



## PREVENTING DEATH AND INJURY IN TRACTOR OVERTURNS WITH ROPS



Tractor overturns are the leading cause of occupational agricultural deaths in the United States. Between 1992 and 2005, 1,412 workers on farms died from tractor overturns. The Roll-Over Protective Structure (ROPS) was developed to protect tractor operators from death and disability from these events by providing a protective zone for the operator in during a tractor

overturn. ROPS are most effective when used in conjunction with a seatbelt, which keeps the tractor operator inside the protective zone during an overturn. The effectiveness of ROPS has been well documented (Thelin, 1998). The National Institute for Occupational Safety and Health (NIOSH) has estimated that fatality rates due to tractor overturns could be reduced by a minimum of 71% if all tractors in the U.S. were equipped with ROPS.

Web Link: **[FIND ROPS FOR YOUR TRACTOR](http://warehouse.ca.uky.edu/rops/ropshome.asp)**

<http://warehouse.ca.uky.edu/rops/ropshome.asp>

In a recent issue of the Journal of Safety Research (vol. 39, issue 5, 2008), a NIOSH-authored article, "Tracking the Prevalence of Rollover Protective Structures on U.S. Farm Tractors: 1993, 2001, and 2004," summarized the changes in the prevalence of ROPS use over an eleven year period. The data, which were collected for NIOSH by the U.S. Department of Agriculture (USDA), National Agricultural Statistics Service (NASS), show ROPS use has increased from 38% in 1993 to 51% in 2004 (an average increase of 1.2% per year). More recent NIOSH/NASS ROPS surveillance data indicate the prevalence of ROPS-equipped tractors reached 59% in 2006 (NASS, 2008). While the increase in ROPS-equipped tractors is encouraging, the slow rate of ROPS adoption continues to frustrate the agricultural safety community.

The Journal of Safety Research article shows that farms in the South and the West had the highest percentage of ROPS-equipped tractors at 52%, compared with 46% in the Midwest and 40% in the Northeast. Additionally, the older the age of the primary farm operator, the less likely tractors on the farm were equipped with ROPS. On farms with operators younger than 55 years, over 50% of tractors were equipped with ROPS. When the operator was 25- to 34-

years old 57% of the tractors had ROPS. The lowest percentage of ROPS-equipped tractors was found on farms operated by farmers over 65 years of age at only 42%. Farms with a value of sales over \$99,999 had the highest percentage of ROPS-equipped tractors (67%). The lowest percentage was on farms with a value of sales less than \$10,000 (40%).

It may seem obvious that farmers with limited resources do not have the capital to buy new tractors or retrofit their existing tractors, and cost has been identified by farmers as one barrier to retrofitting ROPS on older tractors, even if they will continue to be used for decades. However, economics are not the only factors influencing reluctance to place ROPS on older tractors. Studies have shown that even with an economic incentive, ROPS acceptance by the farm operator was not 100%. In New York, only 12% of farm operators interviewed were willing to pay the \$400 for a ROPS retrofit, while 40% said they would never accept a retrofit even if it were free (Kelsey, May, and Jenkins, 1996). A second study found that farm operators in New York were more willing to retrofit as subsidy offers increased, with a cost-sharing incentive of 75% to 90% encouraging the greatest number of farm operators to retrofit. However, even when offered a 100% subsidy, 20% of the interviewed farmers stated they would not retrofit an older tractor with a ROPS (Hallman, 2005). Common reasons given by farm operators for not placing a ROPS on older tractors include:

- the ROPS are too tall to allow tractors to enter farm buildings or interfere with farm operations where low clearances are an issue (e.g., tractors used in orchards);
- the belief, particularly among older farmers, that they know how to control a tractor, making ROPS unnecessary;
- what they perceive as the inconvenience and time needed to purchase a ROPS and have it installed on their tractor.

These and the economic factors make campaigns to encourage equipping older tractors with ROPS difficult.

Although federal regulations and voluntary standards have been set as a means of reducing injury and death from tractor overturns, these measures have limitations. In 1976, the Occupational Safety and Health Administration (OSHA) required all agricultural employers to equip all employee-operated tractors manufactured after October 25, 1976, with ROPS and safety belts. This standard, which is still in effect today, does not apply to family members (family-only farms) and, since its inception, has not been enforced on farms with fewer than 11 full-time employees in 47 of the 50 states. California, Oregon, and Washington are the exception, and cover all farms with hired workers. These restrictions mean that only about 8% of all farms in the U.S. are covered by this standard. Another major effort to increase the use of ROPS was taken by the American Society of Agricultural Engineers (ASAE now the American Society of Agricultural and Biological Engineers, or ASABE). In 1985, ASAE

adopted a voluntary standard, S318.10, which encouraged tractor manufacturers to install ROPS and seatbelts on all new agricultural tractors for use in the U.S. market. All major tractor manufacturers agreed to adopt this standard, and since 1986, nearly all new agricultural tractors sold in the U.S. have been equipped with ROPS and seatbelts.

It was anticipated that the voluntary ROPS standard would lead to a decrease in the number and rate of tractor overturn deaths on U.S. farms. Yet between 1992 and 2005, tractor overturn fatality rates have not decreased significantly because of the large number of older tractors in use on U.S. farms that are not equipped with ROPS. Based on the current rate of ROPS adoption, we would not expect to see fatality rates from tractor overturns in the U.S. to be at or near zero until sometime after the year 2020. The loss of life in the interim is unacceptable. The data suggest that incentive programs addressing the concerns of older farm operators and low-income farm operations may help increase retrofitting of ROPS on older tractors.

NIOSH, through its network of Agricultural Safety and Health Research Centers and the National Occupational Research Agenda (NORA) Agriculture, Forestry, and Fishing Sector Council, is making the retrofitting of ROPS on older tractors a major research and outreach priority. As a part of this process, we would like to hear your success stories or ideas about how to encourage the retrofitting of ROPS on older farm tractors and protect America's farmers and farm workers.

## References

1. Hallman E. [2005]. ROPS retrofitting: measuring effectiveness of incentives and uncovering inherent barriers to success. *J Agric Saf and Health* 11(1):75-84.
2. National Agricultural Statistics Service. [2008]. 2006 farm and ranch safety survey. Report No. Sp Cr 3-1 (1-08). Washington, DC: U.S. Department of Agriculture, National Agricultural Statistics Service.
3. Kelsey, T. W., J. J. May, and P.L. Jenkins. [1996]. Farmtractors, and the use of seat belts and rollover-protective structures. *Am J Ind Med* 30:447-451.
4. Thelin A. [1998]. Rollover fatalities—Nordic perspectives. *J Agric Saf and Health* 4(3):157-160.

*Author:* **John Myers, MSF** | Health Statistician, NIOSH Division of Safety Research

*Source:* [http://www.cdc.gov/niosh/blog/nsb010509\\_rops.html](http://www.cdc.gov/niosh/blog/nsb010509_rops.html)