

INJURY UPDATE

*A Report to Oklahoma Injury Surveillance Participants**

August 20, 2010

Work-Related Mobile Machinery Deaths, Oklahoma, 1998-2008

In the United States in 2007, approximately 800 workers were fatally injured and 69,000 workers were non-fatally injured with days away from work after being struck by, against, or caught in machinery or work-related equipment. In Oklahoma, 940 workers were injured with days away from work in 2007 due to machinery-related incidents. In addition to being struck by or caught in machinery, workers are also injured after falls from machinery, electrocutions when equipment comes in contact with power lines, and collisions with motor vehicles. Many of these injuries involved mobile machinery, heavy equipment that is self-propelled but not designed for use on public roads. Mobile machinery is common in many industries, including construction, road and highway maintenance, manufacturing, and warehouse management.

The Oklahoma State Department of Health Injury Prevention Service began collecting information on all work-related fatalities in July 1997 with funding from the National Institute of Occupational Safety and Health. Data are collected from death certificates, the Office of the Chief Medical Examiner, the Occupational Safety and Health Administration (OSHA), the Department of Labor Public Employees Occupational Safety and Health Program, and newspaper clippings.

From 1998-2008, a total of 1,221 work-related deaths were reported in Oklahoma. Of these, 89 (7%) involved mobile machinery and were not farming-related (farming-related injuries often involve tractors and are discussed in the Injury Prevention Service publication: *Farming-Related Prevention at Work*). Ages of workers ranged from 18 to 82 years with a median age of 45 years (Figure 1). Almost all (96%) deaths occurred among males. Ninety percent of persons who were fatally injured were white, 6% were Native American, and 1% were African American. One percent of persons who were fatally injured were of Hispanic ethnicity.

Almost all (92%) persons who were fatally injured were residents of Oklahoma. The largest number of fatal injuries occurred in Oklahoma and Tulsa Counties, with 12 and 19 injuries, respectively (Figure 2). The number of deaths was highest in 2002 and 2004, with 13 deaths each. Thirty-eight percent of fatal injuries occurred from 8:00 AM to 12:00 PM (Figure 3). Nearly half (45%) of all fatal injuries occurred between June and September, with the largest number of injuries (12) occurring in September.

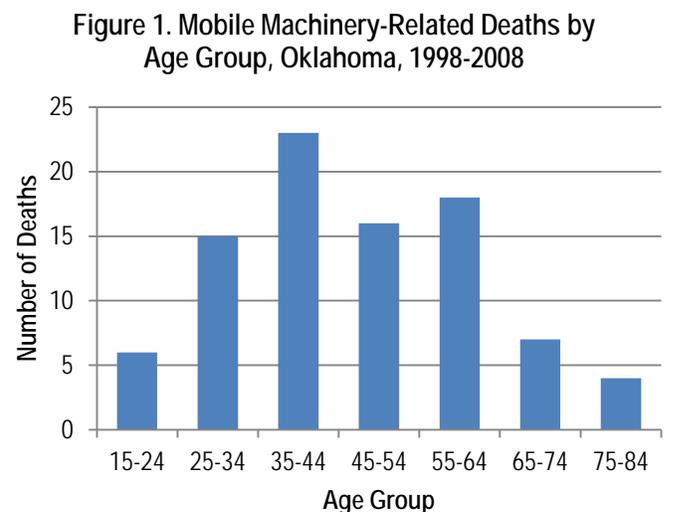
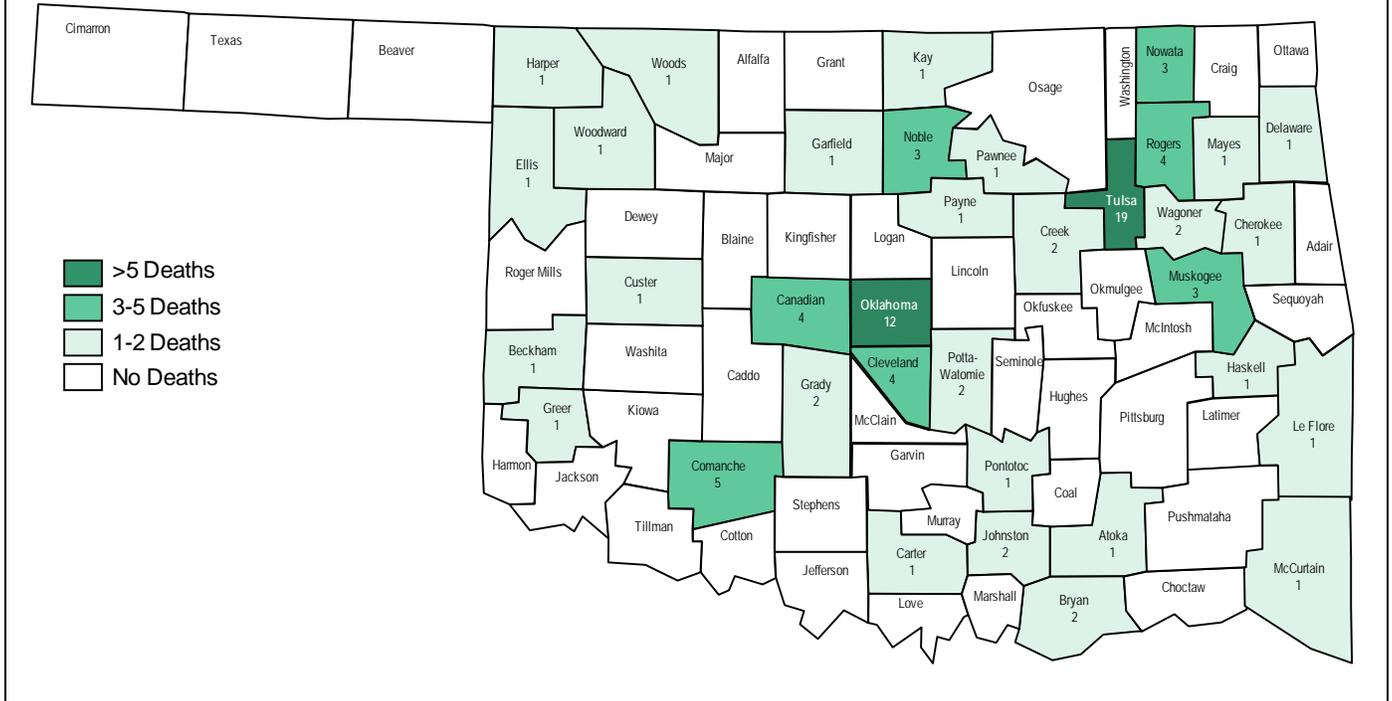


Figure 2. Work-Related Mobile Machinery Deaths by County of Incident, Oklahoma, January 1998 – December 2008

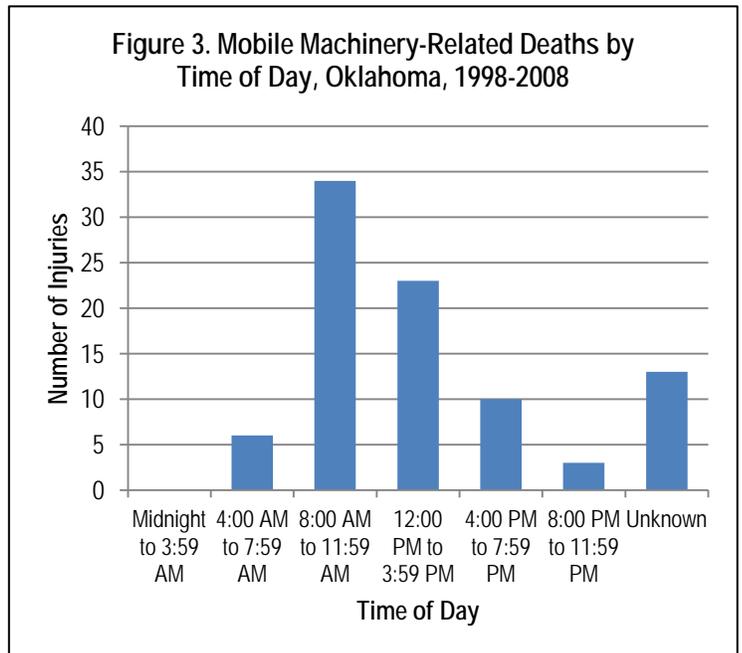


Two-thirds of fatal injuries involved a forklift, tractor, aerial lift, or crane (Table 1). Seventeen percent of fatal injuries were construction related, 15% were roadway work zone related, and 8% were oil and gas related. The most common causes of fatal injuries included being struck/crushed by machinery, falls, and machinery rollovers (Table 2).

Case Briefs

- A 54-year-old male was operating a boom lift at a construction site when the machinery backed into a nine-foot drop. He was catapulted approximately 40 feet from the boom lift and impacted the side of a parked vehicle.
- A 28-year-old male was working in the construction area of a bus manufacturing plant with three coworkers. He attempted to secure a strap around an 800-pound piece of steel pipe (approximately three feet in diameter and 20 feet in length) in order for it to be lifted and secured to another piece of pipe. As the crane operator hoisted the pipe, the strap loosened and the pipe fell approximately 15 feet to the ground, crushing the worker beneath it.

Figure 3. Mobile Machinery-Related Deaths by Time of Day, Oklahoma, 1998-2008



- A 21-year-old male was working at a roof truss manufacturing company. The worker had not been trained in forklift operation. He and a coworker were standing on a platform that was six feet above the ground on a forklift. They were attempting to secure a steel beam into place. The steel beam was supported by a second forklift and wooden post 11.5 feet above the ground. The second forklift operator raised the beam and it came off the forks of the forklift and struck the worker in the head. The worker died later the same day.
- A 66-year-old male was moving dirt on a sloped street using a front-end loader. The rear tires of the front-end loader hit a curb and it rolled onto its top. He was ejected as the front-end loader rolled and was pinned underneath it. The front-end loader did not have seat belts or a roll cage.
- A 19-year-old male was standing close to a backhoe at a pipeline construction site. The backhoe turned and he was struck in the chest by the boom of the backhoe and knocked to the ground. He stood back up, walked approximately 20 feet and collapsed. He could not be resuscitated.
- A 39-year-old male was laying sod at a new highway construction site using a tractor towing an 11-foot sod roller. He fell from the tractor and was dragged approximately 30 feet before he was run over by the sod roller.
- A 54-year-old male was moving a large basket of scrap metal using a forklift. He was operating the forklift on a pile of metal and was not wearing a seat belt. As he was unloading the basket, the forklift overturned and he was crushed under the cage of the forklift.
- A 45-year-old male was on his first day of work as a surveyor. He was holding a measuring rod used for grading/leveling and standing behind and to the right of a road grader when the grader backed over him with its right rear tires.
- A 32-year-old female was riding a mower up a steep ramp. She popped the clutch of the mower and it rolled backwards on top of her, spilling gasoline all over her. The gasoline was ignited by a hot exhaust pipe and she sustained third degree burns to 60% of her body. She died 12 days later due to her injuries.

Table 1. Mobile Machinery-Related Deaths by Type of Machinery Involved, Oklahoma, 1998-2008

Type of mobile machinery	Number of deaths	Percent
Forklift	17	19%
Tractor	17	19%
Aerial lift	14	16%
Crane	13	15%
Front-end loader	7	8%
Backhoe	6	7%
Bulldozer	2	2%
Pad-foot drum compactor	2	2%
Road grader	2	2%
Skid-steer loader	2	2%
Trackhoe	2	2%
Other	5	6%
TOTAL	89	100%

Table 2. Mobile Machinery-Related Deaths by Mechanism of Injury, Oklahoma, 1998-2008

Mechanism of injury	Number of deaths	Percent
Struck/crushed by machinery	14	16%
Fall	12	14%
Machinery rollover	12	14%
Run over by machinery	12	14%
Electrocution	11	12%
Struck by object falling from machinery	6	7%
Pinned between machinery and vehicle	5	6%
Struck by other object	4	5%
Other	13	15%
TOTAL	89	100%

Prevention

- Comply with existing OSHA standards for proper safety procedures.
- Train and certify all operators of mobile machinery.
- Develop, implement, and enforce comprehensive written safety programs.
- Conduct proper maintenance of equipment with all safety features in place.
- Maintain and utilize equipment according to manufacturer's recommendations.
- Use task-specific equipment and be alert to potential hazards.
- Provide well-lighted work environments.
- Protect workers from exposure to electrical hazards.
- Be aware of and avoid power lines near the work site.
- Use caution when operating mobile machinery near holes, ditches, and sloped/graded terrain or embankments.
- Do not enter trenches that have not been properly shored. Equipment and materials should be stored away from the edge of an excavated trench to prevent collapse of trench walls.
- Keep workers on foot separated from equipment as much as possible.
- Use spotters to guide equipment operators.
- Install back-up alarms, back-up cameras, or radar systems on vehicles.
- Know the weight of a load before moving it and ensure that it does not exceed the limits of the mobile machinery in use.
- Install rollover protective structures on all applicable mobile machinery.
- Wear seat belts when operating equipment.
- Use fall protection equipment such as lanyards and harnesses when working from heights.
- Wear proper safety equipment, such as hard hats, safety goggles, gloves, and protective footwear.

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