21,000 tractors.

Figure 1 depicts the trends in total injuries, fatalities and proportion of tractors equipped with ROPS. The four different years during which new policy requirements for ROPS and cabs were implemented are also noted. The trends illustrate a remarkable decline in fatal and nonfatal tractor rollover injuries concomitant with a marked rise in the proportion of tractors equipped with ROPS. In 1959 when there were no safety regulations for tractors, Sweden had 12 fatalities per 100,000 farm tractors. By 1968, when about half the tractors had ROPS, fatalities were down to four per 100,000 tractors. After 1981 when safety cabs were mandated on all tractors, the rate dropped to 0.2 fatalities per 100,000 tractors.

Discussion

Fatal and nonfatal tractor rollover injuries are strikingly associated with tractors without ROPS. In Sweden the increase in the number of ROPS-equipped tractors and simultaneous decrease of fatal and nonfatal rollover injuries was observed. When the Swedish authorities first announced plans to introduce mandatory regulations on ROPS for all tractors, there was strong resistance from farmers. However, the authorities supported the new regulations. Through effective enforcement by the Labour Inspectorate, the goal of the 1959 policy, and the following strengthened ones, was achieved and nearly all tractors are now equipped with rollover resistant cabs. The Swedish society did not provide any economic compensation to farmers that directly related to the increased costs of protected tractors. Indirectly, this policy

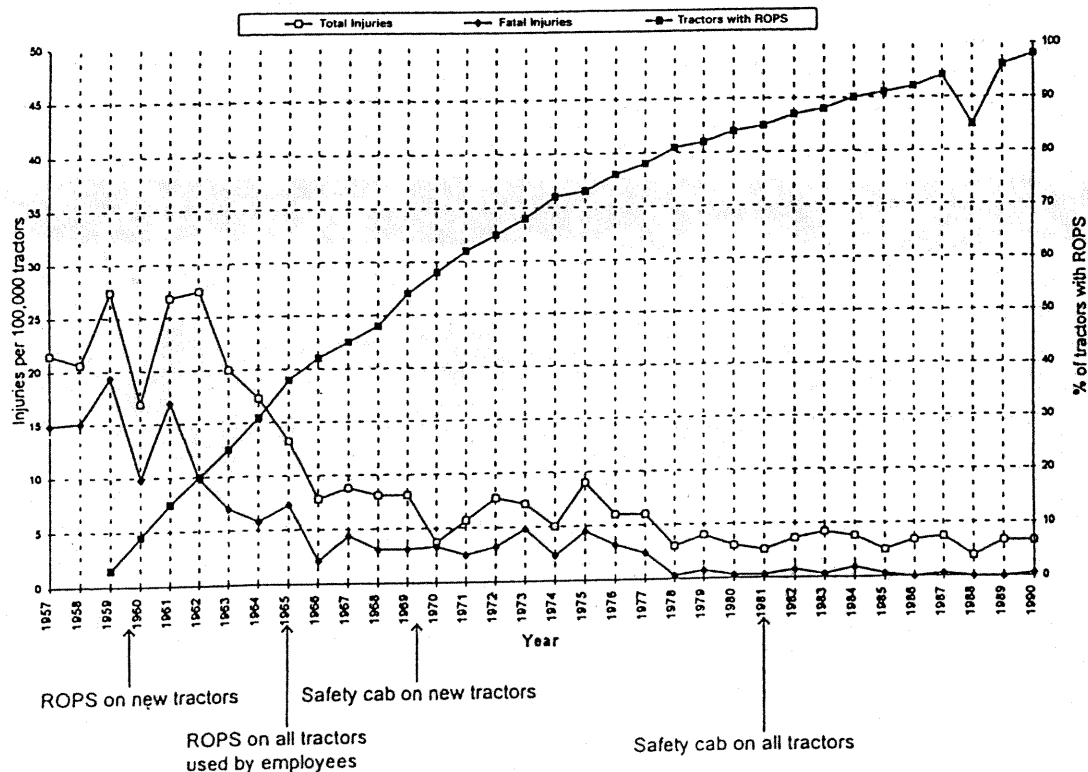


Figure 1—Rollover injuries per 100,000 tractors 1957-1990. Years during which new regulations were introduced are marked. The drop in the curve in 1988 is associated with a structural change in agricultural work.

saved money for farm owners and society by reducing costs associated with adverse outcomes of tractor rollover events.

The powerful impact of an engineering design modification is illustrated by a 93% reduction of rollover-related fatalities from 12 to 0.2 per 100,000 tractors over a 30-year period. Rear overturns accounted for 12% of nonfatal rollover injuries but 28% of the fatalities. Thus, rear overturns were more fatal than side flips (table 3). This finding suggests implications for engineering as well as educational interventions in countries where ROPS are not presently required.

Rollover fatalities per 100 million driving hours decreased to less than 1% when 93% of the tractors were protected (table 4). While data on fatalities per driving hours were derived from proportions of primary and secondary tractors, the Swedish proportions of newer versus older tractors differ from tractors in the U.S. (Kelsey et al., 1996). According to a telephone survey of randomly selected New York farmers, the investigators found that older tractors were only slightly less likely to be used primarily for fieldwork than the newest tractors (with ROPS). In the New York study, one third of tractors in use were more than 20 years old and 4% or less had ROPS. Compared with U.S. farm tractors, the oldest Swedish tractors without ROPS are very few and might be more aged than those used on U.S. farms.

This analysis supports the principle that passive or automatic safety measures are highly effective for reducing injury (Springfeldt, 1993; Haddon, 1974). Rather than rely on educational approaches to inform tractor owners of the value of ROPS, the country of Sweden passed legislation affecting tractor manufacturers and retail dealers. The original ROPS in Sweden were rollover frames, and since 1981, all farm tractors must have rollover resistant cabs. The Swedish policy does not require seat belts on tractors, but all Swedish tractors must have a cab.

Certain limitations of this study should be noted. Given that the primary sources for injury data were government reports, the validity of annual calculations was not verified. While Swedish routines for reporting tractor rollover injuries are strict, especially for fatalities, it is possible the variance between actual and occurred events could be 10% or more. The process for reporting occupational injuries is connected with the insurance system. Compensation from the compulsory injury insurance is paid out solely on condition that the injury is reported to the authorities. Under reporting of occupational injuries sometimes occurs, especially with injuries of a temporary nature. As of 1977, farm owners had weaker insurance protection for themselves than for employees and, thus, are less likely to report their own injuries. The system is more reliable for serious injuries than minor ones. All fatalities are reported. Studies in agriculture in 1987 demonstrated that 68% of occupational injuries with one or more sick days were reported and 82% of injuries requiring one month absence from work were reported (NBOSH, 1992).

Another issue for consideration is the possible influence of factors other than ROPS on tractor rollover events. For example, tractor design modifications, operator behaviors, or environmental conditions could account for improved safety. Newer tractors have a lower center of gravity than older models and, thus, are more stable. Over the years, tractor operators were likely to have increased opportunities for education and training in avoiding rollovers. Dangerous field and road conditions may have been modified over time. Clearly, these factors could have contributed to the reduction in fatal and nonfatal tractor rollover injuries. Yet, the primary and consistent intervention experienced in agricultural work during that time period was the requirement for ROPS on all tractors.

Summary

The Swedish approach for preventing farm tractor rollover injuries was an implementation of the passive method, i.e., ROPS on newly manufactured tractors followed by mandatory rollover resistant cabs on all tractors. This is compared with active approaches that rely on personal choices, such as noted in the U.S. and other countries. The passive approach has demonstrated a major impact on the protection of tractor operators from fatal and nonfatal rollover injuries.

NOTE on Method for Calculating Fatalities per Million Driving Hours

For the years 1971-1975 it was reported that 34.6% of 253,544 tractors were secondary tractors, used about 100 h per year ($253,544 \times 0.346 \times 100 = 8.8$ million hours). The 65.4% primary tractors were used 500 h per year ($254,544 \times 0.654 \times 500 = 81.5$ million hours). Totally, the farm tractors were used $8.8 + 81.5 = 90.3$ million hours on an average during that period. The average number of fatalities was 9. Then 9×100 million/90.3 million = 9.97 or 10 fatalities per 100 million driving hours. In other periods the proportion of secondary tractors was 9% (1957-1960), 17% (1961-1965), 27% (1966-1970), 35% (1976-1980), 39% (1981-1986), and thereafter 40%.

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In the wrong place— all of the time

By Nancy Esser

Ag Youth Safety Specialist
National Children's Center
For Rural and Agricultural
Health and Safety
Marshfield, Wis.

It has happened to all of us at one time or another. Being in the wrong place at the wrong time. And then BOOM . . . a car in the ditch, a broken leg, a dog bite, a fall from a ladder. We call them "accidents," and someone usually gets hurt.

But is it really an accident—an unpredictable event, one that could *not* have been prevented? Is it really a case of being in the wrong place at the wrong time, or is there something that could have been done to prevent it?

That is an important question. Working in childhood agricultural injury prevention and farm safety, it is a question I often contemplate.

Usually when I read stories or review injury data about children who have been seriously hurt or killed by falling from tractors, becoming entangled in PTOs, falling into augers, and so on, I think about what is preventable and what is not. How could these situations be altered to prevent farm injuries from occurring?

I think of small children—6 years of age and younger—who follow along with their parents, older siblings, grandparents or other adults as they do work on the farm. The questions are rather basic.

What is a child's purpose for being there? Do these children engage in productive agricultural work? Are they capable of productive agricultural work? Are they obtaining a work ethic? Are they learning job skills for the future? Is this really a way to spend "quality time" with a child? Who is benefiting from this quality time? Most importantly, I wonder why this workplace isn't recognized as a potentially deadly industrial environment.

Children 6 years of age and younger are curious, impulsive and lack real

awareness of their surroundings and of potential dangers. They have increasing motor abilities that they want to test; they explore objects by touching or placing them in their mouths, are activity oriented, have trouble with balance, have slow reaction times and are fascinated by noise and movement. Based on these typical characteristics of a developing child, does the farm work site seem like a good environment to place a young child? Or is it a recipe for disaster?

Take a walk through a toy store. The toys you see for children 6 years or younger are indicative of their mental and physical capacity. You see soft fuzzy toys, toys that challenge small fingers and hands and nurture growth and development.

When you see toys that challenge a child to place a square block through a square hole, ask yourself: If a young child is challenged by something as simple as matching shapes, why would I place him or her in an environment of fast-moving PTOs, augers, large tractors and other hazardous distractions?

It should be obvious that preschoolers are developmentally incapable of recognizing and avoiding hazards on the farm.

Children are very vulnerable to injury. Their only protection lies in the decisions that adults make regarding their safety. As parents, we spend a considerable amount of time determining the types of toys, games, videos and books that are the

most appropriate for our children. We see and heed warnings about "small pieces that can be swallowed" . . . "not suitable for a child under 3 years" . . . "sharp edges" . . . "for ages 4 to 8 years" . . . "Rated G."

Why aren't we as careful and deliberate about the decisions we make concerning our child's safety on the farm? Why aren't we asking if the farm environment is age-appropriate and safe for our children?

Do we need to put warning labels on farms? "Large animals that can be unpredictable" . . . "not suitable for children under age 14" . . . "moving parts that can cut, chop, grind, shred, and mutilate" . . . "suitable for adults only."

We know that children are seriously injured or killed everyday on farms. I see the numbers and read the reports. When a child gets hurt on a farm I am commonly told by both farm and nonfarm folks, "Get real, Nancy, this is the farm life. It's just the price that some kids pay for growing up on a farm."

I didn't know that kids had a debt to pay for growing up on a farm. A child's first "job" should be to grow and develop in a safe and protected environment.

We can talk about accidents and being in the wrong place at the wrong time. As for injuries and deaths to preschool children in the farm workplace, it is a matter of being in the wrong place—all of the time.



"As for injuries and deaths to preschool children in the farm workplace, it is a matter of being in the wrong place—all of the time"

Do you agree? Or disagree? Let us know.

Send correspondence to DAIRY TODAY, P.O. Box 1167, Monticello, MN 55362. Send e-mail to DairyToday@aol.com.

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WE KILL TOO MANY FARM KIDS

By Cheryl Tevis

Mud puddles usually get little boys into trouble. But a mud puddle on a farm may have saved the life of 2-year-old Jeffery Sondag. He suffered only a broken leg when his father backed over him with a tractor. The boy, who was pinned under a rear tire in a mud puddle, was lucky.

No one knows the exact toll, but
Continued on next page

*Mr. Matthew Benken and Nicky Benken
learn to play safely.*

WE KILL TOO MANY FARM KIDS

Continued from preceding page

about 300 kids are killed each year in farm accidents and at least 5,000 more are injured seriously. Many others, like 15-year-old David Virnig of Hillman, Minnesota, are permanently disabled. He lost both arms in a self-unloading silage wagon accident in 1986.

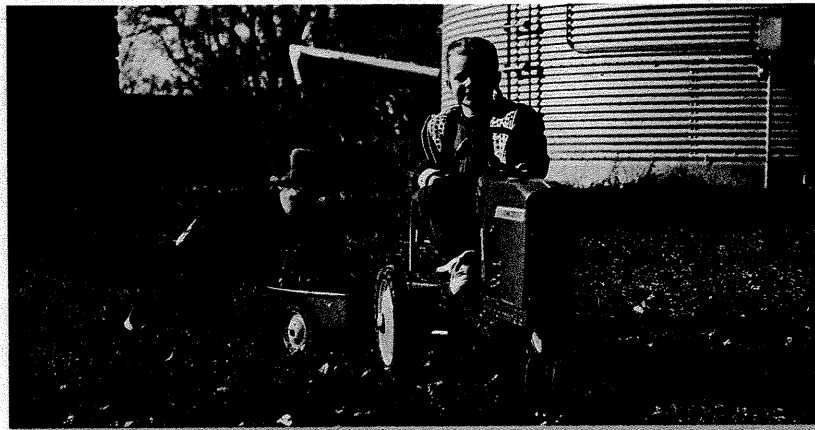
The statistics are a black mark on agriculture. "We have a significant accident problem with farm kids," says Bob Aherin, University of Illinois Extension safety specialist. "Many children who operate equipment don't know what to do if anything goes wrong. And younger kids are hurt because they're attracted to moving parts."

New reasons for concern

Farms always have been hazardous workplaces. But a Wisconsin study states: "Trauma in children on farms is occurring in epidemic proportions." Three factors today may be aggravating the dangers for children:

- ▶ Increased mechanization. Machinery injuries have surpassed other types of injuries, and are a major source of fatalities among children. Many of these injuries are caused by old equipment manufactured prior to safety standards. However, much safer modern equipment may endanger more kids simply because it is easier to operate. "You wouldn't see a 7-year-old driving a tractor without power steering," Aherin explains.

- ▶ New safety hazards. One-half of the ATV



VICTIMS NOT DOING FARM WORK

The First Annual U.S. Accident Report—1986

Name and age of victim	Details of accident	Address
Ryan A., 1	Run over by tractor	Idaho
Derek B., 1	Crushed by tractor	Illinois
Name not available, 3	Suffocated in grain bin	Michigan
Female, 6	Extra rider, pants in PTO	Minnesota
Female, 5	Extra rider, tractor tipped	Montana
Chad S., 7	Fell from tractor, crushed	Nebraska
Male, 4	Rider on ATV, flipped over	North Dakota
Male, 8	ATV crash	Texas
Cory E., 6	Fell off ATV	Wisconsin
Jeffrey R., 5	Suffocated, gravity box wagon	Wisconsin
Angella G., 2	Arm caught in auger	Kentucky
Randy A., 9	Trapped in wooden grain bin	Indiana

accidents (900 deaths over five years) have involved children.

- ▶ Stressful economic conditions. Hard times may be placing more children in the role of hired help. Furthermore, with more women working off-farm, kids have less supervision.

Fatalities reported by the National Safety Council only include persons age 14 and over. But data from Minnesota, Indiana, Pennsylvania and Wisconsin indicates that 14% to 24% of fatal farm accidents involve children under the age of 16.

In fact, studies show that children have a higher accident rate than adults when statistics are adjusted for the fact that they aren't exposed to farm hazards on a full-time basis. See graph at left.

No consensus for action

What can be done to turn the situation around? Farm health and safety specialists suggest requiring safety classes in rural schools, and lowering insurance premiums for graduates of these classes.

Furthermore, a 1987 Mayo Clinic study of accidents involving farm kids proposes a review of federal safety standards for machinery on all farms, mandatory safety devices and tougher laws.

Why is it so hard to improve the situation?

Three factors pose barriers:

- ▶ The merger of farm work and family life. Farmers live in the midst of their work, and they often aren't as aware of the hazards.

- ▶ The desire to instill children with a work ethic. "It's our rural belief that kids should help with farm work," Aherin says. "But the benefits often don't outweigh the risks."

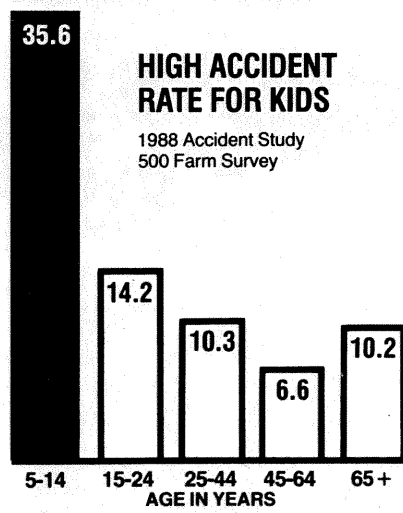
- ▶ The desire of farmers to avoid government regulations. Farm kids working on the family farm do not have to be trained or licensed to operate equipment or perform work. They aren't even required to have a driver's license to drive equipment on the highway.

Farm organizations lobbied for a loophole in the OSHA laws to exclude farmers with fewer than 11 employees.

"The high level of tolerance among rural residents for injuries in agriculture has been a major barrier to prevention efforts," says Bill Field, Purdue University extension safety specialist, West Lafayette, Indiana.

For instance, when two kids are killed after bouncing out of a bucket loader attached to a tractor, is it simply a tragic accident, or is it child endangerment?

"The farm community will be embarrassed when the situation comes to light," Field says. "No other industry tolerates children being killed and maimed." ●

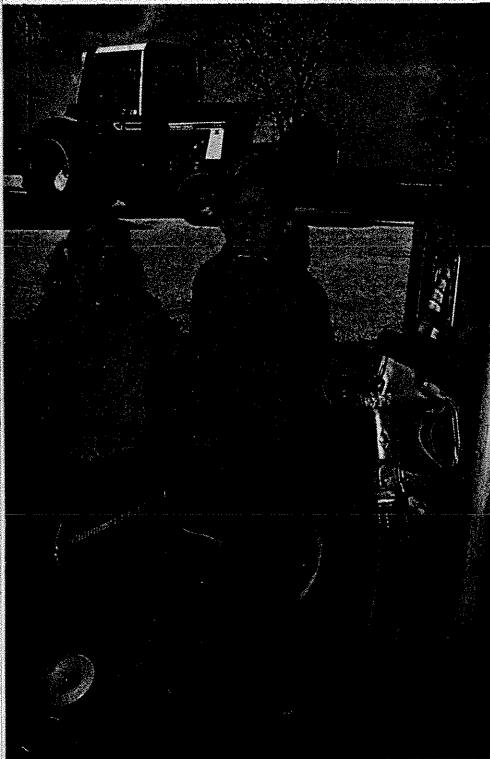


A Cornell University study of injuries and accidents conducted on 500 farms reveals that children bear the brunt of accidents when the injury rate is adjusted to account for the time each worker is in the workplace.

Photograph: Stephanie Jobst

The farm isn't a giant playground

ATVs: Children often lack the size and skill to handle ATVs, even though some models are tailored for them. Three-wheeled ATVs no longer are manufactured. Most of the deaths and injuries involve head injuries. You can buy lightweight helmets with airflow for \$30 to \$300.



Andy and Kelly Naberhaus, Iowa.

A national public opinion study shows that the number 1 fear of parents is that their child will be kidnapped. In reality, accidents are the leading cause of death for children under 16. This is alarmingly true for farm kids.

How are farm kids injured and killed? No national statistics exist, but studies conducted in several states provide some answers. For instance, the Mayo Clinic study reported that corn augers were the source of 42% of the accidents involving 87 farm children from 1974 through 1985. The children, ages 16 and under, were admitted to St. Marys Hospital in Rochester, Minnesota.

But this study focused on trauma injuries. "We get the worst of the worst," says Jill Swanson, M.D., and author of the study. She says, "Other studies show more tractor accidents and minor injuries."

For example, a 1982 study based on Indiana statewide figures, indicates that 62% of fatal accidents involved tractors, and 82% involved tractors or other farm machinery,

such as augers and PTOs.

"We're convinced the greatest problem is tractors and the extra rider," says Bill Field, Purdue University.

An Ontario, Canada study from 1975 to 1981 reinforces this—showing more than 50% of all tractor-related deaths involved extra riders.

The Wisconsin study, conducted by Gundersen Clinic and La Crosse Lutheran Hospital, singled out farm machinery and large farm animals, such as horses and cows. Other known hazards include:

- ▶ Silos—a source of deadly gases and hazardous unloading equipment.
- ▶ Farm ponds and open liquid manure storage facilities.
- ▶ Stationary machinery, such as a feed mill.
- ▶ Electrical boxes and wiring.

Ages 4 and 14 are dangerous

Toddlers in the Wisconsin study were more prone to falls and to kicks by farm animals. Older children were more frequently injured in falls from horses and tractor accidents. The age distribution for accidents indicates a sharp rise from birth, peaking at age 4, hitting a low at age 8 and rising to another peak at 14.

The Mayo Clinic study also pinpointed the greatest number of injuries at ages 3 and 13. Virtually all of the studies show increased injuries during summer and fall, and a majority of accidents in late afternoon and early evening or on Saturdays.

It's estimated that as many as two-thirds of deaths of farm children occur to kids under 13; one-third claim the lives of children under 5 years old.

The Mayo study concludes, "The incidence of farm machinery-related injuries in younger

children occurred perhaps due to inadequate supervision, but higher incidence of tractor and PTO injuries in older children is more likely due to inappropriate task for age." For example, children often act as "manual overrides" for the silo blower or auger.

One study of young workers states that the majority of their accidents occurred during the first day on the job, or the first time they performed the task after a long lapse.

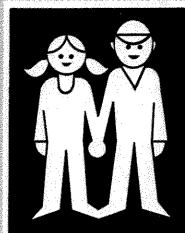
A study in Michigan and Ohio found that tractor operators under age 14 were involved in over nine times as many accidents, per hour of exposure, as those ages 25 to 44. Much higher tractor accident rates also were reported for youth under age 15 on public highways.

"Emergency medical technicians tell me the worst run is an accident involving a child," Field says. "The emotions of EMTs are so powerful that it's difficult to do their job." ●



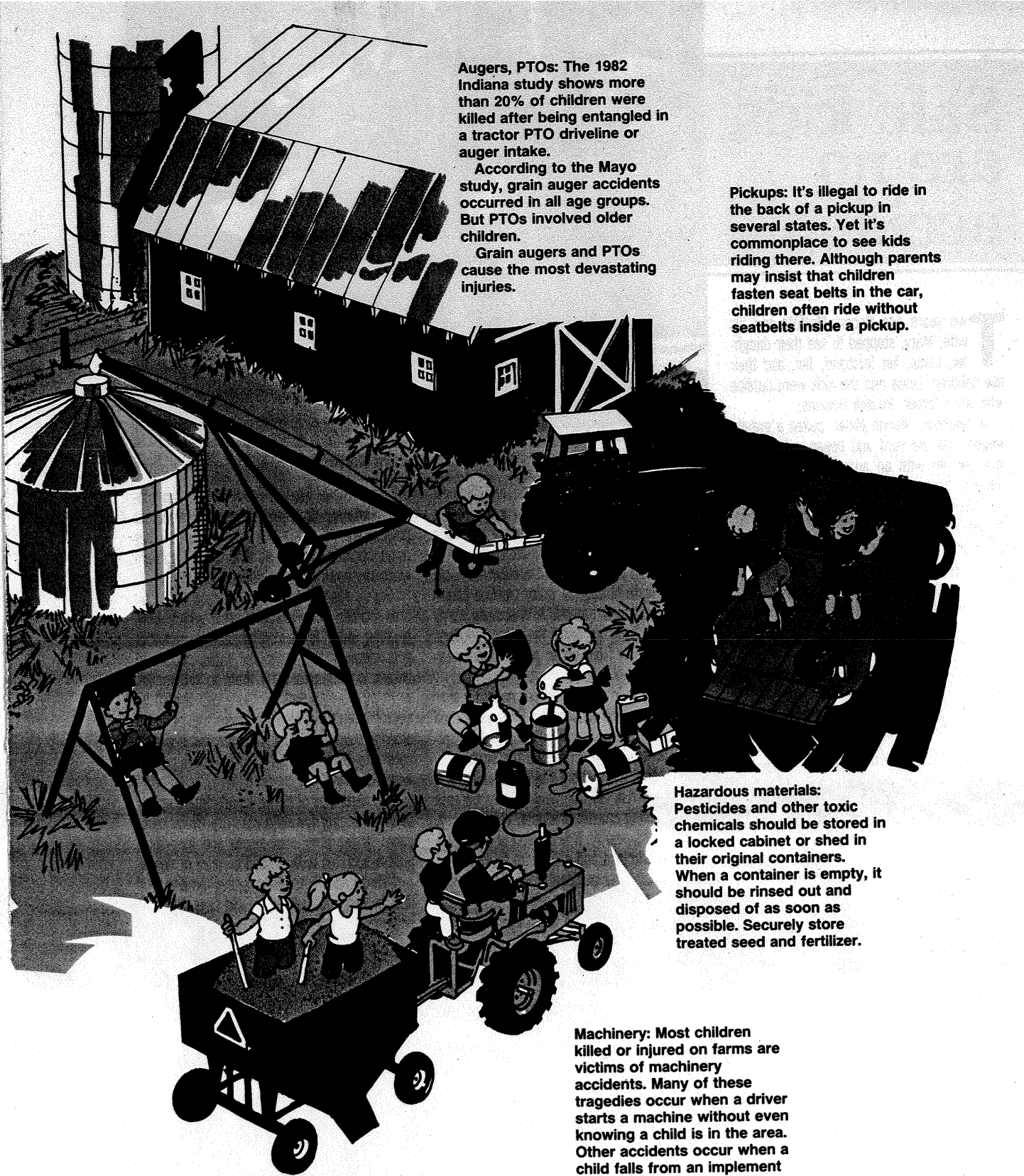
How kids are killed on farms

Mayo Clinic, 1987



Grain augers	42%
Tractors	25%
Power take-off	11%
Conveyor belts	6%
Other machinery	16%

Photograph: John Schultz



Augers, PTOs: The 1982 Indiana study shows more than 20% of children were killed after being entangled in a tractor PTO driveline or auger intake.

According to the Mayo study, grain auger accidents occurred in all age groups. But PTOs involved older children.

Grain augers and PTOs cause the most devastating injuries.

Pickups: It's illegal to ride in the back of a pickup in several states. Yet it's commonplace to see kids riding there. Although parents may insist that children fasten seat belts in the car, children often ride without seatbelts inside a pickup.

Hazardous materials: Pesticides and other toxic chemicals should be stored in a locked cabinet or shed in their original containers. When a container is empty, it should be rinsed out and disposed of as soon as possible. Securely store treated seed and fertilizer.

Machinery: Most children killed or injured on farms are victims of machinery accidents. Many of these tragedies occur when a driver starts a machine without even knowing a child is in the area. Other accidents occur when a child falls from an implement or tractor fender.

Illustration: Jim Stevenson

Grain bins: Grain can turn into quicksand, particularly during bottom-unloading. About half of all farmers now use the gravity-dump type of grain wagon. A Purdue University study reveals kids under 15 were involved in 40% of grain bin entrapments and in suffocations in gravity wagons.

Place warning decals on all grain bins, wagons and trucks.

Safe kids are no accident

Two years ago Robert McNutt and his wife, Mary, stopped to see their daughter, Linda, her husband, Jim, and their five children. Linda and the kids were outside with Jim's father, Russell Hoskins.

A neighbor, Marvin Miller, pulled a gravity wagon into the yard and began unloading it into the bin with an auger. Soon afterward three of the children, including Miller's 8-year-old son, began playing on top of the 300-bushel wagon.

McNutt saw Miller's son yelling, but he couldn't hear him above the noise of the machinery, and didn't see anything wrong.

When Miller emerged from the grain bin, he realized his son was screaming that McNutt's grandson, David, 10, was under the corn. McNutt quickly shut off the grain auger. He and Miller found David's arms sticking out of the grain and 14-year-old Lisa buried in corn up to her chest. They couldn't pull him out or even dig the corn away from his face.

Miller jumped out and opened a gate. McNutt and Lisa began to sink, but she managed to cling to the side of the wagon. Before McNutt became submerged, he cupped his hands in front of his face.

Then Linda climbed into the wagon and became partially buried. Hoskins, age 77, climbed in to stop her from sinking.

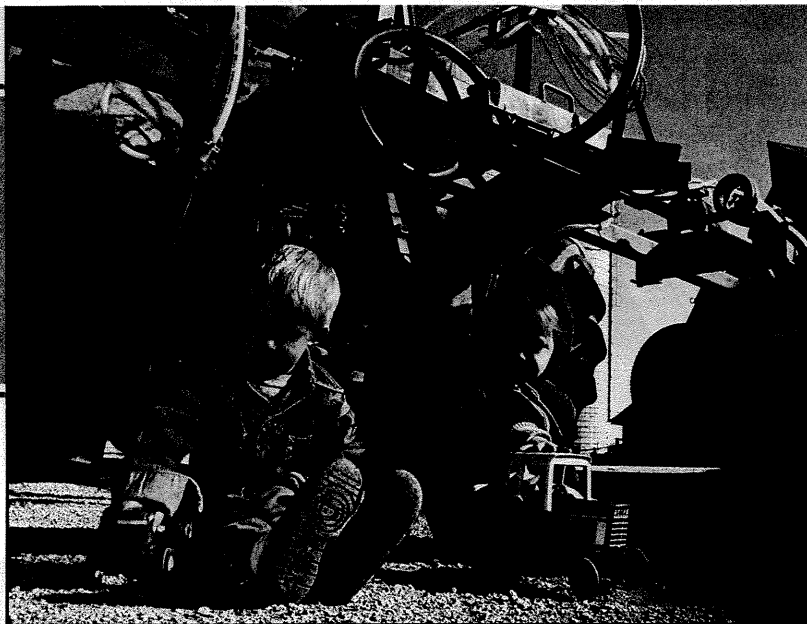
But while McNutt was submerged, David's legs emerged in the gate opening, and Miller pulled him out. He was unconscious and turning blue. They removed the corn from his mouth and began CPR.

In a few moments, the second gate of the wagon opened, the grain began to flow, and McNutt emerged unharmed. By that time, David was on his feet.

It was a near-tragedy for four people. Since the incident, McNutt, who is an insurance agent, has ordered 500 warning decals, and is paying FFA students \$1 for each one placed on a wagon.

Kids attracted to hidden hazards

Kids are subject to the same hazards as adults, such as unshielded PTOs, a lack of roll-over-protective structures and flowing grain. But they're more susceptible to other dangers,



Photographs: John Schultz

Nicole Jobst and Lin-Mathew Behnken are oblivious to lurking dangers.

including careless housekeeping in buildings. There have been several cases of a child being crushed by a tractor tire left leaning against a wall. Another child died when baler twine hanging from a beam caught around his neck.

Inadequate storage of dairy pipeline cleaners is a particular hazard. A Wisconsin study shows that toddlers drink the clear, odorless pipeline cleaner from water glasses and measuring cups.

"A tiny sip is enough to permanently scar and damage the esophagus," says Bruce Edmonson, the University of Wisconsin Hospital pediatrician who conducted the study.

He adds, "A milk house in the evening is a classic high-risk environment—busy parents routinely using caustic products, with hungry, tired toddlers nearby. It is a blend of home, industrial workplace and child-care facility."

Countless other accidents result when children are cared for at farm work sites. "Close to 50% of farm children killed are under age

5," says Steve Zronik, Farm Safety Association, Ontario, Canada. "These children are playing around machinery, in barns and other areas because there's no safe place for them while the work is being done."

Safety specialists like Field argue that children shouldn't be allowed in areas where work is under way. "It's a very difficult issue and it goes against the grain for farm people to believe it's dangerous for them to accomplish work and watch kids at the same time," he says. "I would like to see a grassroots group of older people or a farm group organize a day-care site or baby-sitting co-op during peak work seasons."

The hardships of hiring a part-time employee or arranging for child care are trivial compared to the emotional stress and long-term guilt associated with a child's injury or death.

"These accidents disintegrate families and destroy farm businesses," Field says. "I can't imagine a greater loss." ●

ATV is new source of childhood dangers

When Michael Blankenship isn't instructing others on ATV safety, you can find him with his family on their ATVs practicing what he preaches.

The Mississippi Farm Bureau safety director believes education is crucial to solving the problem that children are victims of nearly half of the 7,000 ATV accidents per month and 900 deaths in five years.

"Many families have the attitude that an ATV is a toy or a baby-sitter," he says. He cites three factors behind the fatalities:

(1) Riders aren't wearing long pants, eye protection, gloves, helmets or boots.

(2) Many kids operate machines which are too big for them.

(3) Kids drive ATVs on public roads. "ATVs don't operate properly on concrete—they either don't turn or they turn over," Blankenship says. "It's also against the law."

He adds, "I don't advise any child under 16 riding an ATV without adult supervision. Kids feel they are bullet-proof. They may be adult-size, but it doesn't mean they have adult minds."

EXCLUSIVE *Successful Farming* SURVEY RESULTS

About 65% of farm boys drive tractors before age 12



Tractors without cabs make kids like Joel Mapes even more vulnerable.

Eight-year-old Ashton Waggoner was clamoring for his first chance to plant. Plowing and field cultivating had given him a taste of tractor driving, but he wanted to plant corn. One day last spring, he got his chance—with his father's John Deere 4430 tractor and a 6-row planter.

"I started him in a big field back away from the road," explains his father Richard. "I stayed right in the cab with him like I always do, but he did pretty good for a beginner. After a couple rounds, he looked at me and said,

'Dad there's nothing to it. All you have to do is follow that [marker] line.'"

Ashton is just one of thousands of farm children who—for one reason or another—grow up driving tractors. Some, like Ashton, have a youthful zest for farming and others are simply called on as an extra hand.

"It's startling how many kids operate tractors at very young ages—long before they are truly mentally or physically capable to handle it," says Bob Aherin, University of Illinois.

That's something extension farm safety

specialists like Aherin have inherently known through observation for years. However, data documenting children's direct involvement in farming operations has always been scarce. Scattered studies have provided a general count of how many kids are killed or injured each year, but no solid knowledge of their involvement. *Successful Farming* wanted to help fill that knowledge gap.

With help from Aherin and Christine Todd, University of Illinois Extension child development specialist, *Successful Farming* randomly surveyed 421 readers with children 15 years and younger. We not only wanted to learn how the kids are involved in the operation, but also how their parents feel about it. Many of the questions focused on farm equipment since it is involved in the majority of accidents.

Beyond gathering numbers, we also received several telling comments from parents. One mother wrote, "Our girls have helped with

What parents are allowing their children to do

Sex	Age of Child		
	7-9	10-12	13-15
Ride tractor with parent			
Boys	95%	94%	92%
Girls	84	77	67
Operate tractor			
Boys	27	65	94
Girls	7	23	56
Be within 10' of rotating parts			
Boys	37	51	80
Girls	18	43	45

Percentage of children within each age group that are allowed to perform each behavior.

chores, grinding and farm work since they could walk. We work with them and stress safety. However, some days I feel the good Lord has worked overtime protecting them."

Several parents, particularly mothers, expressed reservations about their children operating farm equipment. The bottom line remains: Even if parents are not comfortable with it, the children are doing it anyway.

A shocking 65% of farm boys are operating a tractor by themselves at 10-12 years old. And almost 30% are tractor drivers at 7-9 years old. Most often, according to the survey, operating a tractor means traveling on public roads, performing tillage tasks, feeding livestock, mowing or manure handling. That's despite the fact that 42-47% of the parents feel that allowing the child to operate the

Photograph: John Schultz

tractor involves a moderate to high risk.

The same double standard is reflected in the ages when children begin riding on tractors with a parent. The survey revealed that 95% of the children are riding on tractors by ages 7-9 even though only 79% of the parents believe the children should at that age.

Parents perceive less risk when they feel in control

About 70% of the parents perceive the risk for a child riding along on a tractor as very low. Riding on the tractor, they feel, is much safer than being around equipment with rotating parts such as PTOs and combine heads. About 60% of the parents believe being within 10 feet of that type of equipment is a moderate to high risk.

There's no doubt that PTOs and other moving parts are dangerous. However, parents probably feel a false security in having the child on the tractor with them.

"National accident data shows that a lot of injuries and deaths occur when kids fall off equipment while their parents are driving—especially on tractors without cabs," explains Aherin. "However, as parents feel more in control, they perceive less risk. And they feel totally in control when running the tractor."

That sense of control, Aherin says, is one reason they allow their own children to perform tasks they do not believe are appropriate for kids in general.

Many times, parents believe growing up around machinery ensures knowledge and safety through the child's familiarity of the equipment. That is a misnomer, says Todd.

"Parents need to know that what a child experiences and remembers when they are around equipment is much different than what an adult learns," explains the child development specialist. "Don't automatically believe that a child who can physically operate a

Kids like Lin-Mathew Behnken and Andy Naberhaus easily get absorbed in play.



How risky do parents think behaviors are

Behavior	Age of child			Avg. risk level
	7-9	10-12	13-15	
RIDE ON TRACTOR WITH PARENT				
Risk Level				
Low	70%	71%	79%	73%
Moderate	23	18	15	19
High	7	11	6	8
OPERATE A TRACTOR				
Risk Level				
Low	53%	58%	65%	61%
Moderate	35	32	30	31
High	12	10	5	8
BE WITHIN 10' OF ROTATING PARTS				
Risk Level				
Low	31%	38%	43%	41%
Moderate	31	38	43	37
High	38	24	14	22

As reported by those parents who allow their child to perform the behavior.

tractor is mentally ready to do it. They can certainly mimic a physical action such as steering the tractor, but they simply do not have the cognitive abilities to process all the stimuli and make judgment calls.

"Yes, experience is important to learning, but that experience must come at an appropriate time for the learning to be possible. Any child under 13 years old just doesn't have the cognitive abilities to do that," she says.

Gradually ease kids into operating equipment

Both Todd and Aherin recognize parents' desires to get their children involved in the farm operation. They simply recommend waiting until the child is at least 10-12 years old and then starting them slowly.

"Begin by letting them operate a small lawn tractor in controlled situations where you

can closely observe how they handle different situations," suggests Aherin. "Watch to see how often or how easily they are distracted and how quickly they respond."

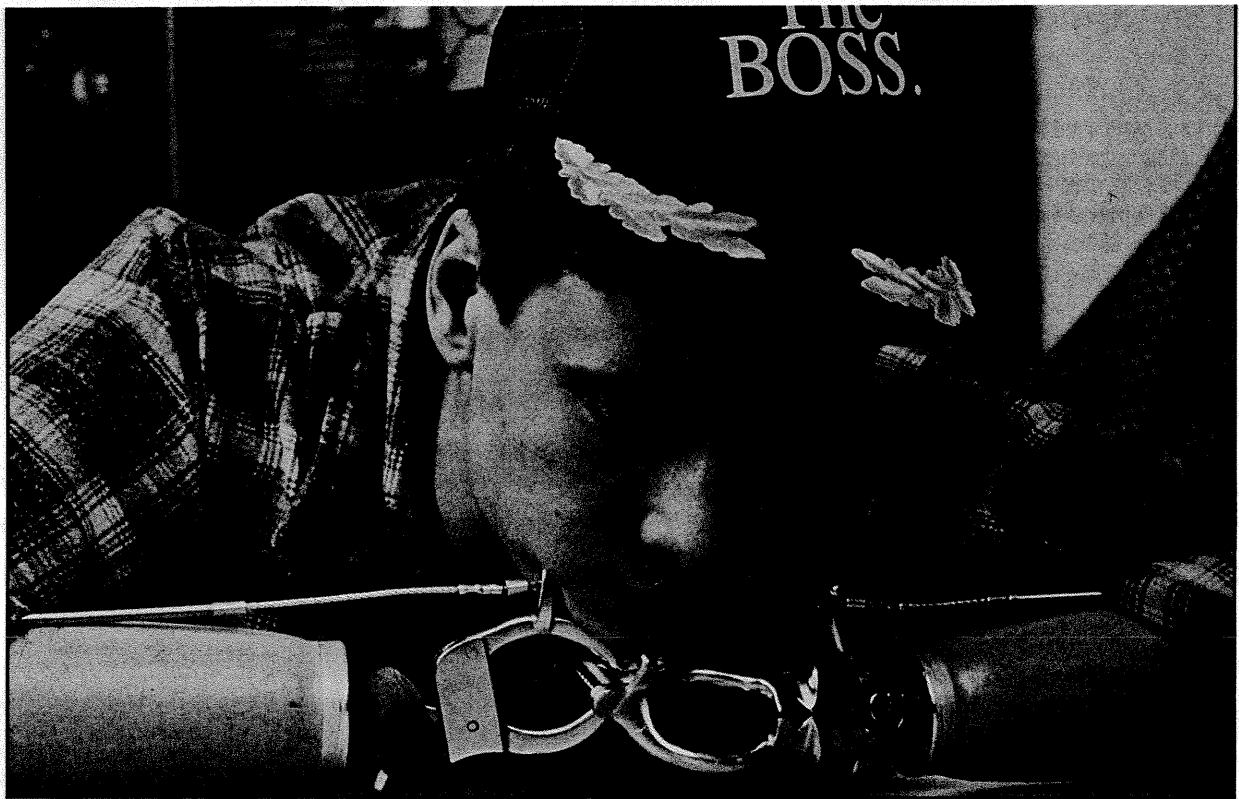
At 13, some children can begin operating field equipment—but under supervision. If possible, always put them on a tractor with a cab or at least in a tractor with a rollover protective structure. Let them get the feel of the tractor while doing little jobs around the farmstead. Give them driving and safety lessons yourself, but also consider training programs offered by the 4-H and FFA.

When you're ready to send them to the field, Aherin suggests having them do tillage work in large-size, open, flat fields. Keep a close eye on them at first to see how they get along. Todd also recommends testing them verbally to see on how they would handle various crisis situations. ●

Ages parents think children should be around machinery

Behavior	Age of child					Av. Age
	0-3	4-6	7-9	10-12	13-15	
Ride tractor with parent	29%	36%	14%	18%	2%	6 yrs.
Operate tractor	0	3	10	54	28	12 yrs.
Be within 10' of rotating parts	1	4	11	41	33	12 yrs.

Percentage of parents who feel children in each age group should begin being allowed to do each activity. Responses for children over 15 were not included.



Photograph: Sipa Press

Farm accidents blight young lives

Two years ago David Virnig was a typical 13-year-old farm boy who loved helping with the farm work and wasn't too fond of school. Then, on one October day, his life changed in a few shattering seconds.

He was helping his brothers unload a silage wagon on the family farm near Hillman, Minnesota. When he reached for a switch across a PTO shaft, his shirt caught and he was dragged into the shaft.

Today he still is much like other kids—except he wears a pair of mechanical arms with hooks for hands, and a sweatshirt with "Hookman" emblazoned on his back.

David, who was hospitalized for three months, can write, use a word processor, drive a retrofitted tractor and wield a fork and spoon. He doesn't plan to farm, but hopes to stay in an ag-related field.

"I would tell other kids who work around equipment to take it slow, watch what they're doing and try to keep their mind on the job," David advises.

Since David's accident, his father, Andrew, Jr., has devised a guard for the silage box. He and his wife Marlene are facing a huge medical bill which threatens to claim their farm of 21 years.

David is not alone. According to the 1987 Mayo Clinic study, 15 of the 87 children admitted to St. Mary's Hospital in Rochester, Minnesota had a body part amputated and 36 suffered a permanent disability. The length of their hospital stay ranged up to 78 days, with an average of 11.7 days.

The study concludes: "Hospitalization for children of farm families is devastating, not only because of the morbidity and illness of the patient, but owing to major financial stresses due to loss of family work time and often inadequate health insurance."

Of 11 patients requiring multiple recon-

structive surgery, 64% had corn auger injuries. PTO injuries caused total or partial amputation in 30% of accidents.

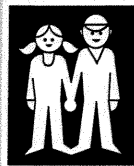
Invest in safe lives

Bill Field does not know David Virnig. But, in his role as editor of a newsletter for disabled farmers, he says, "I've had the opportunity to meet several young boys who will live the rest of their lives in wheel chairs or without limbs, due to farm accidents. But not one of these boys began a conversation with a list of things he couldn't do. They wanted to talk about what they were doing, how they were doing it, and what they planned to do. What a marvelous attitude."

He argues, "Agriculture's greatest resource is not the land, climate, buildings and equipment, livestock or crops. It is the children on our farms. I urge parents to make an investment in safety in the lives of their children today in order to reap a better harvest in the years ahead." ●

Cost of farm injuries

University of Wisconsin 1984



Medical	\$63,198.52
Rehabilitation	70,375.00
Mileage (for medical and rehab services)	5,576.00
Lodging	232.00
Lost Earnings	1,200.00
Property Damage	200.00
Total	\$140,781.52

attend instructional meetings, exhibit a completed manual at county fairs and take a written exam. A driving competition is optional.

But, nationwide, only 4,405 kids age 15 or younger who work for hire received U.S. Dept. of Labor Hazardous Occupation Exemption and Certificates in 1987. (See: "Laws don't protect farm kids" at right.) To be certified, young people must complete 20 hours of classes and pass a written exam.

"Most farmers feel their kids don't need training," says Roger Tormohlen, 4-H extension specialist, Purdue University. "But I don't know many who sit down and go over safety procedures with their kids. Kids learn by watching—and we all make some mistakes."

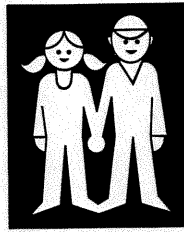
Vo-ag programs are being eliminated in many high schools, and cuts in state extension budgets have weakened 4-H tractor safety training. Schools are struggling to incorporate required subjects into the curriculum, and the population of farm kids continues to dwindle. This underscores the importance of informal efforts in the schools and at home. "Many rural schoolteachers are farm women," says Mayo Clinic's Swanson.

But farm parents have the most at stake. It's up to them to demand safety and to teach children a respect for farm hazards.

"Farmers can be proud of a good work ethic and the responsibility taught on farms," says Pollock. "But we cannot ignore the fact that in many cases we ask kids to do things they can't physically or mentally handle. We have to reconsider the supervision and training we're giving them."

"We can't keep kids off the farm. But farmers must understand the risks their kids face. The final decision rests with them." ●

Patch the scarecrow conveys messages for Farm Safety for "Just Kids."



What Ontario, Canada, does for farm

Someday Marilyn Adams hopes that the United States will launch an effort to achieve the same farm safety education as other countries have. She looks at an Ontario, Canada, brochure warning about gravity wagons, shakes her head and says, softly, "It makes me sick to think that we didn't know the dangers."

The Ontario Farm Safety Association has created a series of fact sheets and cartoons promoting farm safety. With funding from Pioneer, the association published a 32-page softbound book with color illustrations called, "Watch Out!" Says Kerbie.

They also have an eight-page coloring booklet called "Fun with Farm Safety." This features crossword puzzles, illustrations with hidden hazards, dot-to-dot pictures and cartoons. A new video, with a child narrating the safety hazards on the farm, is available for \$10, plus shipping charges.

The Ontario Farm Safety Association, initiated in 1973, is financed through workers' compensation funds paid by agricultural employees. However, all Ontario farmers can take advantage of the information.

A network of 30 volunteers in each county promote safety locally and distribute information, including teacher resource materials. The Safety Association monitors all injuries and has a highly accurate reporting system for fatalities.

For more information, contact: Farm Safety Association, Unit 23, 340 Woodlawn Road West, Guelph, Ontario N1H 7K6, Canada.

"It's the best farm safety program in North America," Bill Field says. "I am one person for 77,000 Indiana farms. Ontario has 11 full-time staff for 30,000 farms. Each state in the U.S. has \$19,000 for farm safety. Ontario has over \$1 million."

Laws don't protect farm kids

On June 21, 1984, 16-year-old Michael James O'Connor was killed working for hire on a farm. Following their son's death, his parents, Fran and Dorothy O'Connor of South Wales, New York, became involved in farm safety. "On that day, the hopes and dreams we shared were shattered," Fran O'Connor says.

The O'Connors, who do not farm, advocate reforms as follows:

- (1) OSHA inspections of farms with fewer than 11 employees.
- (2) Closer attention to ensure that 14- to 16-year-old employees take the required tractor safety course and receive a completion certificate.
- (3) Changing the age requirement to include all employees up to 21 years of age.

The Fair Labor Standards Act for Agriculture and Child Labor and many state regulations require all 14- and 15-year-olds hired as farm employees to have a certificate from the Hazardous Occupation course before operating hazardous machinery. But the laws often are ignored.

"I don't recall any action ever taken against a farmer who didn't comply with this law," says Roger Tormohlen, 4-H Extension specialist, Purdue University.

As a result of the efforts of the O'Connors and others, New York child labor laws have been reviewed by a commission, and a report was issued late last year.

"Farmers should be held accountable for the same level of workplace safety as we expect when we send our kids to work at McDonald's," Field says.

WHAT ABOUT OUR OWN KIDS?

Child labor regulations don't apply to children working on their parents' farm. But England recently passed a law which prohibits children under age 13 from driving or riding on tractor and self-propelled machines. Children also can't enter barnyards if any equipment is in operation. Farmers are fined for violations.

No one proposes passing this law here. "Many farmers argue that it's essential for their 10-year-old to drive a tractor," Field says. "I would like to know why they must use their kids to make a living. One small step would be legislation making it illegal for youngsters under 16 to operate a vehicle on the public highways." Some states, such as Missouri, already have this law.

In Minnesota, a new law takes a carrot approach by appropriating state funds to create a farm safety program. The law would establish a system allowing farmers to request a safety audit, and efforts are under way to convince insurance companies to reduce rates for farmers who adopt specific safety practices.

"Labor laws do not allow young workers in any other industries in this country," says John Pollock, Rural Health and Safety Council. "If farmers aren't successful in reducing injuries to kids, solutions may be legislated or mandated."

Industry can't make fail-safe farms

"Since children are likely to remain an important part of the farm labor force, the need for mandatory protective equipment is of utmost importance," the Mayo Clinic study concludes.

Although farm equipment manufacturers have installed many safety features, there are no mandatory safety requirements for farms with 10 or fewer employees.

But the American Society of Agricultural Engineers (ASAE) meets twice a year to revise and add voluntary safety industry standards. "Manufacturers usually accept these standards," says Arnold Skromme, a retired Moline, Illinois ag engineer.

With Skromme's help, this past summer, Marilyn Adams was appointed to the ASAE wagon committee which will write new safety standards. She hopes the outcome will be a design for a safety grate and a danger decal for gravity wagons. "It will be slow coming, but I intend to follow through," she says.

But new standards don't address the undisputed problem: Old machinery. The average life of U.S. tractors is often 30 years.

"If all machines and structures on farms today had been built in 1987, the death rate would miraculously fall overnight from 50 to about 25 per 100,000," says Skromme, who devotes months of personal lobbying and financial expense to reducing farm accidents.

For instance, the lack of roll-over-protective structures (ROPS) on three million old tractors on U.S. farms is a major hazard. The U.S. only adopted voluntary ROPS standards on

new tractors in 1985. In England, where ROPS or a safety cab have been mandated on new tractors since 1970, there were only four tractor deaths in 1986. Sweden has had a steep decline in deaths after old tractors were required to be refitted with safety devices.

"Our new machines are as safe as any in the world," Skromme says. "But our death rate is three times that of England and Germany. The difference is retrofits."

To address this problem, a new National Coalition for Agricultural Safety and Health has asked Congress to mandate retrofit ROPS.

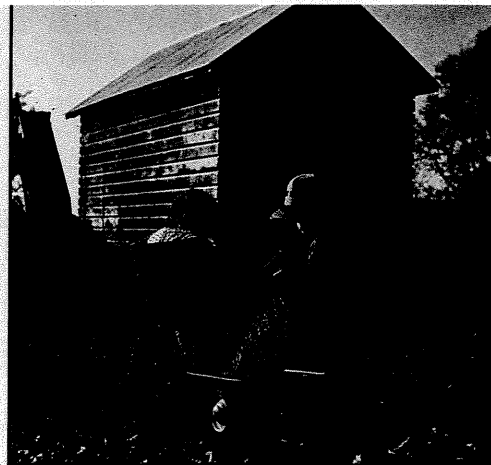
One major company, Ford New Holland, Inc., advertises help in obtaining retrofit ROPS. Kubota and Yanmar offer the same help.

Skromme says small manufacturers would make ROPS and seats for old tractors if they had a design from the original manufacturer. "The new designs are simpler, and less costly," he says. He pegs the cost at about \$600.

Shielding is standard equipment on PTO units; but it's easily removed for maintenance. If farmers are persistent, they can obtain a replacement shield from most companies, Skromme says. In some cases, companies which have been hurt by lawsuits offer free replacement shields and decals.

This past summer, ASAE voted to make it an industry standard to hinge all new shields requiring removal for servicing.

Skromme concludes, "Engineers get blamed, but we need help to improve safety. We have no OSHA inspection, few retrofits and poor laws. Farmers must demand safety." ●



We buried the future of my dreams today

We buried the future of my dreams today. My legacy has no one to continue with growth.

It is not supposed to be this way, you know. My offspring, and their offspring should be the ones to carry on—however they see fit—

The legacy of me, their forefather.

I'm left here with my farm. I've been fighting to hold on to these fruits of my lifetime of labor. But we buried the future of my dreams today. Now with whom can they grow?

It was not the farm that took him nor was it the farm crisis. But with him—this grandson whom I loved... helped raise... fed... talked with... dreamed with... We also buried my purpose for growth... love... life.

I don't know what I'll do to face tomorrow. Today is pain enough by itself.

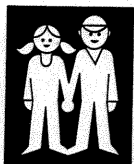
But now, when I'm gone, what will remain As a reminder of my life-print on earth... life... love... family? What will remain as a reminder of my faith in self... in others... in God? Who will say, "My friend, Grandpa, walked here... worked here... loved here... died here?"

Who will say, "My friend, Grandpa, contributed to my life listened to my dreams encouraged my dreams?" Is there another who can do this for me?

We buried the future of my dreams today God—how do I now find meaning for my life as I continue to live?

By Linda E. Schrock
Hesston, Kansas

Photograph: Stephanie Jobst



The time has come for this idea

Mark Hanna, Iowa State University Extension ag engineer, and Arnold Skromme suggest asking farm equipment and commodity organizations to set up a checkoff fund to pay for the retrofitting of old equipment. Once the fund was established, companies would be able to make retrofits

available at no cost to farmers.

"The science of engineering will always march forward to find new and safer ways," Skromme points out. "We need to look back to save lives, with a kitty to pay for retrofits. It's a problem that won't go away."

Hanna agrees, "A survey of farmers in Iowa and New York released last fall shows great concern about safety. In fact, members of farm groups may be more concerned than their current funding reflects. An ag checkoff would be a powerful argument to obtain matching funds from government and others."

Safe farms for safer kids

"I don't sleep well after spending a day recording children's deaths," says Arnold Skromme, who enlists his wife's help to publish an annual *U.S. Report on Farm Accidents and Deaths*. "It's too late to help some farm families. But we must let others feel their grief and take action, so it won't happen again."

Successful Farming challenges farm children, aged 8 to 16, with their parents' help, to take just one step to make their farm safer, today!

At right, you'll see a list with a few suggestions where to start. You'll think of other ideas. Begin today to compile a list of your farm's specific safety hazards. Next develop an action plan to reduce these hazards. Complete work on your safety projects by May 15 and send a list of your accomplishments to: SF's Safe Farms for Safe Kids Project, 1716 Locust St., Des Moines, IA 50036.

We'll feature the best entries in *Successful Farming* later this year, and these winners will be honored at a special ceremony held on National Farm Safety Day for "Just Kids" on September 20. We're looking forward to hearing from you! ●

CHILDREN 'WANTED ALIVE'

They are between the ages of 3 and 10 (more or less) and stand belt high (more or less). Their eyes are brown, blue, green or hazel and they go by aliases such as "Princess, Sweet-face, Good Buddy and Champ."

Their general habits dictate close supervision because they are attracted to such things as water and may be found around ponds and tanks. They beg to ride tractors and other dangerous equipment. They're occasionally found climbing trees or buildings. They have been known to play with matches and get into areas where poisons and pesticides are stored.

The pair are wanted at school for questioning regarding the completion of their studies. They are wanted at home to enjoy meals, do homework and be hugged by their parents.

Approach with caution. The pair are known pranksters and may be armed with bubble gum, sticky fingers and even an occasional sling shot. On their persons may be found rubber bands, small rocks, live pet bugs and numerous other seemingly innocent items.

They are often found running in gangs; you should always expect the unexpected from them and their cohorts.

If found, hug them daily. Supervise their activity. Teach them to avoid farm dangers. Be a good example. Set and enforce safe limits. Tell them they're loved and "wanted alive."

Photograph: Stephanie Jobst

Fifteen steps to farm safety

- ✓ 1. Don't allow children as extra riders on equipment.
- ✓ 2. Do not allow children to play with idle machinery.
- ✓ 3. Leave any equipment that might fall—such as front-end loaders—in the down position.
- ✓ 4. When self-propelled machinery is parked, brakes should be locked and keys removed from the ignition.
- ✓ 5. Always leave a tractor PTO in neutral.
- ✓ 6. When starting machinery—and especially when reversing it—know where the children are.
- ✓ 7. Maintain machinery in good repair, particularly protective shields, ROPS and seat belts.
- ✓ 8. Do not permit kids to operate machinery until they have completed safety training.
- ✓ 9. Fence farm ponds and manure pits.
- ✓ 10. Place fixed ladders out of reach, or fit with a special barrier; store portable ladders away from danger areas.
- ✓ 11. Shield dangerous machinery components and electrical boxes and wiring and place out of reach of small children, or fit with locking devices.
- ✓ 12. Store chemicals and pesticides in a locked area.
- ✓ 13. Place warning decals on all grain bins, wagons and trucks.
- ✓ 14. Maintain lights and reflectors for all equipment used on roads.
- ✓ 15. Devote a day to family safety instructions and rules.

Nicole Jobst and Joe Beaman of Earlham, Iowa, represent the future generation of farmers and rural leaders.





Invited Participants

Chairperson

Susan Gallagher MPH
Education Development Center, Inc.
Newton, MA

Participants

Marilyn Adams
Farm Safety 4 Just Kids
Earlham, IA

Robert Aherin Ph.D.
University of Illinois-Champaign
Urbana, IL

Jed Bauer
River Falls, WI

Thomas Bean Ph.D.
National Safety Council
Itasca, IL

Dorianne Beyer Esq LLM JD
National Child Labor Committee
New York, NY

Suzanne Binder MD
Ctr. for Disease Control & Prevention
Atlanta, GA

Deb Boyle DVM
Minnesota Dept. of Health
Minneapolis, MN

Christine Branche, Ph.D.
Nat'l Ctr. for Inj. Prevention & Ctrl.
Atlanta, GA

Steven Browning Ph.D.
University of Kentucky Medical Ctr.
Lexington, KY

Stephanie Bryn MPH
Maternal & Child Health Bureau
Rockville, MD

Shari Burgus M.Ed.
Farm Safety 4 Just Kids
Earlham, IA

Ann Carruth Ph.D.
Southeastern Louisiana University
Hammond, LA

Dawn Castillo
NIOSH
Morgantown, WV

Sandi Cihlar
Cihlar Farms
Mosinee, WI

Kelley Donham DVM
University of Iowa
Iowa City, IA

Sharon Dorfman SCM, CHES
SPECTRA
Ponce Inlet, FL

Elaine Faustman Ph.D.
University of Washington
Seattle, WA

Jennifer Felzien
Women Involved in Farm Economics
Sterling, CO

William Field EdD
Purdue University
West Lafayette, IN

Lawrence Fine MD, MPH
NIOSH/CDC
Washington, DC

Eric Fogg
Pioneer Hi-Bred International Inc.
Des Moines, IA

Susan Gerberich Ph.D.
University of Minnesota
Minneapolis, MN

Britt Gumport
National 4-H Council
Chevy Chase, MD

Dan Hair MSS, CSP
Zenith Insurance Company
Harrisburg, PA

Eric Hallman MS
Cornell University
Ithaca, NY

Dave Hansen
Farm Safety 4 Just Kids
Earlham, IA

David Hard Ph.D.
NIOSH
Morgantown, WV

Frances Henderson RN, EdD
Alcorn State University
Natchez, MS

Sharon Hughes CAE
Nat'l Council of Ag Employers
Washington, DC

Ronald Jester Ph.D.
University of Delaware
Georgetown, DE

Art Kerschner, Jr.
US Dept of Labor
Washington, DC

Alan Korn J.D.
National SAFE KIDS Campaign
Washington, DC

Karen Liller Ph.D.
University of South Florida
Tampa, FL

Bryan Little
American Farm Bureau Federation
Washington, DC

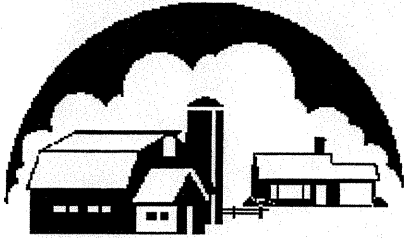
Murray Madsen BSAgE, MBA
Deere & Company
Moline, IL

John May MD
NY Center for Ag Medicine & Health
Cooperstown, NY

<p>McCallum Ph.D. University of Alabama Tuscaloosa, AL</p>	<p>Steve Pearson Nat'l Assn. of Farm Broadcasters St. Paul, MN</p>	<p>Tim Size Rural Wisconsin Health Coop. Sauk City, WI</p>
<p>Linda McCauley Ph.D. Oregon Health Sciences University Portland, OR</p>	<p>Robert Petrea Ph.D. University of Illinois Urbana, IL</p>	<p>Doris Slesinger Ph.D. University of Wisconsin Madison, WI</p>
<p>Stephen McCurdy MD, MPH University of California, Davis Davis, CA</p>	<p>Tim Pizatella MS NIOSH Morgantown, WV</p>	<p>Rick Smith Maternal & Child Health Bureau Rockville, MD</p>
<p>Jennie McLaurin MD, MPH American Academy of Pediatrics Winston-Salem, NC</p>	<p>Patricia Pulte National Safety Council Itasca, IL</p>	<p>Bernie Staller National FFA Organization Indianapolis, IN</p>
<p>Becky Meyer National FFA Organization Indianapolis, IN</p>	<p>Mark Purschwitz Ph.D. University of Wisconsin Madison, WI</p>	<p>Lorann Stallones MPH, Ph.D. Colorado State University Fort Collins, CO</p>
<p>Ted Miller Ph.D. Pacific Institute for Research & Eval. Calverton, MD</p>	<p>James Rainey Edmond, OK</p>	<p>Sam Steel Northeast Iowa Community College Peosta, IA</p>
<p>Karen Mountain MBA, RN Migrant Clinicians Network, Inc. Austin, TX</p>	<p>Risto Rautiainen University of Iowa Iowa City, IA</p>	<p>Anthony Suruda MD University of Utah Salt Lake City, UT</p>
<p>Dennis Murphy Ph.D. Pennsylvania State University University Park, PA</p>	<p>Deborah Reed MSPH, Ph.D. University of Kentucky Lexington, KY</p>	<p>Cheryl Tevis Successful Farming Des Moines, IA</p>
<p>John Myers MSF NIOSH Morgantown, WV</p>	<p>Brad Rein PE U.S. Department of Agriculture Washington, DC</p>	<p>Donna Thompson Ph.D. The University of Northern Iowa Cedar Falls, IA</p>
<p>Stephen Olenchock Ph.D. NIOSH-OD Morgantown, WV</p>	<p>Susan Reynolds Progressive Farmer Magazine Birmingham, AL</p>	<p>Roger Tormoehlen Ph.D. Purdue University West Lafayette, IN</p>
<p>Lenora Olson Intermountain Injury Control Research Center Salt Lake City, UT</p>	<p>Carol Runyan Ph.D., MPH University of North Carolina Chapel Hill, NC</p>	<p>Jay Wilkins BCE, DrPH Ohio State University Columbus, OH</p>
<p>Ana Maria Osorio MD, MPH U.S. Environ. Protection Agency Washington, DC</p>	<p>Steve Schlecht Gempler's Inc. Belleville, WI</p>	<p>Craig Zwerling MD, PhD, MPH The University Of Iowa Iowa City, IA</p>
<p>Kevin Paap Paap Farms Garden City, MN</p>	<p>Charles Schwab Ph.D. Iowa State University Ames, IA</p>	
<p>David Parker MD, MPH Minnesota Dept. of Health Minneapolis, MN</p>	<p>John Shutske Ph.D. University of Minnesota St. Paul, MN</p>	

Marshfield Staff

- Beth Busscher
- Michael Caldwell, MD
- Holly DeBlois
- Nancy Esser
- Kathy Farnsworth
- Chris Hanna
- Tracy Jakobi
- Jodi Katzenberger
- Barb Lee, Ph.D.
- Barb Marlenga, Ph.D.
- Cyndi Phelan
- Martha Vela



Resources for EMS / Fire Departments

Mark A. Purschwitz

University of Wisconsin

UW-Extension, Cooperative Extension Office
 (located in county seat)
 Ask for Agricultural Agent
 Mark A. Purschwitz, Ph.D.
 UW - Madison/Extension
 Dept. of Biological Systems Engineering
 460 Henry Mall
 Madison, WI 53706
 phone (608) 262-1180 or FAX (608) 262-1228
mapursch@facstaff.wisc.edu

Additional Farm Rescue Training

Dennis Schultz
 Specialists Code 3
 1331 Elm Street
 Almond, WI 54909
 phone (715) 366-2868
 Ron Naab
 Specialists Code 3
 P.O. Box 362
 Allenton, WI 53002
 phone (414) 629-9749
 Dept of Medical Education
 Marshfield Clinic
 1000 North Oak Ave.
 Marshfield, WI 54449
 phone (715) 387-5207
 FARMEDIC Provider Course
 Rock River Region Emerg. Services
 2850 Glenwood Ave.
 Rockford, IL 61101
 phone (815) 971-6824
 FARMEDIC
 National Training Center
 Alfred State College
 Alfred, NY 14802
 phone (800) 437-6010

Print Materials (prices subject to change)

Bulletin from University of Wisconsin - Extension
 A3676, "Farm Rescue Continuing Education: Methods and Resources" (\$1.75)

Contact your local County Extension Office. Quantity discounts may be available.

- NRAES-10, "Farm Accident Rescue" (\$5.00)
- NRAES-12, "First on the Scene" (for lay persons) (\$7.00)
- NRAES-18, "Extinguishing Silo Fires" (\$4.00)
- NRAES-39, "Fire Control in Livestock Buildings" (\$4.00)

Small orders (5 or less) can be purchased from:
Dept. Of Biological Systems Engineering
University of Wisconsin - Madison
460 Henry Mall
Madison, WI 53706
phone (608) 262-3311 (Ask for Hallie)

Large or small orders can be purchased directly from the publisher:
Northeast Regional Agricultural Engineering Service
Cooperative Extension
152 Riley-Robb Hall
Ithaca, NY 14853-5701
phone (607) 255-7654 or FAX (607) 255-4080

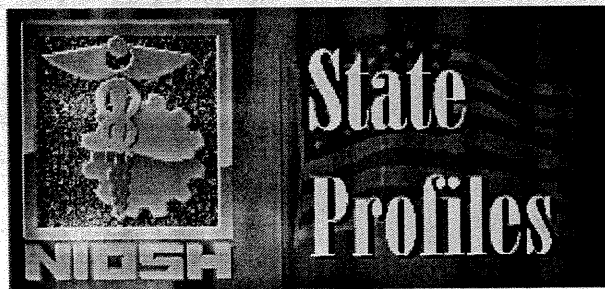
"Rural Rescue and Emergency Care" (\$32.00)
American Academy of Orthopaedic Surgeons
Customer Service
6300 North River Rd.
Rosemont, IL 60018
phone (800) 626-6726 or FAX (800) 823-8025

Video

"Farm Machinery Accidents" (\$39.95)
Lincoln Medical Education Foundation
4600 Valley Rd.
Lincoln, NE 68510
phone (402) 483-4581 or FAX (402) 483-4184

UW
Extension

National Institute for Occupational Safety and Health

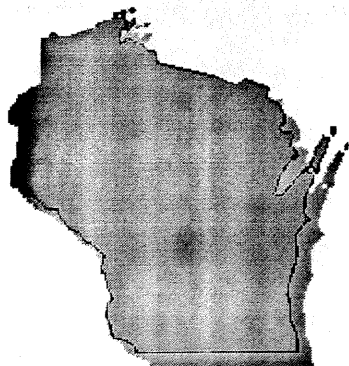


The National Institute for Occupational Safety and Health (NIOSH) is the only Federal agency that conducts research, trains professionals, and develops innovative solutions to occupational safety and health problems. As part of the Centers for Disease Control and Prevention (CDC), NIOSH operates programs in every State to improve the safety and health of workers. The Institute responds directly to requests for assistance from businesses, workers, and State agencies. NIOSH also supports a wide variety of research, training, and outreach projects.

Why we need to be concerned about occupational safety and health

On a typical day, 154 U.S. workers die from work-related disease or injury, and an additional 9,000 workers are disabled. In 1993, the National Safety Council estimated that for injuries alone, medical costs and losses of productivity and wages totaled \$112 billion. This toll on U.S. health and productivity is largely preventable—but not without investing in the science needed to identify causes and develop solutions to this national problem.

Job Safety and Health in Wisconsin



How many workers die or are injured on the job in Wisconsin?

More than 100 workers per year died from work injuries in Wisconsin between 1980 and 1989. The average annual rate of workplace fatalities in Wisconsin during this period was 6.2 per 100,000 workers. While that rate was slightly below the national average of 7.0 per 100,000 workers, the rate of fatalities in Wisconsin mining operations was double the national average (61 versus 32 per 100,000). The

highest number of work fatalities in the State were in the agriculture sector, followed by manufacturing and transportation.

How much do workers' injuries and diseases cost?

In 1993, approximately 78,000 claims were filed for worker's compensation in Wisconsin, primarily for nonfatal injuries. More than 50% of these involved sprains and strains, such as back injuries which are the most prevalent cause of work disability. In 1993, wage compensation payments cost Wisconsin businesses \$232 million. Based on national workers' compensation data, it is estimated that Wisconsin businesses would also have paid \$93 million in workers' compensation medical payments. These payments represent only part of the costs for work injuries and diseases since only about 60% of injured workers receive workers' compensation. In addition, costs are not covered for most chronic occupational illnesses, such as occupational cancers. Costs for workers with these chronic diseases, estimated to exceed \$5.4 billion for the United States, are paid by Medicare, Medicaid, public and private disability insurance, and victims and their families. Total annual costs for work injury and disease in Wisconsin probably exceed \$500 million dollars, excluding the costs of lost productivity.

How NIOSH prevents worker injuries and diseases in Wisconsin

Helping solve workplace problems: NIOSH evaluates workplace hazards and recommends solutions when requested by employers, workers, or State and Federal agencies. Since 1980, NIOSH has evaluated more than 50 worksites in Wisconsin, ranging from small publishing companies to large manufacturing operations. NIOSH has investigated toxic metal exposures among battery manufacturers, musculoskeletal disorders among printers, and cancers and other chronic disease among workers exposed to industrial chemicals. These investigations identified hazards and recommended solutions to reduce disease and injury.

For example, in 1990, NIOSH received a joint labor-management request from the Milwaukee facility of the Harley-Davidson company to evaluate musculoskeletal disorders among its workers. The labor-management team was concerned about increasing injuries and workers' compensation costs. On the basis of NIOSH recommendations, the company redesigned jobs where musculoskeletal hazards had been identified. NIOSH recently returned to the facility to evaluate the effectiveness of the changes. Researchers found that cases of musculoskeletal disorders have been reduced by more than half. Lost or restricted workdays have dropped from 610 to 190 per 100 workers.

Building State worker safety and health capacity: NIOSH funds several programs within the Wisconsin Department of Health and Social Services to identify worksites with special work injury and disease problems. Department staff investigate fatal work injuries, track and respond to cases of excessive lead exposure in adults (which can cause kidney and nervous system damage and infertility), and track and respond to reports by health care providers of individuals with silicosis (a disabling, potentially fatal occupational lung disease) and carpal tunnel syndrome (a disabling nerve disorder affecting the hands).

When fatal work injuries are investigated, health professionals provide employers with recommendations to prevent future fatalities. In 1994, 120 workers died as a result of 114 fatal work incidents. Staff conducted investigations at 15 worksites providing immediate recommendations for improved safety measures. Information from these investigations is also used to inform other worksites where similar hazards may exist. A fatal fall of a worker installing storm windows at the University of Wisconsin in Madison in 1994 revealed that none of the State university campuses had fall protection programs for their maintenance workers. This led to a statewide effort to implement worker safety