



## **FINAL KY FACE #94KY02901**

Date: 15 November 1994

### **Subject: Tree Trimmer Dies After 50-Foot Fall While In Bucket Truck**

#### **SUMMARY**

A 48-year-old male tree trimmer (the victim) died from a fall while trimming a tree from a bucket truck. The victim was the owner/operator of a tree trimming service. He operated the business for about 23 years, employing various part time helpers. On the day of the incident, two sons-in-law were operating chain saws at the scene when they heard a loud "pop." As they looked up, the witnesses saw the bucket carrying the victim slam against the truck. The sons-in-law removed the victim from the bucket. He was not breathing.

The rescue squad was called and arrived at the scene about 15 minutes later. They reported no pulse or respiration. The victim was pronounced dead at the scene by the county coroner. The victim was wearing a safety belt. A cable on the bucket truck had apparently failed. Investigators concluded that, in order to prevent future incidents of this type, owners/users of bucket trucks should:

- Develop and implement a comprehensive inspection procedure to evaluate conditions of all elements of the bucket truck.
- Establish routine preventive maintenance procedures to systematically test and replace worn parts.
- Train employees in first aid procedures

Additionally, owners should be provided with material from the manufacturers on a periodic basis through mail to prompt them to inspect equipment and replace worn parts.

#### **INTRODUCTION**

On April 18, 1994, a 48-year-old male owner/operator of a tree trimming service (the victim) died after falling an estimated 50 feet while in a single-person bucket truck. On April 19 the Kentucky FACE inspector was notified by the county coroner of the fatality. On April 28, 1994, the Kentucky FACE investigator, accompanied by a NIOSH safety officer, conducted an investigation of the incident. One witness was interviewed, the truck and scene were photographed. Attempts to personally interview the two sons-in-law were unsuccessful. However, their phone comments are included in this report. State police were interviewed.

A copy of the coroner's report and autopsy were obtained. Equipment manufacturers and a second tree trimming company were consulted.

The victim had been in the tree trimming business for 23 years. He was also a part-time minister for nursing homes and filled in on weekends as a preacher at various churches. Based in Portsmouth, Ohio, he frequently had tree trimming jobs which took him into Kentucky. On previous occasions, he had trimmed trees in the residential neighborhood where the fatality occurred. On this day, he was hired as an independent contractor by a private citizen to trim trees at a residence. On average, he employed three helpers for this type of work.

His company had experienced no prior fatalities. He was in good health at the time of the incident.

## INVESTIGATION

The company owner (the victim) and three helpers were trimming trees at a residential neighborhood. The trees to be trimmed were close to the homes and the power lines. The victim was trimming a maple tree about 28 feet from the nearest home and about 30 feet from the nearest power line. The truck was parked on the blacktop driveway. Its wheels were chocked and the outriggers extended. The boom was extended to near the maximum height of 50 feet. The victim, wearing his safety belt, was in the single-man bucket operating a chain saw.

The three helpers were all in the vicinity. Two were operating chain saws and the third was operating a chipper about 30 feet from the truck. The lawn was fairly level with a few bushes. The morning was cool, about 50 degrees. Preventive maintenance had been completed on the truck the previous week.

At about 8:35 one chain saw operator heard a loud "pop" and he turned around just as the bucket carrying the victim hit the right side of the truck. The other chain saw operator heard the same "pop" as the cables broke and saw the bucket crash against the truck. He ran to the truck where the bucket lay on top of the rear portion with the victim still in it. He states the victim's eyes were open, but he was not responsive. The victim was removed from the bucket and laid on top of the bucket truck. The second chain saw operator went to a phone at one of the homes to summon help. Emergency Medical Service personnel arrived at 8:50. The coroner was notified and arrived at the scene at 9:30 am. Death occurred within minutes at the estimated time of 8:40 am.

## CAUSE OF DEATH

The coroner ruled the cause of death as exsanguination due to internal hemorrhage due to lacerations of pericardium, heart, aorta, due to blunt impact to chest. An autopsy was done. Toxicology was negative.

A thorough inspection of the modified 1987 Ford F700 dual rear truck was done the day of the investigation. A dent was noted at the top left corner of the topper. The overall condition of the truck and the twin cable drive assembly was fair. Lift cables were not available for inspection. They had been removed by the State Police for analysis at the crime lab. On November 1, results of the examination on the cables stated, "No foreign substances were found on Exhibits 1 and 2." Exhibit 1 was in fact the cables taken from the scene of the incident. There was no mention of wear (normal, excessive or otherwise), injuries (or lack of), or general condition of the cables by the police forensic laboratory. The cable remaining on the boom was dry but showed no excessive wear. The operator's manual was seen in the truck along with tubes of grease. The hydraulic controls had been examined by the State Police and were covered in plastic the day of the FACE investigation. The single basket measuring 24 inches square had a rated capacity of 300 pounds. The victim weighed 160 pounds.

The victim had owned the truck since 1991. Witnesses reported that he inspected and maintained his equipment at regular intervals. Records to confirm this were not located. Witnesses also stated that maintenance on the cables was done the preceding week and that about four hours had been logged in the lift since the cable was serviced. It could not be determined if the victim had received any formal training on the truck operations and preventive maintenance methods and frequency. The cables had not been changed since the victim assumed ownership of the vehicle.

## RECOMMENDATIONS/DISCUSSION

**Recommendation #1:** Develop and implement comprehensive inspection procedures to evaluate the truck condition.

**Discussion #1:** Records of methods and frequency of lift and truck inspection were not found. Appropriate inspection procedures are described in the owners' manual but it is not known if the victim adhered to the protocol. The wire rope assembly must be inspected and maintained periodically. A program complete with documentation of a competent inspection is recommended. The frequency of cable replacement is dictated by this competent inspection and proper evaluation of the remaining strength after an allowance for deterioration. Age of the cable assembly need not be the deciding factor. Environmental and use factors such as abrasion, wear, fatigue, corrosion and kinking are of greater significance in determining safe usable life of wire rope. The wire rope used on this lift was a 6 x 37 construction, meaning 37 wires are formed into a strand and six strands are wound into a cable. The most common type of wire break on aerial lifts is due to fatigue which exhibits itself as a separation in the wire with little or no outward displacement. The wires remain in line. Fatigue is caused by the repeated flexing of the cable as it wraps and unwraps around the sheave. A second type of wire failure is a root or valley break. This is the result of an internal break in a wire and is caused more by weight than by repeated use. When a wire protrudes out from the cable wildly a valley break is possible and immediate steps to replace the cable should be initiated since the extent of internal damage cannot be determined.

**Recommendation #2:** Establish routine maintenance procedures to systematically test and replace worn parts.

**Discussion #2:** Although prior maintenance was asserted by the witnesses, the inspection procedures are unknown. The procedure to inspect the wire rope is, if necessary, to wipe the cable clean of any excessive grease, oil or dirt. Then locate any wire breaks. Running a soft cloth or cotton ball over the cable may help locate any breaks as remnants of the material will catch on the parted ends. If there are two or more broken wires in any one strand within the length of rope lay (one complete rotation around the wire), the cable should be replaced. If there are six or more broken wires occurring in the strands within one rope lay (distance a single wire makes in one rotation around the cable), the cable should be replaced. A drift test should also be routinely performed to assess hydraulic system integrity.

**Recommendation #3:** Train employees in basic first aid and CPR.

**Discussion #3:** In this case the helpers did not know basic life support Cardiopulmonary Resuscitation. The extent of the victim's internal injuries was not evident moments after the crash. Initiating CPR if the internal injuries were less severe may have prolonged his life long enough to get the victim to a trauma center.

## REFERENCES

Manual Aerial Lift Models LR-42, LR-45 LR-50 Operation Maintenance Installation Parts. Part Number 801-0076-26 Rev. 2 Issued 04-87 Asplundh Manufacturing Division 50 East Hamilton Street Chalfont, Pennsylvania 18914