

# **Cleaner Falls 35 Feet to His Death Through Temporary Roof Opening**

**Incident Number: 04KY011**



**Exhaust fan had been removed for cleaning, creating a temporary opening where cleaner fell approximately 35 feet onto a piece of machinery in the factory.**

**Kentucky Fatality Assessment and Control Evaluation Program  
Kentucky Injury Prevention and Research Center  
333 Waller Avenue  
Suite 202  
Lexington, Kentucky 40504  
Phone: 859-323-2981  
Fax: 859-257-3909  
[www.kiprc.uky.edu](http://www.kiprc.uky.edu)**



## **Kentucky Fatality Assessment and Control Evaluation (FACE) Program**

**Incident Number: 04KY011**

**Incident Date: February 28, 2004**

**Release Date: September 12, 2005**

**Subject: Cleaner Falls 35 Feet to His Death Through  
Temporary Roof Opening**

### **Summary**

On February 23, 2004, a 50-year-old male cleaner died when he fell approximately 35 feet through a temporary roof opening and was impaled on a piece of equipment on the factory floor. He had been cleaning an exhaust fan on a factory roof with a pressure washer. He and two co-workers had removed the fan from its casing creating a temporary roof opening and set the fan beside the roof opening for cleaning. Facing the fan with his back to the opening, the cleaner apparently stepped backwards and fell through the opening. He fell onto a 1200-ton die-casting machine on the factory floor. Onsite personnel working nearby heard the cleaner fall onto the machine. They summoned help for the fallen cleaner. Factory-employed emergency response trained personnel responded to the scene, assessed the situation and called for an ambulance. Local emergency medical personnel and police personnel arrived at the scene and contacted the coroner. The coroner arrived, and declared the cleaner dead at the scene.

To prevent future occurrences of similar incidents, the following recommendations have been made:

Recommendation No. 1: When removing fixtures for cleaning on roof tops, temporary roof openings should be covered or barricaded.

Recommendation No. 2: Personal fall protection equipment should be worn by all workers working 6 feet or more above ground level.

Recommendation No. 3: Employers should train employees to recognize hazardous work conditions and how to abate or avoid them.

### **Background**

On March 2, 2004, via newspaper surveillance, the Kentucky Fatality Assessment Control & Evaluation program became aware of an occupational fatality involving a fall. A site visit was made on May 20, 2004; the coroner was interviewed and pictures were taken at the scene. On April 21, 2005, the employer was interviewed.

A commercial painting company had been contracted to clean eight exhaust fans and vents attached to a roof at a factory. The company had been in business since 1974 and its focus was professional painting and cleaning services for industrial and commercial businesses. Depending upon the season, the company employed between 3 and 6 employees. According to the employer, only experienced painters were hired. Toolbox talks were held weekly by the

supervisor. The decedent had been employed by the company for eight months prior to the incident, and was previously employed by the company for approximately 1.5 years. The decedent had 20 years of professional painting experience.

According to the painting company, the factory was recently built and the painting company had painted and cleaned the business building for a number of years at its previous location. At this new location, the painting company was contracted to clean the factory walls every 6 months and paint them as necessary. As part of the onsite equipment maintenance, grease buildup on the exhaust fans was to be removed. When the incident occurred, it was the first time the exhaust fans had been cleaned at the new facility. The roof of the building was flat and covered with smooth stones.

According to a national weather service, the temperature on the day of the incident ranged from 28 degrees Fahrenheit to 58 degrees Fahrenheit.

Cleaners wore cotton gloves while spraying degreaser and pressure washing the exhaust fans with water. Type of footwear the workers wore is unknown.

## **Investigation**

A professional painting company was contracted by a die-casting factory to clean eight exhaust fans located on the roof. On February 23, 2004, at 7:00 am, two laborers and a supervisor used an onsite manlift to access the 100 foot x 300 foot roof to clean fans. The three laborers, including the victim, had cleaned three fans at the facility the day before. The fans were 5 foot x 5 foot and were attached in the roof approximately 40 feet above the factory floor. They were used to vent factory air to the outside of the factory. As the fans drew air across their blades, dirt and grease from the factory air would coat the fan blades and motor housing. Keeping the exhaust fans clean was to become routine equipment maintenance.

To prepare the fans for cleaning, an onsite electrician disconnected each electrical connection for the fans on the roof top. After the electrical connection was disconnected, the three laborers would remove the fan from its casing in the roof and lay the fan beside the temporary opening. A degreasing cleaning solution was sprayed onto the fan and allowed to penetrate the grease and dirt for approximately ten minutes. After ten minutes, the cleaner used a 3000 psi pressure washer to clean and rinse the fan. Tap water for the pressure washer was supplied from a hose attached to a spigot located on the outside factory wall near the ground. The degreasing/rinse process was repeated at least twice per fan, and if necessary, three times. After the fan was cleaned, it was left in the same location where it had been cleaned and allowed to air dry. After the fan dried, the three laborers would then replace the fan in its casing and the onsite electrician would reconnect the electrical connections to the fan. Sometimes, the pressure washer water hoses would freeze because of the low outside temperature. To thaw the hoses, the cleaners would lower them down into the temporary hole where the fan had been removed. The heat from the factory would thaw the hoses and the cleaner could raise it out of the opening and continue cleaning the fan.

At approximately 8:30 am, the decedent was preparing to clean a fan removed from its casing by the three laborers (one of which had been the decedent). The fan was placed beside the temporary opening on the roof. The distance between the fan and the temporary opening is unknown. It appears that the decedent was facing the fan with his back to the roof opening. Apparently the decedent took a step back away from the fan then fell backwards through the temporary opening, into the factory onto a piece of machinery. No one saw him fall. At the time of the decedent's fall, the other two laborers were each cleaning fans in different areas of the roof and it was break-time. One of the laborers walked toward the man lift while the other went to tell the decedent it was break time (it was approximately 8:40 am – 8:45 am). In the meantime, according to the employer, the laborers heard an ambulance approach the factory. The laborer looking for the decedent, approached the area where the decedent had been cleaning a fan, did not see the decedent, and only saw the water hose guided down into the factory. The laborer looked through the opening in the roof and observed the decedent had fallen onto a piece of machinery.

Two factory floor workers were near the machine when the decedent fell and called for help. On-site emergency service personnel responded to the scene where the decedent lay on the machine. Floor employees were sent to the roof to inform the decedent's coworkers of the incident. At the same time, the decedent's coworkers were descending in a manlift to the ground to reach their coworker in the factory. The floor employees met the two laborers on the ground and escorted them to the scene of the incident. An ambulance arrived at the scene with local emergency medical response personnel. Local police also arrived. Aid was given to the cleaner who then died at the scene shortly after EMS arrived. The police contacted the coroner who arrived on the scene and declared the cleaner dead.

### **Cause of Death**

The Certificate of Death states the cause of death as due to "blunt force trauma to head".

### **Recommendations and Discussions**

Recommendation No. 1: When removing fixtures for cleaning on roof tops, temporary roof openings should be covered or barricaded.

Kentucky Occupational Safety and Health standards state that employees shall be protected from falling through holes by use of personal fall protection, covers, or guardrail systems CFR 1926.501(b)(4). After this incident occurred, the company constructed covers of 2 x 4s and plywood nailed together to be placed over the temporary holes in the roof while the fans were removed. The employer stated that the factory initially did not want the holes covered up when the fans were removed because it would keep air from flowing out of the factory. In these circumstances, if a guardrail is used, it should meet CFR 1926.502(b)(1) requirements of the top rail to be a minimum of 42 inches high, plus or minus three inches. Also, according to CFR 1926.502(b)(3) the guardrail system must be able to withstand a minimum of 200 pounds of force on the top two inches of the guard rail. CFR 1926.502(b)(11) states that if guardrails are used, they must be installed on all sides of the opening.

Along with a roof covering, a moveable four-wall, five foot high barricade could have been constructed for the roof openings. This would have allowed the factory air to exhaust through the roof openings while the fans were being cleaned.

Recommendation No. 2: Personal fall protection equipment should be worn by all workers working six feet or more above the ground.

CFR 501(b)(8)(ii) states that workers working above floor equipment need to be protected from falling by guardrail systems, a safety net system or a personal fall arrest system. Besides barricades around the roof openings, the laborers could have worn appropriate harness devices tethered to roof anchors. The roof of the building was flat and there are at least two types of roof anchors designed for use on flat roofs. One system is a device which has legs that are bolted to the roof, can be used multiple times, has a retractable life line, and has a 360-degree rotating bracket which allows for freedom of movement. The life lines are available in different lengths and attach to the worker's safety harness. Another anti-fall configuration would be an appropriate safety harness with a lanyard attached to a reusable flat roof anchor bolted to the roof.

Recommendation No. 3: Employers should train employees to recognize hazardous work conditions and how to abate or avoid them.

According to KY OSH Standard 1926.21(b)(2), employers are responsible for training each employee on recognition of work hazards and how to avoid, control or eliminate them. Training should include appropriate fall protection devices and their use. KY OSH Standard 1926.501(a)(2) states that each employee should be trained by a competent person in the nature of fall hazards. Training should include how to properly erect, maintain, disassemble, and inspect fall equipment and systems such as guardrail systems, personal fall arrest systems, warning line systems, safety monitoring systems, controlled access zones and other protection systems/devices to be used.

## **Keywords**

Fall  
Fan  
Pressure washer  
Roof

## **References**

CFR 1926.21(b)(2)  
CFR 126.501(a)(2)  
CFR 1926.501(b)(4)  
CFR 1926.501(b)(8)(ii)  
CFR 1926.502 (b)(1)  
CFR 1926.502(b)(3)  
CFR 1926.502(b)(11)

## **Acknowledgements**

Coroner  
Business Owner  
Factory Management

The Kentucky Fatality Assessment & Control Evaluation Program (FACE) is funded by a grant from the Centers for Disease Control and the National Institute of Safety and Health. The purpose of FACE is to aid in the research and prevention of occupational fatalities by evaluating events leading to, during, and after a work related fatality. Recommendations are made to help employers and employees to have a safer work environment. For more information about FACE and KIPRC, please visit our website at: [www.kiprc.uky.edu](http://www.kiprc.uky.edu)



Machinery onto which the cleaner fell.



Exhaust fan above machinery on factory floor where fatal incident occurred. Picture was taken from factory floor.