



# Hazards Associated with Using Farm Tractors to Move Large Bales

## Description of HAZARD

Beginning in the mid-1970s, standard small-bale forage balers began to be replaced by large-bale balers in the agricultural industry. The chance for serious injury or death to workers grows with the size and weight of bales. Bales that weigh more than 750 pounds put workers at especially high risk. According to NIOSH analysis of data from the Bureau of Labor Statistics (BLS) Census of Fatal Occupational Injuries (CFOI), 74 workers were fatally injured from 1992 through 1998 while harvesting, handling, or working near bales and bale-handling equipment [BLS 2000]. Forty-two of these workers were killed while preparing bales for transport or while moving them. Farm tractors were involved in 34 of these 42 events. In a number of these deaths, rollover protective structures (ROPS) on tractors and specialized handling equipment were not used, and parked tractors were not secured to prevent them from rolling.

During 1993 through 1999, the Minnesota Fatality Assessment and Control Evaluation (FACE) Program, working with the National Institute for Occupational Safety and Health (NIOSH) FACE Program, studied 11 fatal incidents in which workers were killed while working with large bales. Eight of the 11 workers were moving or preparing to move large bales using farm tractors when they were struck by a bale that fell, were caught between a bale and a piece of equipment, or were crushed as a result of a tractor rollover.

NATIONAL INSTITUTE FOR OCCUPATIONAL SAFETY AND HEALTH

HAZARD ID

## CASE STUDIES

### Workers are at risk of being struck by bales that fall from equipment during transport.

A 70-year-old farmer died from injuries received when a large, round hay bale fell out of the bucket of a tractor-mounted front-end loader. The bale pinned him against the tractor seat. The loader did not have a grapple or spear for holding bales in place. Instead, the farmer had tied the bale with a 5/8-in.-diameter rope. The rope broke, and the bale tumbled down the loader lift arms, striking and killing the farmer [MDH 1995].

### Workers are at risk of being caught between a bale and a piece of farm equipment.

A 63-year-old farmer died from injuries received when he was pinned between a large bale and a tractor-mounted front-end loader that had a bale spear attached. The farmer drove the tractor to a spot along a public road where he planned to use chains to pull a large bale from the ditch. He turned the tractor, its wheels still on the road, so that the front faced the ditch. The farmer climbed down from the tractor and walked about 12 to 15 feet to the bale. He had not blocked the wheels or set the emergency brake. As he wrapped chains around the bale, the tractor rolled forward into the ditch, coming to rest against the bale. The bale spear attachment skidded across the top of the bale and wedged the bale between the front of the tractor and the loader. The farmer was caught between the bale and the loader and was unable to free himself. He died as a result of traumatic injury [MDH 1999].

### Tractor rollover hazard: Workers risk fatal injury when moving large bales with tractors that are not equipped with ROPS and a seat belt.

A 65-year-old farmer died from injuries received when the tractor he was driving rolled over. He was using a tractor-mounted front-end loader equipped with a large bale spear to haul bales from a field to his farmyard. The tractor did not have ROPS. The farmer had raised the loader about 5 feet above the

ground so that the bale he was moving would not block the beams from the hood-mounted headlights. As the farmer drove the tractor from the field to the farmyard, the left rear tractor wheel left the driveway surface and entered a ditch. The tractor rolled over to the side 180 degrees, coming to rest on top of the farmer and causing fatal crushing injuries [MDH 1996].

## Recommendations for prevention

To reduce the risk of injuries and deaths, farmers and their employees should take the following measures:

- Make sure equipment is suitable, in good repair, weighted properly, and able to carry the load safely and securely.
- Rig tractors with ROPS and a seat belt. Use seat belt when driving tractors with ROPS.
- Always operate equipment according to the manufacturer's instructions and recommendations.
- Before beginning work, plan the safest travel path. When possible, use travel paths that are flat, firm, free of obstructions, and a safe distance from holes, ditches, and ruts. Because conditions change, continually scout the ground to find the safest travel path.
- Front-end loaders are used to stack, load, or move bales. Use attachments that are designed to handle large bales, such as grapples (photo 1) and front-end bale spears. Do not raise or lower loaders while the tractor is moving.
- Drive tractors with front-end loaders at slow speeds.
- When moving bales but not stacking or loading them on trailers, use tractors that have a rear-end bale spear attachment (photo 2) whenever possible.
- Before moving bales by using front-end loaders or rear-end bale spear attachments, make sure that enough counterweights are added and that attachments are safely placed in the lowered position.

- Use tractors with headlights, taillights, and warning flashers. Be sure this equipment is not obstructed when bales are moved with attachments in the safe, lowered position. Move bales during daylight hours whenever possible.
- When moving up or down sloping land, keep the bale on the up-slope end of the tractor and place the attachment in the lowest possible position. For example, if a front-end loader is used to move a bale, the tractor operator should drive uphill or back downhill. If a rear-end spear attachment is used, drive downhill or back uphill.
- If you must leave the tractor, lower the attachments, stop the engine, remove the key, and secure the tractor to prevent it from rolling. If the tractor's transmission has a park position, shift the lever into park. If there is no park position, shift it into the lowest gear. Set the parking brake if the tractor has one. Chock the wheels front and back to prevent rolling.

## REFERENCES

BLS [2000]. Census of fatal occupational injury data files. Washington, DC: U.S. Department of Labor, Bureau of Labor Statistics.



**Photo 1.** The tractor shown above has a front-end loader equipped with an attachment for securing bales (grapple). The loader is shown in a lowered position, which is the safest position to use when moving bales.

MDH [1995]. Farmer dies after large round hay bale falls on him. Minneapolis, MN: Minnesota Department of Health, Minnesota Fatality Assessment and Control Evaluation (MN FACE) Investigation 95MN01301.

MDH [1996]. Farmer dies after tractor he was driving rolled over on him. Minneapolis, MN: Minnesota Department of Health, Minnesota Fatality Assessment and Control Evaluation (MN FACE) Investigation 95MN07101.

MDH [1999]. Farmer dies after being pinned between large bale and tractor loader. Minneapolis, MN: Minnesota Department of Health, Minnesota Fatality Assessment and Control Evaluation (MN FACE) Investigation 99MN02901.

## ACKNOWLEDGMENTS

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**Photo 2.** The tractor shown in the photo has a rear-end bale spear attachment. Moving the bale with the rear end bale spear attachment makes the tractor more stable, does not get in the way of the tractor's headlights, and allows the operator a clear view.

## For more information

NIOSH has recently published a report on this hazard: Wahl GL, Brown M, Parker DL, DSR, NIOSH, CDC [1998]. Fatalities associated with large round bales—Minnesota, 1994–1996: MMWR 47(2):27–30.

To obtain more information about this hazard or other work place hazards

- call NIOSH at **1-800-35-~~NIOSH~~**, or
- visit the NIOSH Web site at

**<http://www.cdc.gov/niosh>**

NIOSH and MN FACE recommend that farmers, farm machinery owners, and agricultural workers

- contact manufacturers for information about ROPS and the safe use of farm equipment attachments, and
- contact the NIOSH FACE program, the MN FACE program, your Occupational Safety and Health Administration (OSHA) office, and your county’s agricultural extension agent for more safety information.



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