

# Lift Injuries – More Than a Drop In the Bucket

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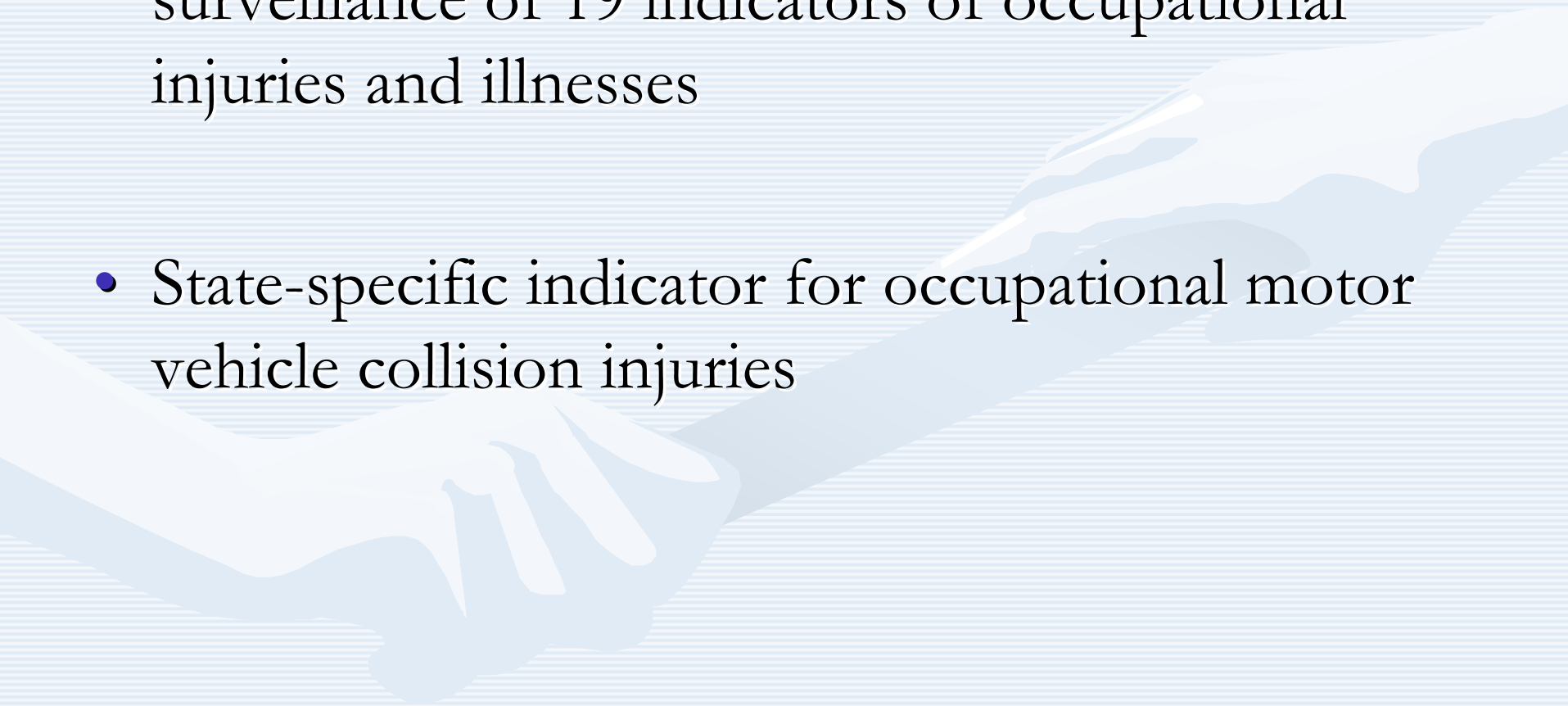
Kentucky Injury Prevention and Research  
Center, College of Public Health, University  
of Kentucky

# KIPRC

- Established as unique partnership between the University of Kentucky and the KY Department for Public Health in 1996.
- There are 12 projects/programs currently funded

# Fundamental Program

- 15 states funded by CDC/NIOSH to conduct surveillance of 19 indicators of occupational injuries and illnesses
- State-specific indicator for occupational motor vehicle collision injuries



# Expanded Program

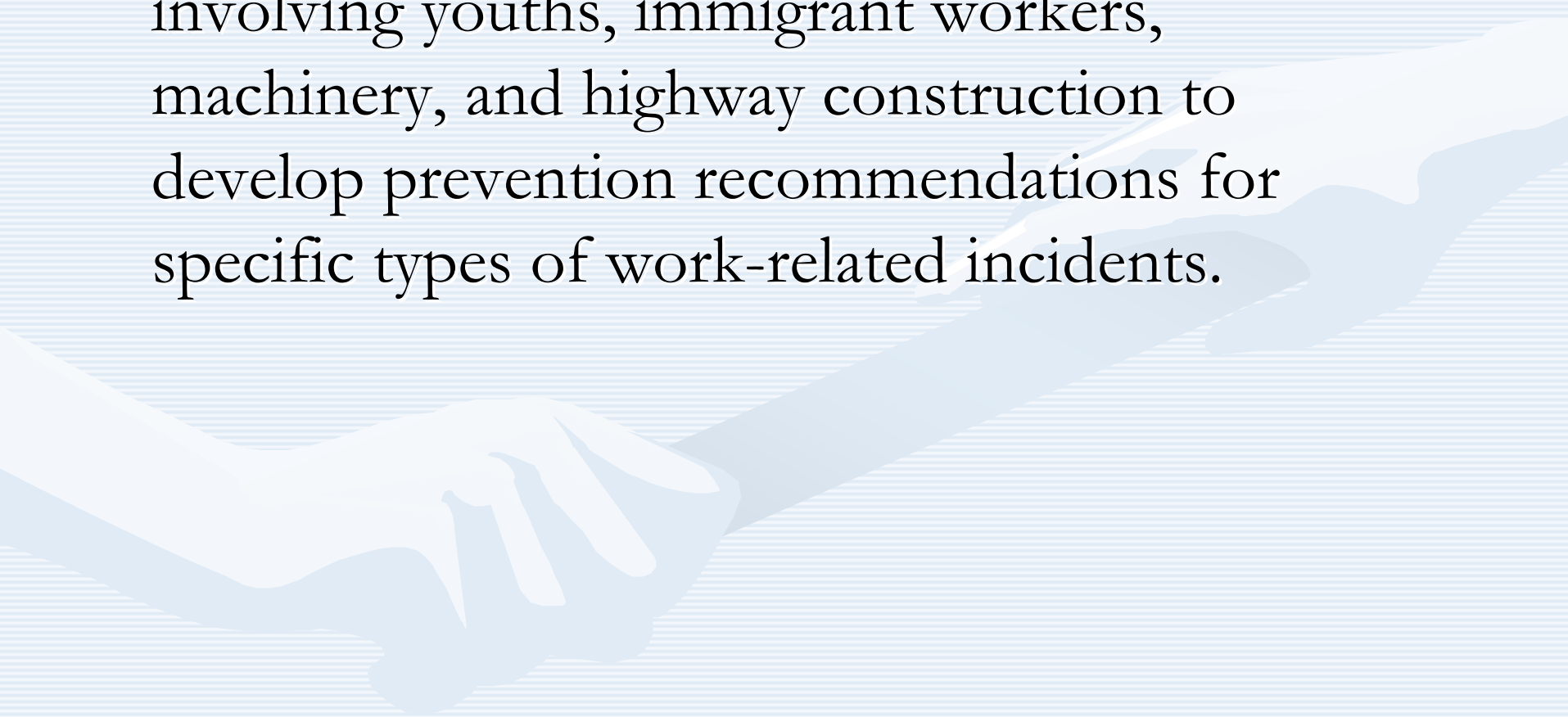
- FACE- Surveillance of fatal occupational injuries
- On-site evaluations of fatalities involving machinery, youths, immigrant workers, highway work zones
- State targets- MVCs (semis, dump trucks and farm vehicles), construction falls

# FACE Program Objectives

Surveillance of all occupational fatal injuries that occur within Kentucky's boundaries to identify new and emerging risk factors for work-related deaths.

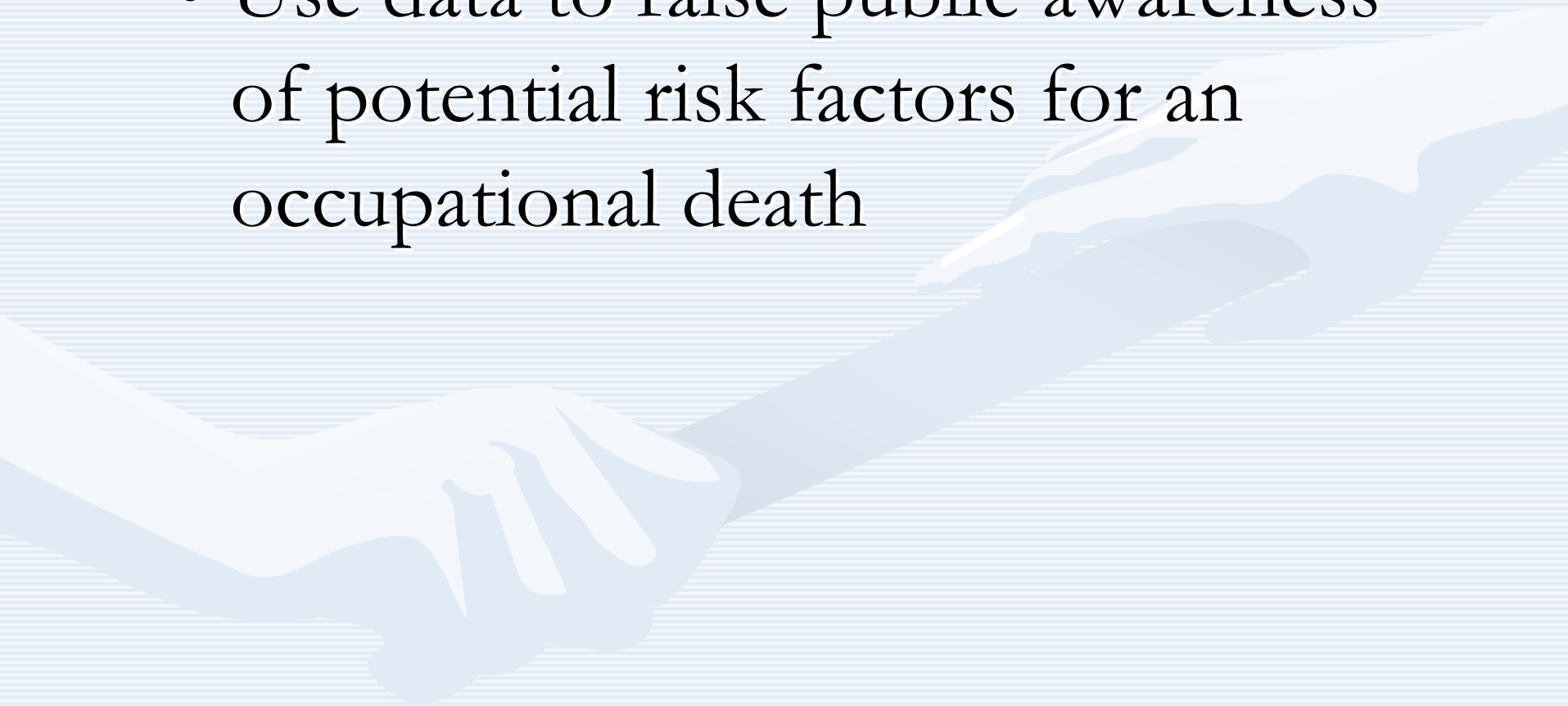
# FACE Objectives (cont'd)

- Case investigation of targeted incidents involving youths, immigrant workers, machinery, and highway construction to develop prevention recommendations for specific types of work-related incidents.



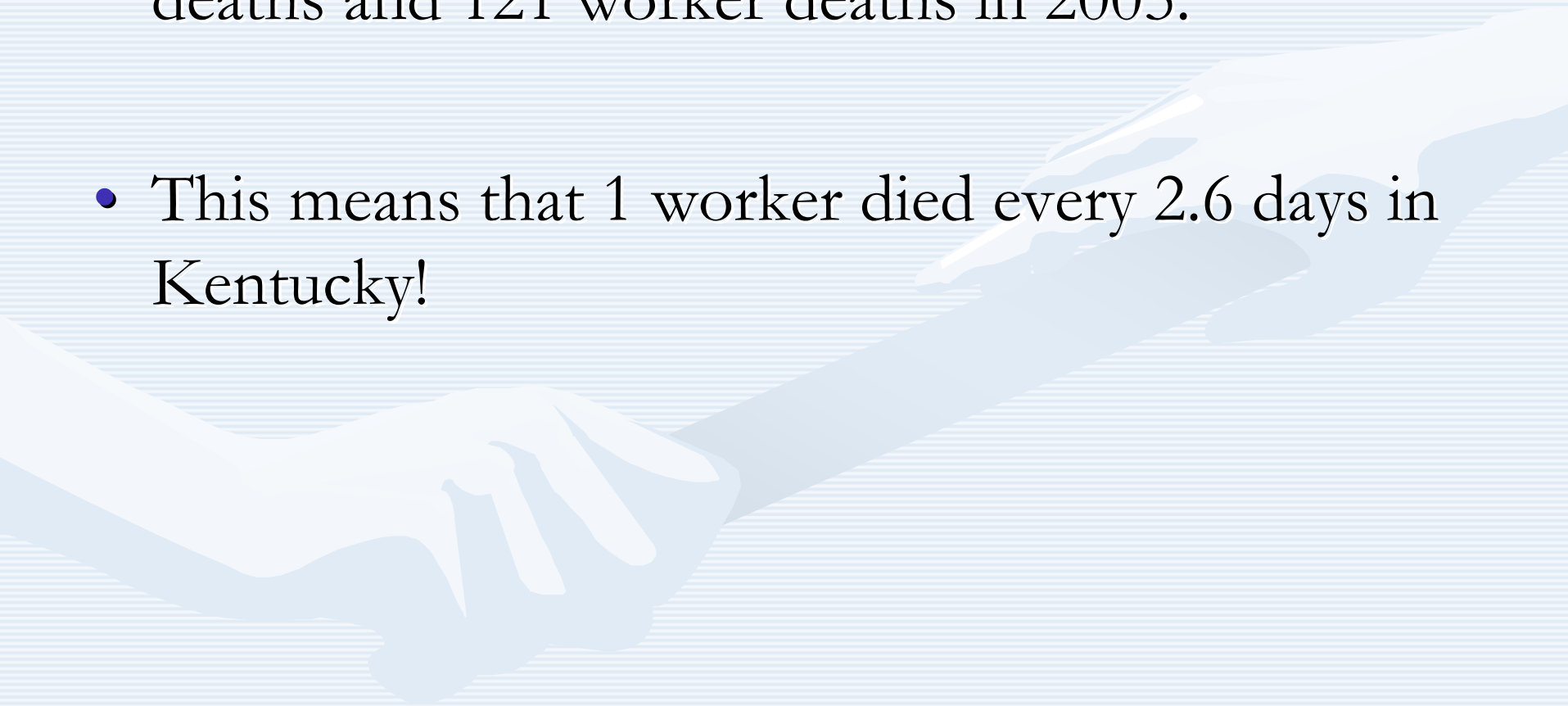
## FACE Objectives (cont'd)

- Use data to raise public awareness of potential risk factors for an occupational death

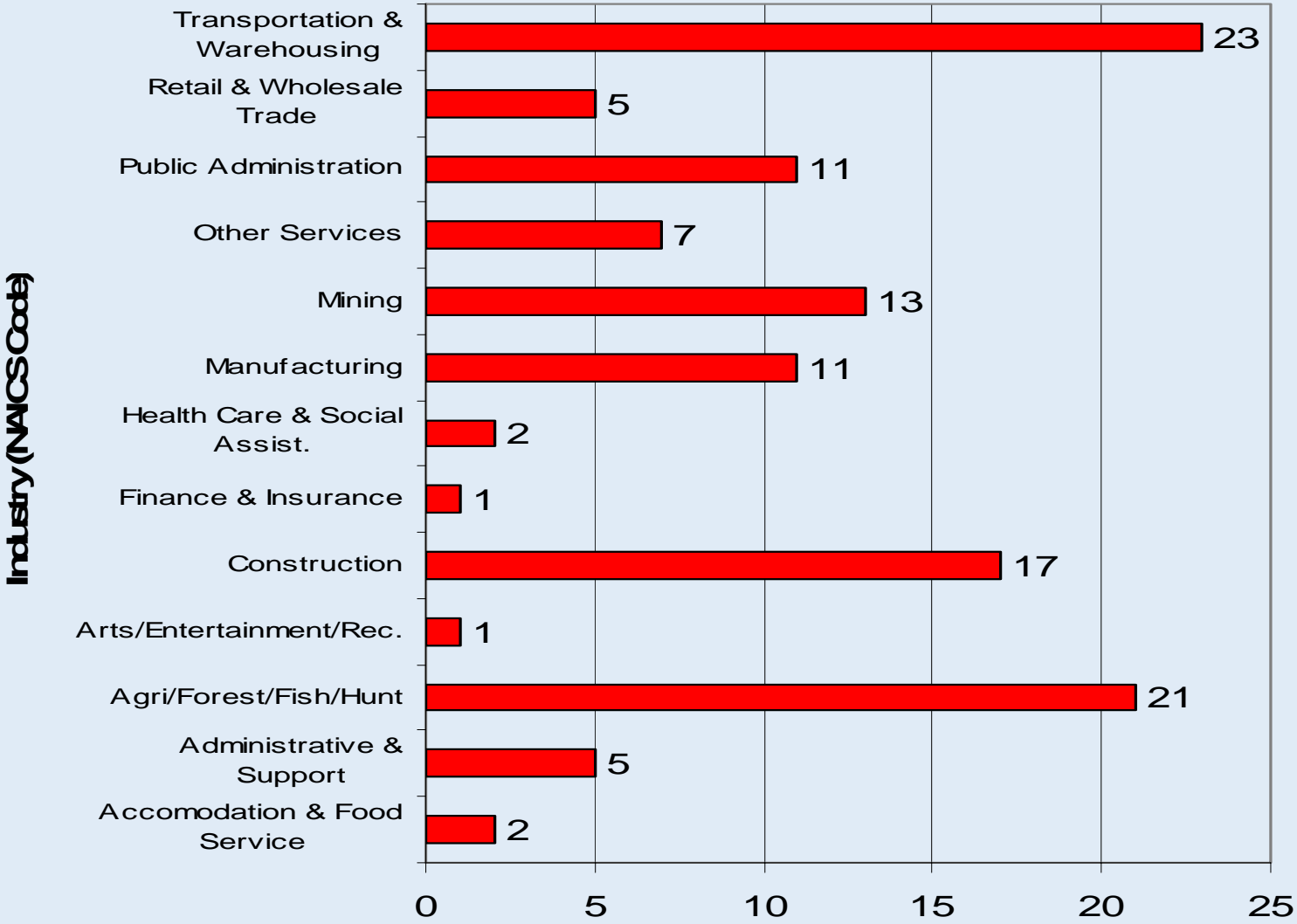


# Why study worker deaths?

- For 2006 in Kentucky, there were 142 worker deaths and 121 worker deaths in 2005.
- This means that 1 worker died every 2.6 days in Kentucky!



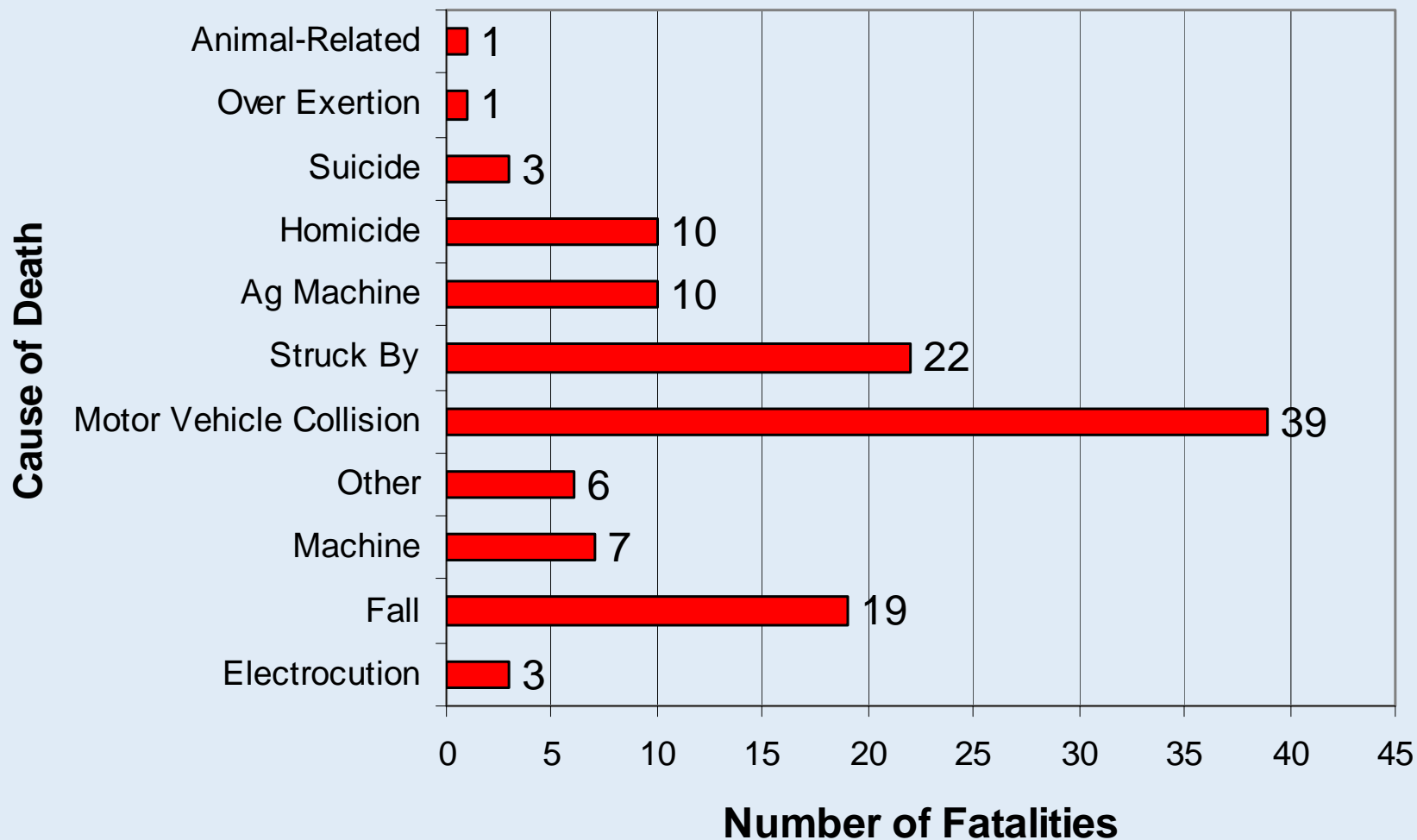
# Occupational Fatalities by Industry- 2005



# Occupational Fatalities by Industry 2005, (Rates calculated per 100,000 workers).

<b>Industry<sup>b</sup></b>	<b># of KY Fatalities</b>	<b>2005 KY Fatality Rate</b>	<b># of US Fatalities</b>	<b>2005 US Fatality Rate<sup>c</sup></b>
<b>Professional and Business Services</b>	5	0.9	481	2.8
<b>Agric/Forest/Fish/Hunt</b>	21	46.0	714	32.5
<b>Construction</b>	17	20.4	1,186	16.3
<b>Manufacturing</b>	11	4.2	393	2.8
<b>Mining</b>	13	68.0	159	25.6
<b>Other Services</b>	7	65.0	208	3.9
<b>Government</b>	11	4.3	514	2.4
<b>Trade, Transportation, and Utilities</b>	30	8.1	1512	5.8
<b>Total</b>	121	6.4	5702	4.0

# Occupational Fatalities by External Cause of Death- 2005



# Future Lost Wages by Industry- 2005

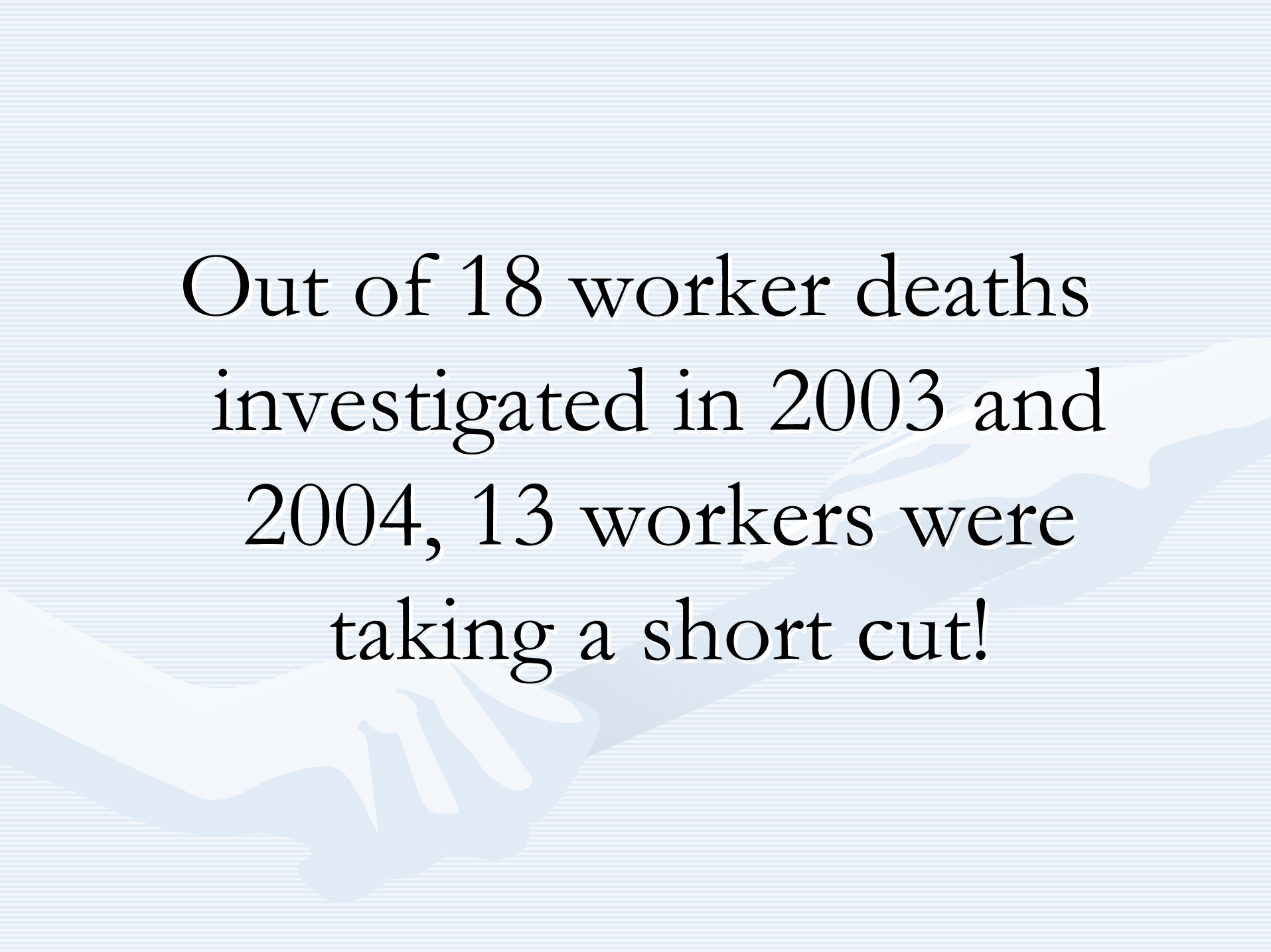
<b>Industry Classification</b>	<b>Average Salary<sup>a</sup></b>	<b>Total Earnings Lost (in millions)</b>	<b>% of Total</b>
Agriculture, Forestry, Fishing, and Hunting	\$22,470	\$6.3	7%
Mining	\$45,210	\$16.0	17%
Trade, Transportation, and Utilities	\$40,765	\$18.8	20%
Construction	\$40,960	\$17.9	19%
Manufacturing	\$39,240	\$11.3	12%
Financial Activities	\$49,200	\$0.6	.06%
Professional and Business Services	\$29,510	\$3.0	3%
Education and Health Services	\$39,400	\$1.9	2.1%
Leisure and Hospitality	\$19,090	\$1.8	1.9%
Other Services (except Public Administration)	\$30,710	\$4.2	4.5%
Government	\$44,250	\$10.6	11.5%
<b>Total</b>		<b>\$92.4</b>	<b>100%</b>

# Falls from Lifts

year	#first reports and claims
2000	25 (20%)
2001	23 (19%)
2002	28 (23%)
2003	22 (18%)
2004	13 (10%)
2005	13 (10%)
Total	124

# Shortcuts





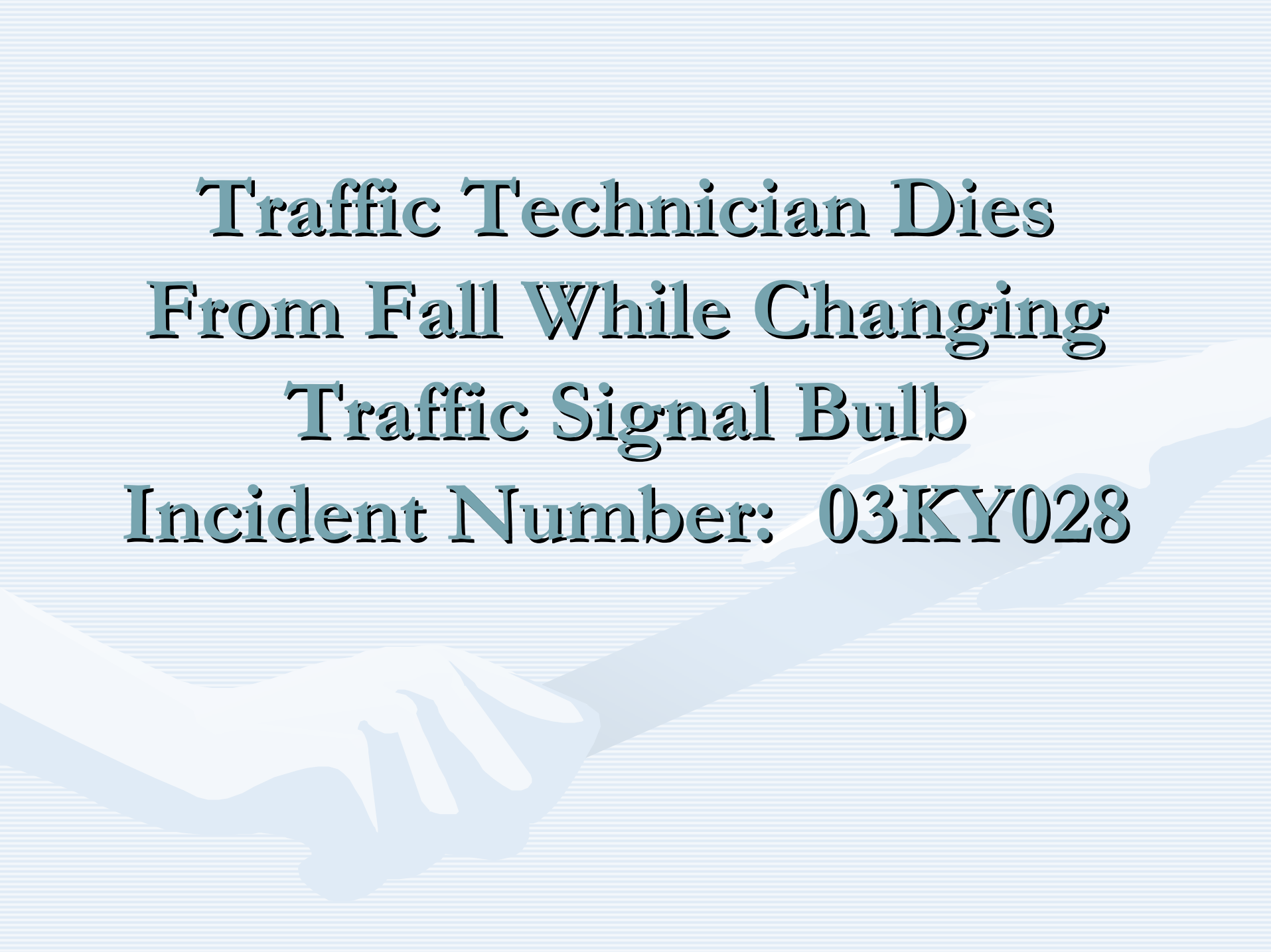
Out of 18 worker deaths  
investigated in 2003 and  
2004, 13 workers were  
taking a short cut!

# Fatality Investigations



# Haddon Matrix

- Examines the sequence of events that resulted in fatal injuries.
- Useful for determining optimum points of intervention for controlling injuries- anywhere in the sequence of events.



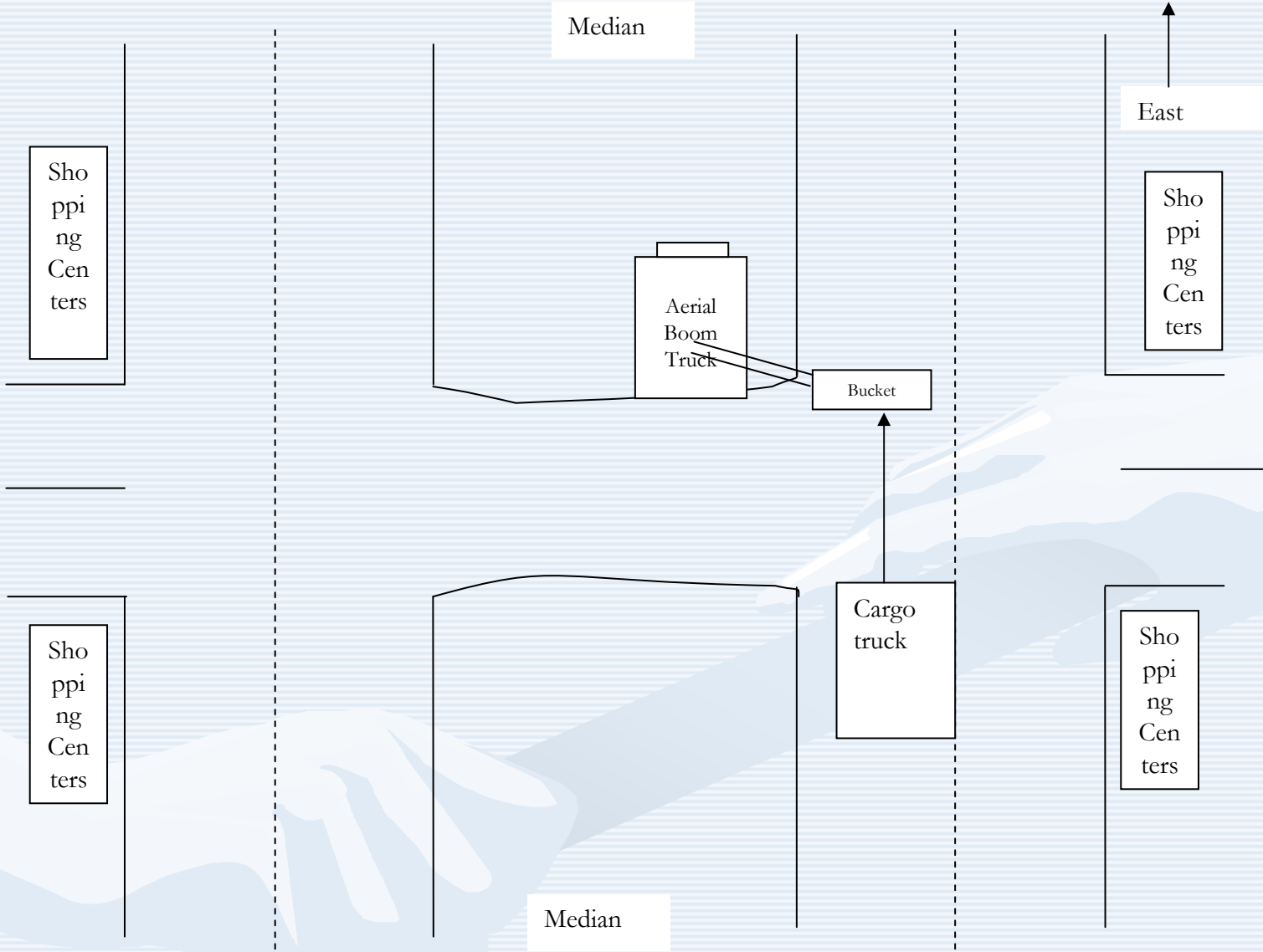
**Traffic Technician Dies  
From Fall While Changing  
Traffic Signal Bulb  
Incident Number: 03KY028**



## Summary

On Monday, March 31, 2003, a 39 year-old male (decedent) highway traffic technician, working alone, received fatal head injuries after falling out of an aerial boom truck. The injuries from the fall resulted in his death four days later. He was changing a burned-out green traffic bulb in a traffic signal suspended over 2 lanes of traffic. As he worked from the aerial lift suspended over traffic to change the burned out bulb, a cargo truck drove underneath the bucket, striking it, and spilling the decedent to the asphalt below. As the worker fell approximately 10 feet, an eye witness called emergency services. Paramedics arrived within minutes and transported the technician to a nearby hospital. From there, the technician was airlifted to a trauma level hospital where he died 4 days later due to head injuries received from the fall.









IN  
CAPACITY  
CAPACITY

MODEL	
YEAR	
MAXIMUM WEIGHT	
MAXIMUM CAPACITY	
MAXIMUM HEIGHT	
MAXIMUM REACH	
MAXIMUM SPEED	
MAXIMUM FUEL CONSUMPTION	
MAXIMUM OPERATING TEMPERATURE	
MAXIMUM STORAGE TEMPERATURE	
MAXIMUM STORAGE HUMIDITY	
MAXIMUM STORAGE PRESSURE	
MAXIMUM STORAGE VIBRATION	
MAXIMUM STORAGE SHOCK	
MAXIMUM STORAGE ACCELERATION	
MAXIMUM STORAGE DECCELERATION	
MAXIMUM STORAGE ROTATION	
MAXIMUM STORAGE TORSION	
MAXIMUM STORAGE BENDING	
MAXIMUM STORAGE TWISTING	
MAXIMUM STORAGE COMPRESSION	
MAXIMUM STORAGE TENSION	
MAXIMUM STORAGE SHEAR	
MAXIMUM STORAGE TORSION	
MAXIMUM STORAGE BENDING	
MAXIMUM STORAGE TWISTING	
MAXIMUM STORAGE COMPRESSION	
MAXIMUM STORAGE TENSION	
MAXIMUM STORAGE SHEAR	

# Recommendations for Prevention



# **Recommendation No. 1: Employees should use personal fall protection equipment in an aerial lift bucket at all times.**

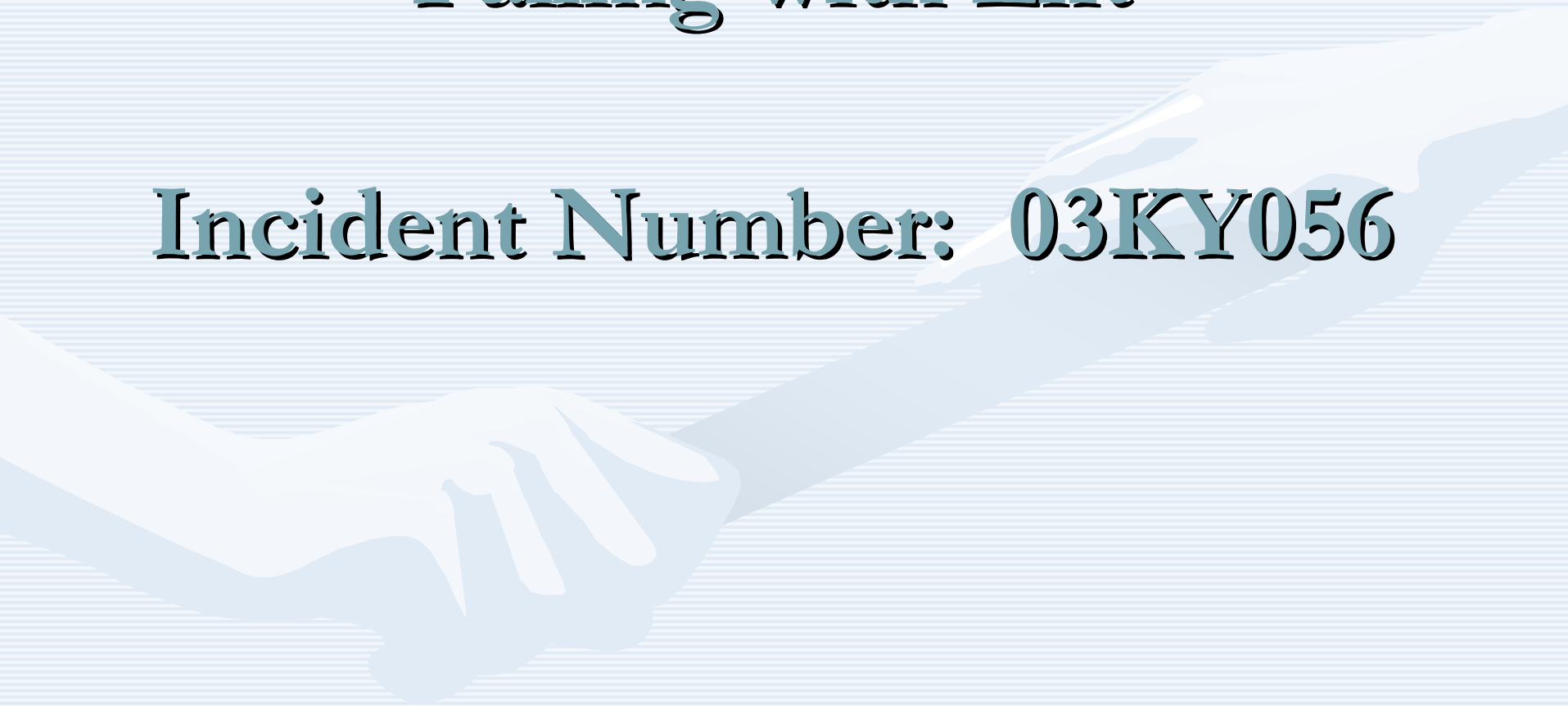
- Employers have a responsibility to provide a safe working environment for all their employees. Employees have a responsibility to themselves and to their employer to use all applicable safety training and personal fall protection equipment provided by the employer. The safety harness was not worn at the time of the incident. There were two other harnesses in the truck provided by the truck manufacturer which had not been used and only needed adjustment to fit the user.

## **Recommendation No. 2: A Competent person should conduct a hazard assessment of the highway work zone and implement a safety plan.**

- There are several methods of working safely while changing the traffic signal. Besides wearing appropriate personal fall protection, the traffic lane(s) over which the bucket is suspended should be clear of all traffic and remain clear until the worker is back to a safe place. This eliminates the worker or drivers estimating if there is enough space under a bucket to pass safely by. According to highway personnel it takes approximately 2 light changes to change a green bulb. During this time, traffic can be routed into the next lane around the bucket, or the traffic can be stopped while the light bulb is changed. Cones should be placed around the work zone prior to work beginning to warn motorists of an upcoming work zone area and to direct them to the unoccupied lane, and to proceed with caution. Traffic in the work zone lane could have been closed off. To inform motorists of the lane closure, A Shadow Vehicle, equipped with flashing or rotating lights and an appropriate directional arrow could also have been used.

# 28-Year-Old Man Dies after Falling with Lift

Incident Number: 03KY056





# Summary

On June 27, 2003, a 28-year-old male sound technician died due to injuries received after falling approximately 50 feet from a lift. Three men (one chief sound engineer and two sound technicians) were sent to repair a sound system in a school gymnasium. Upon arriving and assessing the situation, the three diagnosed that a particular speaker, located in the rafters, should be removed from its location. Using a 30-year-old telescoping, self-leveling lift belonging to the school, the chief engineer used controls located at the base of the lift, to hoist the two sound technicians to the speaker in the rafter. After determining which tools they needed to remove the speaker, the chief engineer lowered the two men to the ground. They retrieved the appropriate tools from their equipment truck and proceeded to be hoisted a second time to the speaker. After removing the speaker from the rafter, the two sound technicians placed the speaker in the middle of the lift's basket and the chief engineer reversed the direction of the lift and began to lower the two men and the speaker to ground level. Shortly after the lift began to descend, it started to tilt to the east side of the gym. The lift continued its fall to the ground. Both sound technicians were critically injured and transported to a hospital where one survived and the other died of multiple blunt force trauma.

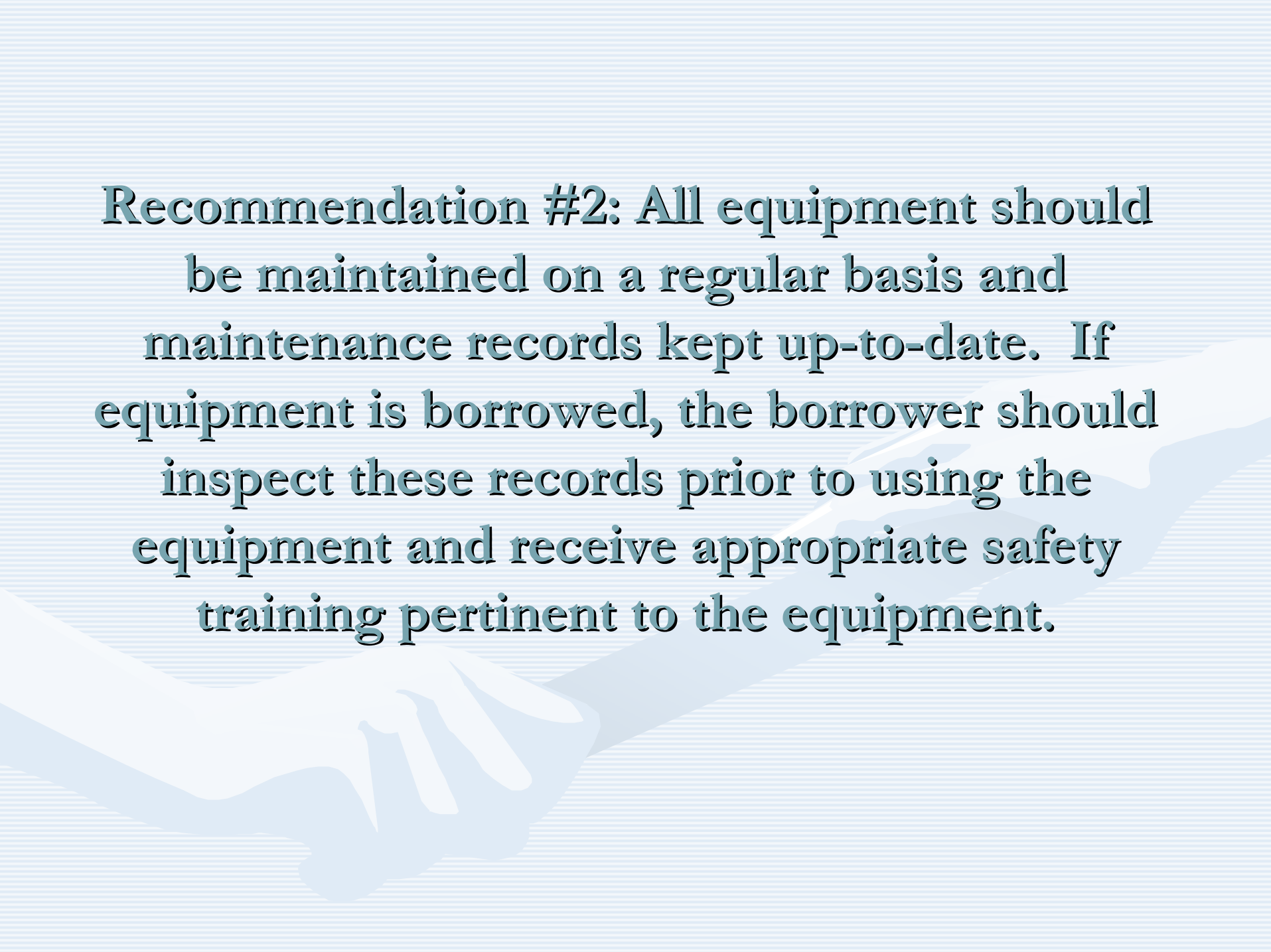






## **Recommendation #1: Training of supervisors and employees on equipment should include, but not be limited to: load capacity, work height, use of outriggers, and weight calculations.**

A competent person should be trained in calculation of the load capacity for lift equipment and be knowledgeable of work heights and outriggers. KY OSH Standard 1910.29(a)(3)(i) states the work height of a mobile work platform should be no more than four times the base and when this is not possible, outriggers should be used. It is believed that the combined weight of the two workers and the speaker were below the 500 pound limit of the platform of the lift. The outriggers had also been used, but it is unknown if they had been extended to an adequate distance to compensate for the additional height of the lift.



**Recommendation #2: All equipment should be maintained on a regular basis and maintenance records kept up-to-date. If equipment is borrowed, the borrower should inspect these records prior to using the equipment and receive appropriate safety training pertinent to the equipment.**

# Discussion

The lift involved in this fatality was purchased prior to 1970.

Maintenance records for the lift were unavailable at the time of this investigation and thought not to exist. Owners of equipment should follow the manufacturer's recommendations on operating and maintenance and inspection schedules.

According to several lift equipment manufacturers, the metal cables of the lift required regular greasing in order to keep the lift functional.

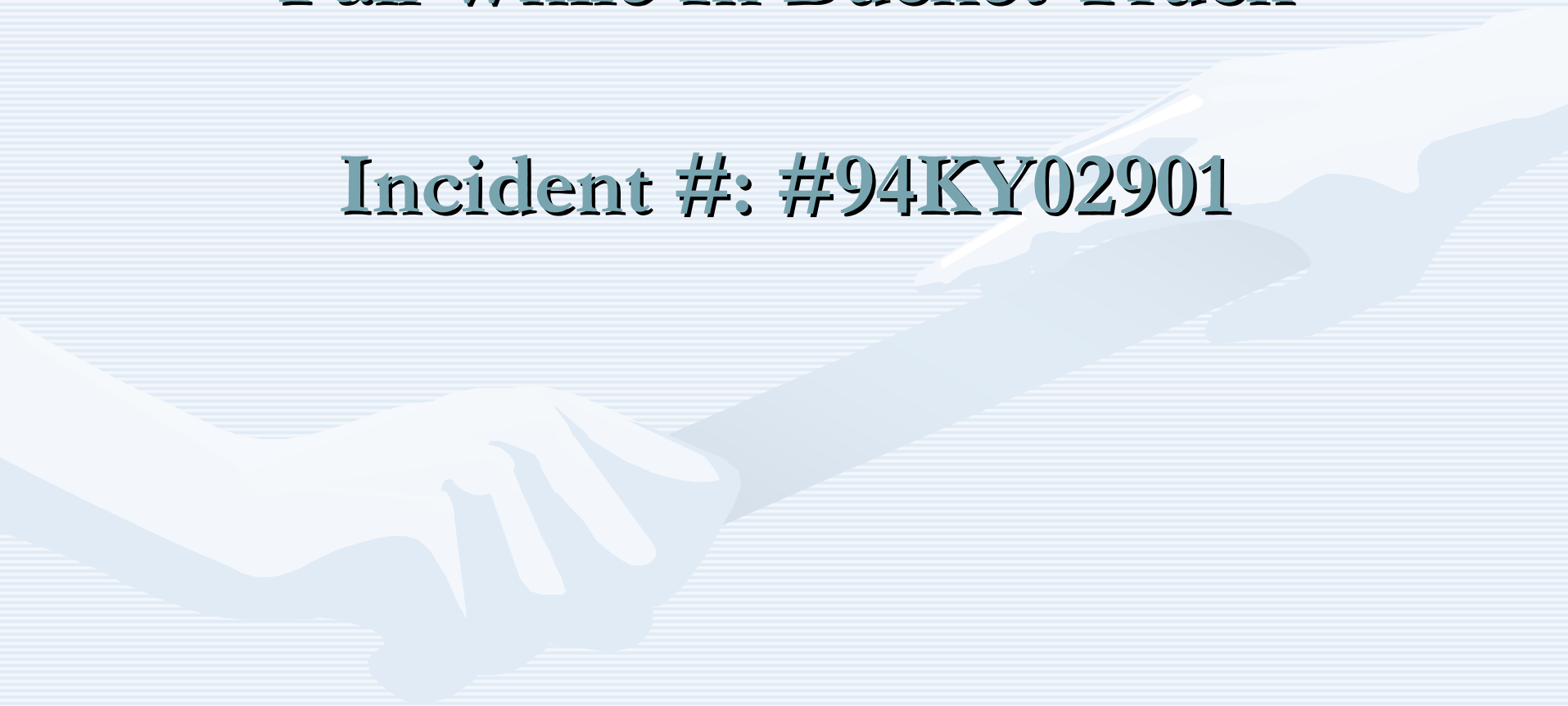
When borrowing equipment from a customer, the competent person or job foreman should check maintenance records and perform an operating test to ensure the equipment is in proper working condition. The contractor had used this particular lift before without incident and trusted it would perform as it had before. At the time of use, equipment owners should hold refresher training on equipment operations and safety before equipment is used by the borrower.

## **Recommendation No. 3: Older equipment should be inspected to ensure it complies with the latest requirements of the American National Safety Institute and the Occupational Safety and Health Administration Standards.**

According to OSHA 1910.67(b), aerial lifts acquired before July 1, 1975 had to meet ANSI A92.2-1969 requirements. If the equipment did not meet the ANSI A92.2-1969 requirements, the company had the choice to modify it so it did meet the requirements or choose to not use the equipment again. In researching this particular lift design and speaking with several lift manufacturers, lifts are now designed to be more stable.

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

**Incident #: #94KY02901**

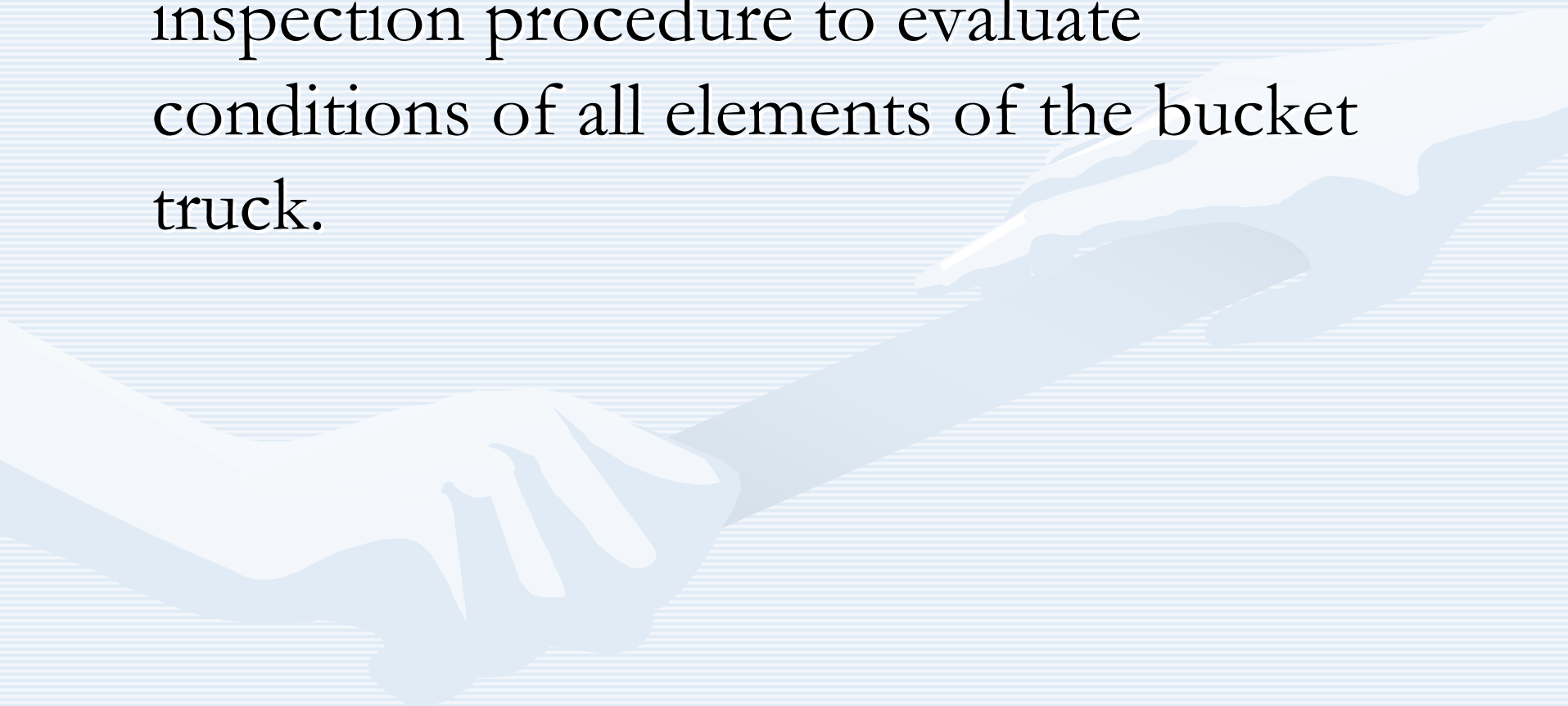


# Summary

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.

# Recommendation #1

Develop and implement a comprehensive inspection procedure to evaluate conditions of all elements of the bucket truck.



# Discussion

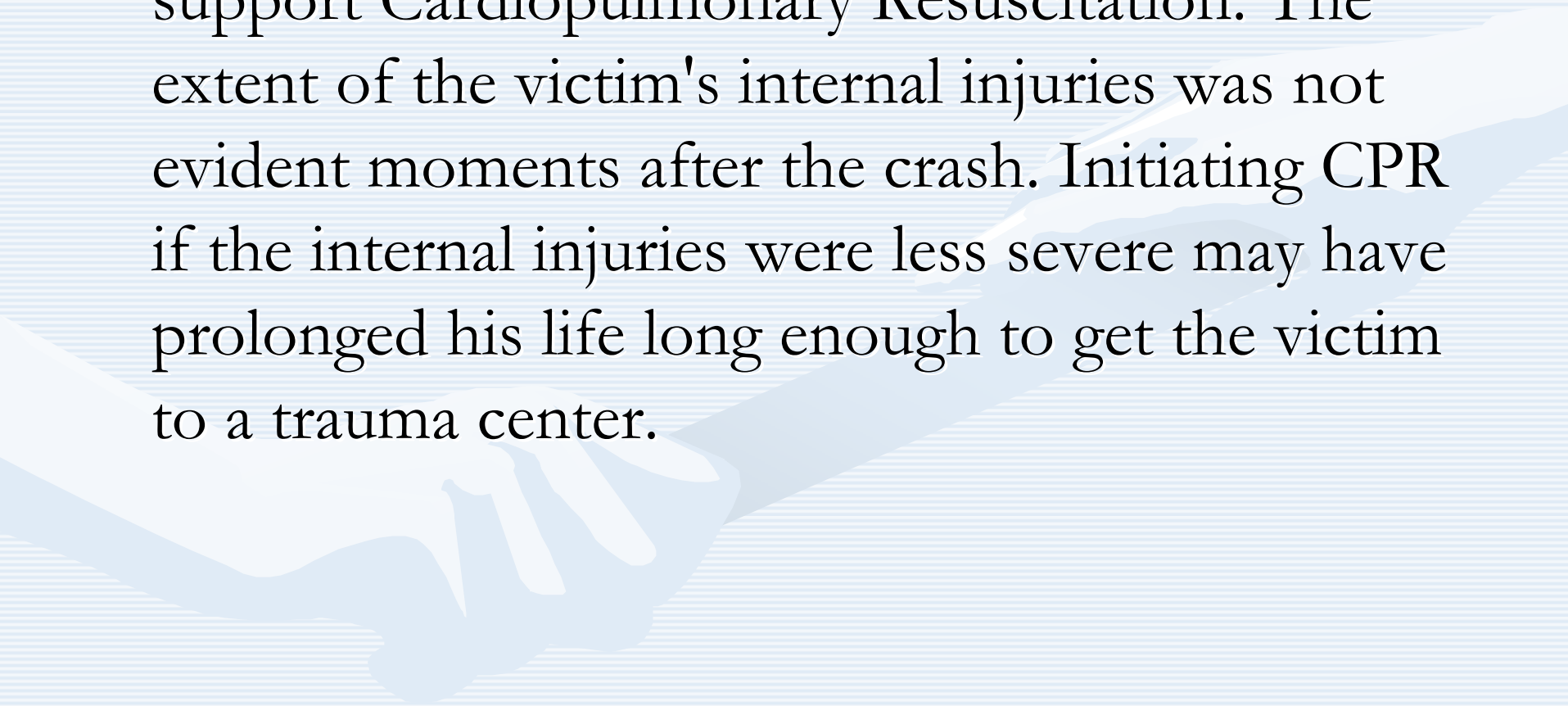
Records of methods and frequency of lift and truck inspection were not found. Appropriate inspection procedures are described in the owners' manual but it is not known if the victim adhered to the protocol. The wire rope assembly must be inspected and maintained periodically. A program complete with 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 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.

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

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.

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

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.



To contact the **KY FACE** Program:

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