

# Accidents in Arboriculture: What's Happening & Why?

By Dr. John Ball

**W**hy do accidents happen? Accidents, by definition, are unplanned events. No one, including tree workers, plans on having an accident. But accidents do happen in every occupation and, unfortunately, disproportionately in the tree care industry.

No one reading this is shocked to learn that accidents occur in the tree care profession, or even that lots of accidents happen. After all, the aerial work environment naturally provides ample opportunities for mishaps to occur. Almost every tree worker can tell a story about an accident that occurred to them or a co-worker. So last fall it came as a surprise to some when the Bureau of Labor Statistics (BLS) reports came out ranking “the 10 most dangerous jobs,” that tree work was not on the list. Logging, an allied industry, was on the list. In fact, loggers had the unenviable number-one ranking. So, if tree workers were not on the list, it must be a much safer profession, right? No, it just is that tree worker accidents were pooled with other green industry occupations.

The Bureau of Labor Statistics has tree workers in the Industry Group 078 – Landscape and Horticultural Services. For reporting purposes, tree workers fatalities and injuries are pooled together with those of landscape architects, designers, installers and lawn care workers. This is a large group and tree workers are only a small part of it. There are slightly more than one million workers in landscape and horticultural services and collectively the fatality rate is 16.1 per 100,000 workers (the BLS tracks all occupational fatalities per 100,000 workers so comparison can be



*A ground worker surveys the remains of a large silver maple. One cause of workers being struck by a falling tree is having the tree fail due to internal decay while making a felling cut. Assessing the structural integrity of a tree before working in it or removing it is not only a good idea that would save lives, it is a requirement.*

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made among occupations with different number of workers). The pooled fatality rate of 16.1 per 100,000 is still very high. The average for all industries – if you take every worker in America regardless of occupation – it is slightly more than 4 per 100,000. But within their group, tree work-

ers bear a disproportional number of the fatal accidents. If tree workers are separated out from this group, their fatality rate for 2002 becomes 39.5 per 100,000. Taken alone, tree worker would rank number five on the “top 10” list of dangerous occupations, right behind high steel construction workers. Tree work is high risk. But the odds of having a fatal accident are much higher even than many other high risk professions.

Looking at the risk this way, the odds of having a fatal accident in any given year for construction workers is about 1 in 10,000. Police it is about 1 in 8,200, fire-fighters about 1 in 6,500. How about for tree workers? It is about 1 in 3,000. This makes tree work one of the highest risk occupations in any community and for any city department. Consider this. We spend a

lot of money training firefighters and police officers, and we should because these are high risk professions that demand peak performance from people in high stress situations. How much annual training do we require for tree workers, commercial or municipal? Not a lot, we do work rather than practice it. When was the last time you saw a crew practicing felling or rigging or any other high risk task? This is a pressing need in our profession. While no one plans an accident, you can prepare to avoid them, if you know what to watch out for and practice.

What types of accidents occur in the tree care profession? The government tracks worker fatalities in six major categories, transportation, assaults, contact with an object, falls, exposure to a harmful environment and fire. The greatest two hazards for tree workers are in the categories “contact with an object” and “falls.” Collectively these two categories accounted for more than 2 out of 3 tree worker fatalities during the decade of the 1990s. Most years, and overall, “contact with an object” was the leading category for fatalities, but even then falls were a close second. Transportation and “exposure to a harmful environment” were always in the second tier. There are more fatalities in the category “exposure to a harmful environment” than transportation, but transportation accidents are increasing.

Transportation-related fatalities are common among any profession where workers must drive from site to site or work close to traffic. The age range of tree workers killed in the last decade from transportation accidents was from 21 to 61. While a number of these fatalities occurred while driving to, from or between job sites, a surprising number took place on site. The most common onsite transportation fatality is being struck by passing traffic. Anyone who has worked alongside a street knows that drivers seem to aim for the cones, if they see them at all. A recent accident occurred to a tree worker who was fatally struck while standing near a truck parked by the road. The driver of the car that hit the worker said that she didn't see him



*This ground worker just missed being hit by a passing car. The most common on-site transportation fatality is being struck by passing traffic.*

because the sun was in her eyes. Frequently the worker is not struck by a passing car but by one of their own vehicles. A common scenario is a worker is touching up or fueling a saw when someone backs the truck over them. The simple practice of walking around a truck before backing or having a spotter would save lives.

We have not had any fatal assaults on arborists, at least not in the last 10 years. But there have been tree workers attacked by dogs, including pit bulls, and one instance where a law enforcement officer was fatally shot when an angry, and armed, person confronted a tree crew while they were working. Tree workers have had some other close calls. A city tree worker had a gun pulled on him by someone who was upset that sawdust drifted down and landed on his car.

Contact with an object is the category with the highest number of fatalities. The age range for fatalities in this category was 12 to 60. It is shocking to see the number of workers under the age of 18 who are killed while working on a tree crew. Who would have a 12- or 13-year-old climbing trees or operating an aerial lift, you might ask – that seems a little dangerous. It would, and they are not climbing or operating big equipment, so how are they

killed? Just the same way many workers are killed – being ground workers, just moving brush or raking.

The most common accident in the “contact with an object” category, in fact the vast majority of accidents in this category, is being struck by a falling branch or tree. After that it is the chipper followed by some others, such as chains saws, that are involved in only a few contact-related fatalities.

If a worker is killed by a falling limb, increasingly it is due to a rigging failure. Rigging up to the 1970s was typically performed with a half-inch or three-quarter inch manila lines run over a natural crotch in a tree. Back then, the weakest link in the system was the line. Since that time we have significantly increased the strength of our rigging equipment, lines, blocks, false crotches. The only part of the system we have not strengthened is the tree. The tree is now often the weakest point of the system, and if there is a failure it is not a line that snaps but the limb. Another very common cause for a worker being killed by a falling branch is climbers who cut branches and let them fall without alerting ground workers (and merely shouting “headache” does not count as a valid command and response system) or a dead limb breaking free as the tree is felled.

If the worker is struck by a tree, and this is where the young teenage workers are killed, typically they walked into the path of the falling tree. It is not the worker operating the saw that is killed, it is a ground worker raking leaves or carrying brush. In most of these accidents, the feller remembers shouting out a warning before beginning the back-cut but as with cut branches, did not wait to hear a response that all workers in or near the drop zone had been alerted and moved out of the vicinity of the falling tree's path. In a recent accident a tree worker was struck and killed by a falling tree because he walked across the path of its fall as he dragged brush to a chipper.

Another cause of workers being struck by a falling tree is having the tree fail due to internal decay while making a felling cut. Assessing the structural integrity of a tree before working in it or removing it is not only a good idea that would save lives, it is a requirement. Unfortunately there are instances where defects were not discovered until it was too late. Assessing tree hazards is an art and one that requires more training and practice than tree workers often receive. There will also be those trees that have hidden defects that do not

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become apparent, even to highly trained and experienced workers, until the tree is in the process of being felled or pruned. However, there is one cause of struck-by's that can always be easily avoided – standing in front of a notched tree. Each year tree workers have been killed because they were standing in front of a notched tree. Often the feller is discussing where the tree will fall with co-workers when the notched tree fails and falls on them. Even more surprising are the climbers who have died

because they climbed a tree to remove some limbs after the tree was notched. The tree fails when the climber cuts a large branch and the sway motion causes the tree to snap at the cut. The climber falls with the tree and is often crushed by the impact.

How about falls? The age range for fatal falls was 17 to 67. Not too surprisingly, most falls occur to climbers, with aerial lift operators a distant second. A few fall fatalities occurred to workers who fell from the trucks or even short ladders. Fall fatalities have occurred at less than 10 feet. Tree workers have been killed from 5- and 13-foot falls from a tree when they hit their head on pavement, chippers or other equipment. Obviously there are many more fatalities at greater heights, even up to 100 feet or more. There are also falls from 60- to 70-feet where the worker survived without permanent injuries. But once a worker is above 40 feet and falls, there are more fatalities than injuries.

Repositioning is one of highest risk activities for climbers, not the ascent into the tree or descent from it. The lanyard is unsecured and in that moment the worker is unsecured, balance is lost and the worker falls. The other common reason is the lanyard or climbing line is severed by the saw and the worker falls. Climbers have also died when they cut their anchor point or tied a knot improperly.

When a worker falls from an aerial lift, frequently it is because the aerial lift fails. Booms or cables snap, cylinders fail, turret bolts snap or buckets shear away from the boom. Sometimes these failures occur within weeks of the lift being repaired or inspected. Aerial lifts are supposed to be inspected daily by the worker. A worker should never assume someone else did the daily check. The other reason for the fall is the worker was not using a fall-restraint system. A recent accident occurred to an aerial lift operator who had a cut branch slide down the upper boom and hit the controls. The boom swayed and the worker ejected from the bucket striking the street 35 feet below.

In the category “exposure to a harmful

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environment,” electric shock is the most frequent reason for a fatality; bee stings are a distant second, but still account for one or two fatalities every year or two. The age range for fatalities in this category was 17 to 55. The worker that most often suffered electric shock was a climber; second and very close in numbers were ground workers.

Most of the time when a climber is electrocuted it is through indirect contact with the energized conductor, not direct contact. Accident investigation reports often include the phrase “the cut branch the worker was holding swung down and contacted the power line.” Another common reason is the conductor was contacted by a pole saw or chain saw. Direct contact is commonly via the back of a shoulder or hand. Why would a worker back into a conductor, grab it or touch it with a saw? Simple, no one knew there was a power line running through the tree. If pre-work inspections involved an evaluation of electrical hazards as well as tree hazards, the fatalities due to electrical shock could be significantly reduced.

Ground workers are the victims in many electrical shock accidents. The majority of these fatalities are through indirect contact. Touching power lines with aluminum ladders or metal pole saws and being electrocuted are far too common accidents. In a recent accident, a tree worker was pruning a tree with a chain saw while standing on an aluminum ladder. The worker was killed when the chain saw contacted the power line. Leaning against an aerial lift or feeding a chipper when it becomes energized are also frequent reasons for ground workers receiving a fatal electric shock. Aerial lift operators, while the less likely tree worker to die from electrical shock, still are at risk. Workers have been killed when they, or a branch or pole saw they were holding, contacted two power lines. They also have been killed in buckets that lost their dielectric properties.

The last category, fire, did not contain a single tree worker during the past decade. One worker had to be rescued by the firefighters, however, when a cut branch

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struck and severed a power line that started a ground fire beneath the tree.

These have been the fatalities during the past decade in the tree care industry. While these numbers and accidents seem dry reading, remember that each one of these represents a human being, someone who cannot be replaced and who's lost and will always be remembered by family and friends. The 1990s were a decade when hundreds of tree workers lost their lives, while in the average industry the decade losses were in the tens of workers.

The most important reminder I can give is to be careful out there. Never assume that these accidents occur to the other worker and never expect anyone else to be responsible for your own safety. I doubt if any of the workers in these accidents ever expected it to happen to them – but it did.

*Dr. John Ball is a professor of forestry at South Dakota State University in Brookings. He has a Ph.D. in Urban Forestry and a master's in Forest Entomology, both from Michigan State University, and a bachelor's in Forest Management from Michigan Technological University. He was previously the landscape and tree care manager for Arrowhead Tree and Landscape in Duluth, Minn., and director of technical services at Carpenter-Costin, a large tree care and landscape planning company north of Boston. He has been widely published, has presented more than 150 papers at regional, national and international conferences, and currently serves on the editorial board for Arborist News. He will present updated information on accidents at TCI EXPO in Detroit in October. ⌆*