

INJURY UPDATE

*A Report to Oklahoma Injury Surveillance Participants**

June 30, 2009

Work-Related Burns among Roofers, Oklahoma, 1988-2006

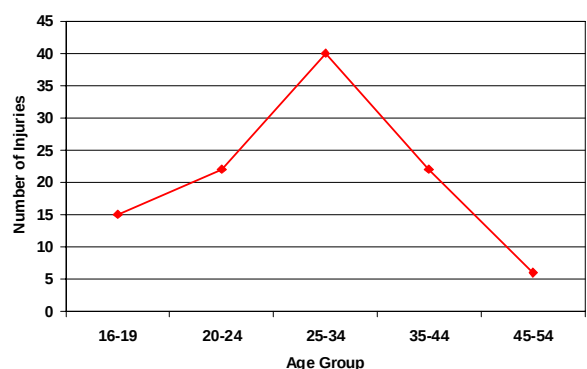
Each year, the Oklahoma Department of Labor (ODOL) conducts private and public sector surveys to provide comparative numbers and rates of occupational injuries/illnesses and fatalities in Oklahoma. Based on annual numbers of lost workday injuries, the ODOL creates an annual Most Hazardous Industries list. Roofing contractors are among the most hazardous industries. Roofing work is strenuous, heat stressful, and dangerous. In one common form of commercial low slope roofing, built-up roofing, hot tar and overlapping layers of tar paper are used to build a leak-proof roofing system. Hot tar can be pumped from a kettle or tanker on the ground to a hot lugger on the roof, or transferred by bucket and ladder to the roof. Depending on the specific type and manufacturer, the boiling point of roofing tar can reach 650°F to 1,000°F; application temperature of roofing tar ranges from 330°F to 444°F. Since liquid tar is hot and slick, roofers are at high risk of slips, falls, burns, and hazardous materials exposure. Roofers' burns commonly result from splashing while operating hot tar kettles, slipping or tripping while carrying a bucket of hot tar, or falling into hot tar. Most roofers' burns are not life-threatening, but they do cause serious physical pain, psychological trauma, and economic loss.

Data were collected from Oklahoma burn centers for injuries and the Office of the Chief Medical Examiner for deaths for the years 1988–2006. For this report, cases included individuals who were Oklahoma residents and were preparing to or in the process of roofing at the time of the burn injury. During the 19-year study period, 1,449 Oklahoma workers died or were hospitalized (in an Oklahoma burn center) for work-related burn injuries; 7% of all burn injuries were among roofers. Work was defined as activities engaged in for profit or compensation and included usual/full-time occupations, secondary/part-time occupations, and unpaid family members working for a family business. Workers employed in industries related to roofing products manufacturing or transportation were excluded from this report. Roofers involved in motor vehicle crashes were also excluded. Nonfatally injured roofers who visited doctor's offices, clinics, emergency departments, or general acute care hospitals were not included in this report, thus this report describes injuries at the severe end of the spectrum.

From 1988-2006, 105 roofers died or were hospitalized in Oklahoma burn centers from work-related burn injuries. The highest number of burn injuries was in 1990 with 15 (14%) workers, while the lowest occurred in 2005 and 2006, each with one hospitalized worker.

Fourteen percent (n=15) of injured workers were under 20 years of age; the youngest worker who suffered a burn injury was 16 years old (Figure 1). Active young

Figure 1. Work-Related Burns among Roofers by Age Group, Oklahoma, 1988-2006



*The INJURY UPDATE is a report produced by the Injury Prevention Service, Oklahoma State Department of Health. Other issues of the INJURY UPDATE may be obtained from the Injury Prevention Service, Oklahoma State Department of Health, 1000 N.E. 10th Street, Oklahoma City, Oklahoma 73117-1299, 405/271-3430 or 1-800-522-0204 (in Oklahoma). INJURY UPDATES and other IPS information are also available at <http://ips.health.ok.gov>.

The leading cause of work-related burn injuries among roofers was hot tar, accounting for the majority (n=95) of all burns (Figure 2). Smaller numbers of burns were caused by electrical power lines (n=7), lightning (n=1), solvent (n=1), and hot water (n=1). Most injured workers survived; however, four (4%) died.

Nearly three-quarters (n=78) of work-related burn injuries among roofers occurred during the spring and summer, March through August, with the largest number in June (Figure 3). Nearly one-quarter of burn injuries occurred on a Monday. Of those injuries with a known time of occurrence (n=88), 44% occurred in the morning between 8:00 a.m. and 12:00 p.m., 45% during the afternoon 12:01-5:00 p.m., and 11% occurred after 5 p.m.

Thirty percent of the burns occurred in Oklahoma county and 20% in Tulsa county (Figure 4). The average total number of days of hospitalization was 11 days. Among the survivors, nearly two-thirds of the injuries involved 5% or less total body surface area burned and just over one-third had between 5.1% and 20% total body surface area burned. Two survivors had more than 20% total body surface area burned.

Figure 2. Leading Causes of Work-Related Burns among Roofers, Oklahoma, 1988-2006

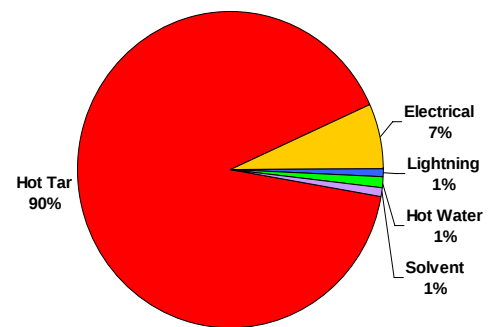


Figure 3. Work-Related Burns among Roofers by Month of Injury, Oklahoma, 1988-2006

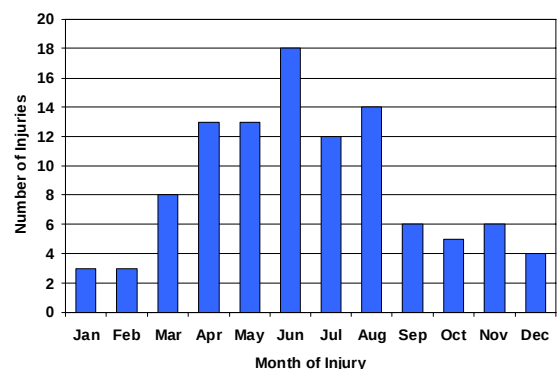
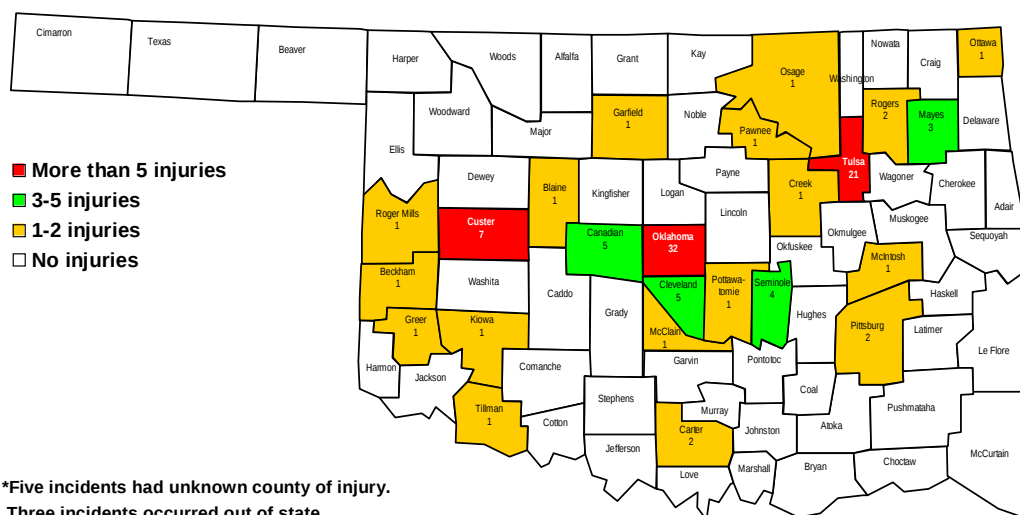


Figure 4. Work-Related Burns among Roofers by County of Injury,* Oklahoma, 1988-2006



CASE BRIEFS

- A 16-year-old male was carrying two buckets of hot tar when he tripped while climbing onto a roof. Hot tar splashed on both of his arms. He was hospitalized for nine days with partial thickness burns over 5% of his arms and a small portion of his body.
- A 22-year-old male was roofing an apartment building when a storm approached. Trying to retrieve one more piece of equipment, he was unplugging a circular saw, while standing in water on the roof, when he was struck by lightning. He died at the scene.
- A 25-year-old male was standing on the ground and looked up at his coworker who had spilled a bucket of hot tar. The tar spilled on him. He received burn treatments in the hospital for four days for partial thickness burns over 2% of his face and right arm and third degree burns over 1% of his left arm.
- A 26-year-old female slipped and fell on a roof covered with hot tar. She suffered partial thickness burns over 10% of her body and third degree burns over 5.5% of her body. She was treated in the burn center for 26 days.
- A 31-year-old male was measuring a residential roof. He unintentionally touched a 2,000-volt power line while climbing a ladder and subsequently fell to the ground. He was taken to the emergency room and pronounced dead.
- A 33-year-old male was working on a roof and spilled hot tar on himself. He was hospitalized for 40 days with third degree burns over 12% of his body.
- A 38-year-old male was pouring molten hot tar from a kettle when the tar splashed on his face and into his eyes. He was treated in hospital for two days with partial thickness burns over 3% of his body.
- A 40-year-old male was sprayed with hot tar when a pipe on a tar pump broke. He suffered partial thickness burns over 2.5% of his hands and third degree burns over 1% of his hands. He was hospitalized for 13 days.
- A 41-year-old male was walking backward along a 20-foot roof with a hot tar dispenser that allowed tar to drip onto the roof. When he reached the edge of the roof, he lost his balance and fell backwards. The dispenser got stuck on the roof, but tilted down, pouring tar on the victim as he fell. He had multiple fractures along with a grade 3 liver laceration and 15% of his total body surface area burned. He died in the hospital three weeks later.

PREVENTION

Most roofers learn their skills informally on the job. It is very important for employers and employees to work together to ensure that workplaces are safe and healthy. Roofing contractors should provide appropriate skill and safety training and supply necessary tools and personal protective equipment (PPE) to their employees. Most importantly, workers should take safety precautions very seriously. Following are some recommendations for roofers to prevent work-related burn injuries:

- Take necessary work-related training courses provided by the employer and participate in all safety trainings.
- Monitor weather conditions before and during roofing work. Do not work on a roof during inclement weather, including rain, lightning, thunder, high winds, ice or snow. If there is lightning, workers should not stay on the roof and should take cover in a building or a vehicle.
- Clean debris on the ground and from the roof to prevent slips, trips, and falls.

- Wear PPE, such as heat-resistant gloves, safety goggles, long sleeved cotton shirts, long pants, and sturdy non-slip shoes.
- To reduce the potential for contact with hot tar, use a pump to directly transfer hot tar from the ground to the roof.
- If only a bucket can be used to transfer hot tar, use a hoist and ensure no one stands near or below a hoisted hot bucket; a bucket should not be filled more than three-fourths full with hot tar.
- Conduct site inspections and be aware of electrical hazards around the roof.
- Discuss with the city or local power supply company options to deenergize power lines or otherwise mitigate electrical hazards for the duration of roofing work.
- Avoid working during extremely hot hours and drink plenty of water when roofing to prevent dehydration, which can cause fatigue, dizziness, muscle weakness, and confusion, potentially resulting in a fall or contact with hot materials.
- If experiencing weakness, fatigue or dizziness, stop working and move to ground level.
- Prepare for emergencies, including having a cool and clean water supply, fire extinguishers, and first aid knowledge and supplies.

Hot tar burns are unique and present thorny clinical problems due to the difficulty of removing sticky tar. Following hot tar, electrical shock is the second leading mechanism of roofing-related burns. Proper first aid at the injury scene is very important for controlling further damage to the injured worker. Following are first aid recommendations for hot tar burns and electrical burns:

Hot tar burns:

- Remove the injured worker from the source of the burn carefully.
- Cool the hot tar with sufficient amounts of clean low-pressure water immediately.
- Do not attempt to remove the tar at the incident scene.
- Seek emergency medical treatment immediately.

Electrical burns:

- Do not touch the victim until power is off.
- Carefully cut off the current if possible.
- If the power cannot be disconnected, separate the victim and the electrical source using a dry nonconducting object, such as wood, plastic, rubber or cardboard.
- Keep surrounding workers away from the electrical source.
- Extinguish any flames.
- Cover burns with dry, sterile gauze.
- Monitor the victim's vital signs. People who are trained to perform cardiopulmonary resuscitation (CPR) should, if appropriate, begin first aid while waiting for emergency medical help to arrive.
- Seek emergency medical treatment immediately.

Prevention is the best tool to reduce and eliminate work-related burn injuries.