Occupational Fatality Report

Kentucky FACE Program

Report No. 15KY063

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Semi-Truck Owner-Operator Crushed by 7.6 Ton Steel Coil While Securing Load to Flatbed Trailer

CASE SUMMARY

On Monday, October 26, 2015, a 46-year-old truck driver (the victim) and a bridge crane operator were loading three 7.6 ton steel coils onto a flatbed semi-trailer, using a bridge crane. The truck driver was standing on the bed of the trailer and both he and the bridge crane operator had their backs turned to the bridge crane, while the crane operator actuated the crane's controls. The crane's sling became entangled in the eye of a steel coil, causing it to become unstable and topple over onto the truck driver. The truck driver was pinned to the bed of the trailer beneath the steel coil and died at the scene.

Figure 1. Photo of steel coils at the jobsite.

Recommendations for prevention:

- Steel coils and other cargo that could tip over should be properly secured to the trailer bed prior to detachment from bridge cranes.
- Workers should maintain visual contact with the cargo and crane at all times during crane operation.
- Written policies for loading and unloading should include that personnel be restricted from the loading zone during mechanized loading and unloading activities.
- After placing and securing the steel coil in the intended location, authorized loading zone personnel should ensure that slings and other attachments are free of the coil's eye before actuating the crane away from the coil.

EMPLOYER

There were three employers involved in this incident:

1. The **victim**, an independent owner-operator who had been in business since July 6, 2008;
2. The **trucking company** that subcontracted the owner-operator to deliver and pick up the steel coils, employed 7 drivers and had been in business since November 16, 2010; and
3. The **heavy metal stamping company** that specialized in stampings, welded assemblies, and e-coat painting for cradles, control arms and fuel tank straps. The stamping company was owned by a Canadian parent-company and employed 1,800 workers.

SAFETY AND TRAINING PROGRAMS

The victim received a copy of all safety policies, procedures and programs from the trucking company who contracted him. While the trucking company had written safety programs that included safe procedures for driving related activities and loading practices, there was no training specifically addressing loading zone safety during loading and unloading activities. Documentation provided by the heavy metal stamping company showed that they had provided crane safety training to the bridge crane operator and that he had performed bridge crane tasks for four years while under their employment.

VICTIM

The victim was a 46-year-old high school graduate, married father of two, and trucking company owner-operator. The victim's company had been in business since July 6, 2008. He had been subcontracted by a trucking company to deliver and pick up steel coils at a heavy metal stamping company.

INCIDENT SCENE

The incident scene was a steel receiving metal warehouse where steel coils were loaded and unloaded onto tractor trailers. The truck and trailer were at a loading dock.

Figure 2. Loading area where incident occurred.

EQUIPMENT & MATERIAL

The following equipment was found at the scene:

1. A **bridge crane** consisting of parallel runways with a travelling bridge spanning the gap. A hoist (the lifting component of the crane) was attached to the travelling bridge and had slings and straps attached to loop through the eyes of the steel coils. The bridge crane had a remote control that is attached to a power cord, which hangs from the ceiling and allows operator mobility during use.

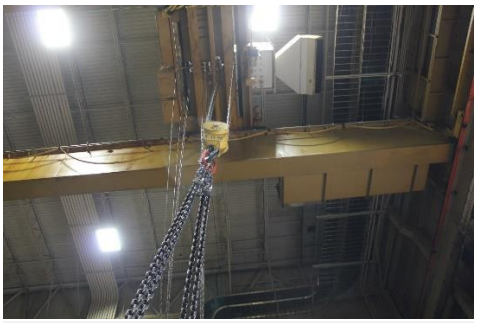

Figure 3. Bridge crane on site.

2. A **2002 tri-axle Kenworth flatbed trailer** with a load capacity of 100,000 pounds. There were 4 coils loaded on the truck at the time of the incident. The coil involved in the fatal incident was the last to be loaded by the bridge crane operator. The tractor trailer combination measured 67'9" long by 8'10.5" wide. The bed height measured 54 inches.

Figure 4. Stock image of tri-axle flatbed trailer occurred.

3. **Steel coils.** The coil that struck the victim had a diameter of 67 5/8 inches, weighed 15,242 pounds, or roughly 7.6 tons, and had a footprint of 17.32 inches wide. The steel coil was approximately 5 feet in height.

Figure 5. Steel coils in the loading area secured to the bridge crane sling.

WEATHER

At the time of the incident, the temperature was approximately 82◦F with clear skies and 73% humidity. Weather was not considered to be a factor in this fatality.

INVESTIGATION

On June 15, 2015, the Kentucky Labor Cabinet notified the Kentucky Fatality Assessment and Control Evaluation Program of a fatality involving a semi-truck driver who died after being crushed by a steel coil in a warehouse loading zone. An investigation was conducted.

A 46-year-old self-employed semi-truck driver (the victim) had been subcontracted by a small trucking company to make a steel coil delivery and subsequent pickup from a heavy metal stamping company. He was to deliver five large steel coils and to load 3 additional coils that were being shipped out from the stamping company.

Figure 6. The flatbed trailer where the coils were to be loaded.

The truck driver, who had made deliveries in the past to this same location, secured and unsecured the steel coils as they were loaded and unloaded from the flatbed trailer. Using a 40 ton bridge crane (Figure 3), the crane operator moved the steel coils onto and off of the trailer (Figure 6). The bridge crane was operated by a remote control which was mounted to the end of a power cord and hung laterally from the ceiling; this allowed mobility for the bridge crane operator when using the crane.

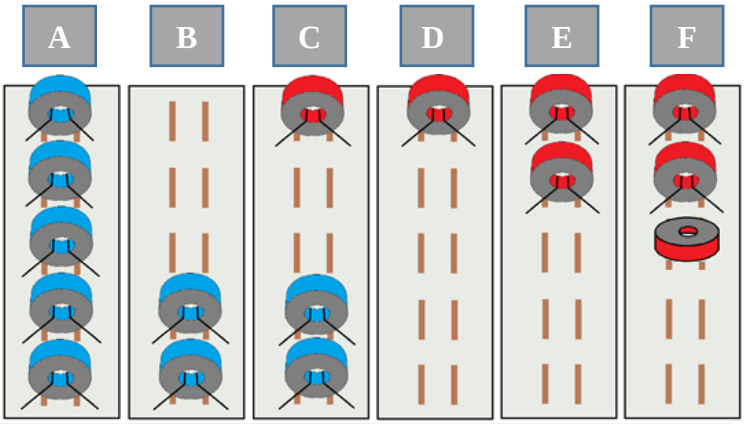

Figure 7. The sequence in which the steel coils were loaded and unloaded from the flatbed trailer. The blue coils represent the coils that were to be delivered. The red coils represent the coils that were to be picked up.

The Loading Process

Arriving to the warehouse (Figure 2) at 8:00 am, the truck driver parked his trailer in the loading dock, exited his cab, and greeted the crane operator. The flatbed trailer had arrived with five steel coils that were standing upright and were secured with chains and ratchet straps (Figure 7A). Each coil had a footprint measuring 17.32 inches wide, weighed 7.6 tons, and rested on two 4”x4” hardwood posts.
The truck driver and the bridge crane operator removed three of the five steel coils (Figure 7B) before loading the first of the 3 coils that were to be shipped out (Figure 7C). Next, the crane operator used the bridge crane to remove the remaining two coils from the flatbed trailer that were to be delivered (Figure 7D) before proceeding to load the second steel coil to be shipped

out (Figure 7E). The crane operator loaded the third and final coil to be shipped out onto the flatbed trailer, approximately 6 feet from the second coil. The truck driver stood with his back to the crane as he secured the adjacent coil while the crane operator disconnected the sling from the final coil. Though the sling's loop had been disconnected from the final coil, a portion of the sling was still inside the coil's eye.

The Incident

The crane operator turned away from the coils and crane and proceeded to exit the bed of the trailer. As he exited the truck bed, he actuated the controls of the crane to move it up and away from the coil. Moving vertically, the crane began drawing the sling through the center opening of coil. Suddenly the crane operator heard a noise and turned to see what happened. The sling, though disconnected, had become snagged in part of the coil's eye, and the upward motion caused the coil to topple over onto the truck driver (Figure 8). The crane operator immediately radioed for the company's internal emergency response team to report to his area. The response team arrived to find the truck driver pinned face down on the bed of the truck by the 7.6 ton steel coil. The coil struck the truck driver across his posterior thoracic area, coming to rest on his lower lumbar region and legs (Figure 9).

Figure 8. Steel coil that fell on and crushed truck driver, on flatbed trailer.

Emergency Medical services were call and dispatched at 8:21 am and arrived within 6 minutes from dispatch. The police were dispatched at 8:22 am and the coroner was called at 8:36 am. The coroner pronounced the truck driver dead on the scene.

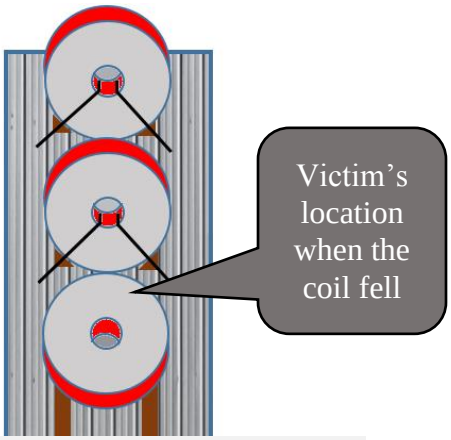

Figure 9. Depiction of steel coil that fell on and crushed truck driver, on flatbed trailer.

CAUSE OF DEATH

The cause of death was multiple blunt force crushing injuries sustained by a falling 7.6 ton steel coil.

CONTRIBUTING FACTORS

Occupational injuries and fatalities are often the result of one or more contributing factors that ultimately result in injury or death. The investigation identified the following factors that may have contributed to the fatality:

- The coil was not secured to the flatbed trailer prior to removing crane sling.
- The loading zone was not clear of personnel during loading/unloading activities.
- The truck driver and crane operator did not maintain a clear line of sight of the crane during operation.
- No written policies for loading and unloading and securing freight for truck driver's safety.

RECOMMENDATIONS AND DISCUSSIONS

Recommendation No. 1: Steel coils and other cargo that could tip over should be properly secured to the trailer bed prior to detachment from bridge cranes.

The steel coil had been set in place and detached from the crane's sling without first being properly secured to the trailer bed. As the crane operator actuated the bridge crane to move away from the coil, the crane's sling became hung in the eye of the coil, causing it to become unstable and fall over onto the truck driver. Had the coil been properly secured to the flatbed trailer prior to removing the crane's sling, the coil may not have become unstable. As a safety precaution, the crane's sling should have been used to hold the coil in place until it was secured to the flatbed trailer.

Recommendation No.2: Workers should maintain visual contact with the cargo and crane at all times during crane operation.

The bridge crane operator was walking away from the crane and exiting the flatbed trailer, when he actuated the crane's controls, not realizing that the sling was caught in the steel coil's eye. Seconds can be vital when cargo becomes unstable, and not maintaining visual sight of the crane during operation reduces reaction time. Additionally, the truck driver also had his back turned to the crane during operation.

Recommendation No. 3: Written policies for loading and unloading should include that personnel be restricted from the loading zone during mechanized loading and unloading activities.[1]

Because of the unpredictability of machinery during loading and unloading procedures, an overhead bridge crane should only be used when the loading zone is free of personnel. Machines often malfunction, and sudden shifts of weight distribution and movement direction can cause

cargo to become unstable, increasing the risk of injury. Additionally, personnel working in or around a loading zone should collectively establish this zone a 'danger zone' and maintain awareness of its boundaries prior to beginning work. The danger zone is the area in which a worker may potentially be struck if cargo becomes unstable; thus, different load types and sizes may require shifting danger zones. Personnel should work closely with the crane operator to establish the danger zone's perimeter and should ensure that all personnel working in the area are fully aware of its boundaries. Physical barriers and/or markings on the floor are recommended to prevent and deter zone entry.

The employer had written policies detailing the procedures for proper loading and unloading of freight in the loading zone, however, a discussion on the safety of the driver during mechanized loading and unloading procedures was not found. Written policies should instruct all personnel to never enter the loading danger zone while mechanized equipment is being used to move cargo. Additionally, written policies should require overhead crane operators to never lift, lower, or transport a load until all personnel are clear of the load and the load's path.

Recommendation No. 4: After placing and securing the steel coil in the intended location, authorized loading zone personnel should ensure that slings and other attachments are free of the coil's eye before actuating the crane away from the coil.

The sling used to attach the bridge crane to the steel coils was detached from the steel coil, but still left in the coil's eye. As the crane operator actuated the controls of the crane, the sling became caught inside of the eye of the coil, causing the coil to become unstable and topple over. Crane operators should ensure that slings and other means of attachment are free of the crane's eye prior to actuating the crane's controls.

KEYWORDS

Loading docks
Cranes
Steel coils
Truck driver

REFERENCES

[1] Evidence Solutions Inc. Truck Safety Expert Witness: *Safe Flatbed Loading and Unloading Procedures for Truck Drivers – FMCSRs. Truck Accident & Truck Loading Safety Experts.* http://evidencesolutions.com/web/index.php/Articles-by-DA/safe-flatbed-loading-and-unloading-procedures-for-truck-drivers-fmcsrs.html

PHOTO CREDIT

Photos used in figures 1-3, 5, 6, 8, and 9 were provided by the Occupational Safety and Health (OSH) Program, Kentucky Labor Cabinet. Figure 7 is property of the Kentucky FACE Program.

ACKNOWLEDGEMENTS

The Kentucky FACE program would like to thank the company's safety director, KY OSH and the county coroner for their assistance with this report.

OTHER RESOURCES

Kentucky FACE Hazard Alert: Workers Killed While Unloading Cargo from Flatbed Trailers [http://www.mc.uky.edu/kiprc/face/hazard-alerts/other/unload-flatbed-trailers.pdf]

Kentucky FACE Fatality Report: Semi-Truck Driver Fatally Struck by Falling Flatbed Cage Door [http://www.mc.uky.edu/kiprc/face/reports/pdf/15KY001.pdf]

Kentucky FACE Fatality Report: Granite Installation Company Owner Struck by Falling Granite Slab [http://www.mc.uky.edu/kiprc/face/reports/pdf/15KY020.pdf]

PROGRAM FUNDING

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Please take the time to complete our brief survey regarding this report:
(https://uky.az1.qualtrics.com/SE/?SID=SV_3JcxmtnruYacMsZ**)**

Electronic access to this full report can be found here:
(http://www.mc.uky.edu/kiprc/programs/face/files/15KY063.pdf)

DISCLAIMER

This case report was developed to draw the attention of employers and employees to a serious safety hazard and is based on preliminary data only. This publication does not represent final determinations regarding the nature of the incident, cause of the injury, or fault of employer, employee, or any party involved.

This case report was developed by the Kentucky Fatality Assessment and Control Evaluation (FACE) Program. Kentucky FACE is a NIOSH-funded occupational fatality surveillance program with a goal of preventing fatal work injuries by studying the worker, the work environment, and the role of management, engineering, and behavioral changes in preventing future injuries. The FACE Program is located within the Kentucky Injury Prevention and Research Center (KIPRC), part of the University of Kentucky's College of Public Health. KIPRC is a bona fide agent for the Kentucky Department for Public Health.

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