Kentucky Fatality Assessment and Control Evaluation (FACE) Program

Incident Number:  07KY070
Release Date:  March 26, 2008
Subject:  Semi-Tractor Trailer Driver Hauling Chicken Dies After Striking A Rock Wall

This is a summary. The entire KY FACE report is available on our website at:
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Summary

On a sunny fall day in 2007, a 50-year old semi truck driver hauling processed frozen chicken in a refrigerated trailer, died when his semi crashed into a rock wall. The driver was north bound on an interstate highway when witnesses saw the semi in the left lane contact the concrete median barrier then veer over to the right across one traffic lane and the shoulder, then strike a rock wall. The impact caused the cab to overturn onto the driver’s door while the refrigerated trailer remained standing upright. An exhaust pipe located on the back of the cab was horizontal facing skyward on the cab. The fuel line to the refrigeration unit was damaged in the crash allowing fuel to drip onto the hot exhaust pipe and ignite a fire. Numerous calls reporting the crash were placed to 911 emergency medical services. A man and woman reportedly driving behind the semi witnessed the fire start between the cab and trailer.

Emergency services arrived and found the cab and front of the trailer engulfed in flames. The local coroner was contacted and called to the scene where he declared the driver dead at the scene.

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

Recommendation No. 1: Semi tractor-trailer drivers should be trained to recognize signs of fatigue and when to seek appropriate rest areas.

Besides distraction, fatigue is one of the main difficulties drivers combat. Drivers should be educated to recognize when they are becoming fatigued while driving. According to an article, “Driver Fatigue: The Dangers of Driving Sleepy”, signs of driver fatigue include daydreaming, straying out of the lane, excessive yawning, feeling impatient and/or stiff, heavy eyes, and reacting slowly. Another article states that over-steering is also a sign of driver fatigue. The study “The development of a naturalistic data collection system to perform critical incident analysis: An investigation of safety and fatigue issues in long-haul trucking” states that most incidents involving fatigued drivers occur in the late afternoon and early evening hours with the highest rates occurring between 11:00 am to noon and 3:00 pm to 6:00 pm. Methods to avoid
driver fatigue include being well rested, getting enough sleep, taking breaks every two hours where the driver may take a nap, eating a snack, avoiding consumption of alcohol, having a driving plan, and staying hydrated.

Every driver should have a route plan that incorporates appropriate rest areas to give the driver access to meals, a quiet place to nap, and be able to stretch. The plan should also provide information on roadside assistance if needed.

**Recommendation No. 2:** Highway median barriers should be designed with local input of emergency responder management allowing entrance of emergency responder personnel.

During this incident, emergency responders were delayed in reaching the semi due to construction and the length of the permanent cast-in-place concrete barrier (11 miles). Because there were no gaps in the permanent barrier or the construction barrier, emergency responders could only access the scene by driving to and from the two exits the at both ends of the crash.

Normally, emergency responders use emergency access in medians to respond quickly to emergency situations. Access gaps should be constructed every two miles in the continuous barriers to allow timely access to respond to emergency situations. “Kentucky’s Highway Management Strategic Plan”, states that local emergency responders are to have an integral part in the design of the continuous barriers in their responding area. Gaps could be created by offsetting ends of the barriers six feet in each direction creating a 12 foot access space. In a minimum width median, this would leave an eight foot inside shoulder in each direction in the section where the access gap would be constructed. This would allow enough space for large emergency vehicles to access either side of the highway in less time than resorting to use the nearest exits, which in some cases could cause emergency responders to drive as many as 20 miles or more for highway emergencies.

**Recommendation No. 3:** Long-haul semi tractor-trailer drivers should have a network of mechanics along the routes they travel in case mechanical problems arise.

The incident photograph of the refrigeration unit shows a line dangling from the middle of the unit to the ground. According to a motor carrier transportation professional, this line appears to be a cable. There are two possibilities as to why the cable was there. One possible reason for the addition of the cable was if there was an electrical problem (e.g.: alternator failure). If this occurs while a driver is en route, it is common for the driver to clip one end of a cable to the alternator and clip the other end to the battery located at the back of the semi. This scenario allows the driver to complete the route and upon completion, address the failure of the refrigeration unit with the company mechanic. Another possibility is the battery on the tractor had failed and the driver used the cable to keep the battery charged to keep the tractor operating, thus allowing the driver to successfully complete the route and then have the company mechanic make the necessary repairs. These two possibilities are typically used by drivers in order to continue driving to the delivery destination and allow repair by the company mechanic. Either situation is dangerous. If the cable clip loosens and comes in contact with metal (such as the frame of the semi), a reaction could occur creating sparks that may ignite the coating of the cable or other nearby flammable material on fire. Companies should have a network of mechanics on-
call along delivery routes so drivers have an efficient and reliable safe source to have mechanical repairs made when necessary.

**Recommendation No. 4:** Employers should require drivers to perform pre-trip and post-trip inspections on the tractor and trailer prior to operating them using an expanded Department of Transportation Inspection form.

Federal Motor Carrier Safety Administration regulations CFR 396.13 and CFR 396.11 require commercial motor vehicles to be inspected before driving the vehicle and at the completion of the day’s work. CFR 396.3 requires companies to not only inspect every commercial vehicle, but to keep the vehicle properly repaired and maintained. Reports are to be completed and available for the next driver to review as part of their inspection of the vehicle. Companies should require drivers to complete the Department of Transportation Driver’s Vehicle Inspection Report, DVIR, (Attachment 1) and turn them into the office each day. If the driver is on a long haul trip, the driver should contact the company office and make a report of the check list. If the driver finds a defect detrimental to safety, then it is recommended the equipment be taken to the proper mechanic for repairs. The report lists important aspects of the vehicle such as air compressor, air lines, battery, body, brakes, clutches, wheels and rims, windshield wipers, etc., which the driver is required to inspect each time the semi is operated. There is a space on the form for the driver to make notes for items not listed on the report that may need to be addressed immediately or in the future. After completing the report, the driver either signs that the vehicle is in satisfactory condition or that defects need to be corrected before the truck should be operated. The DVIR does not compel the driver to check operating mechanisms on trailers such as refrigeration units. Companies with refrigeration units should expand the DVIR to include specific items such as the refrigeration units.

**Recommendation No. 5:** Manufacturers of commercial refrigerated trailers should consider a sensor design that shuts off the fuel supply to the refrigeration unit when the fuel line is compromised.

Refrigeration units on tractor-trailers operate on diesel fuel. Refrigerated unit fuel tanks are typically located 1/3 of the way back on the driver’s side of the trailer, but are occasionally located on the passenger side. Tanks come in three sizes: 20 gallons, 30 gallons, and the most common is 50 gallons. The fuel line, 1/4 inch in diameter, is pressurized and feeds diesel fuel from the fuel tank to the refrigeration unit. A second line, 3/8 inch in diameter, returns unused fuel from the unit back to the fuel tank to be used later. The second line is not pressurized. Thus, diesel fuel is used and circulates through the system. Pressure in the first line fuels the refrigeration system while the second line uses gravity and drains unused diesel fuel back into diesel tank. If the second line is compromised, pressure from the first line will feed diesel fuel through to the second line until the diesel tank is empty. Due to the narrowness of the second line, the draining diesel fuel is almost aerosolized. It is in this state that diesel fuel is volatile. According to the accident reconstructionist, the fire was caused when the second fuel line was compromised and the aerosolized fuel drained onto the hot exhaust pipe, catching fire. The fire consumed the semi, destroyed the trailer, and the chicken cargo. Refrigeration units should be manufactured with switches on the fuel lines that will shut off the flow of fuel if either of the
lines becomes compromised. This redesign could prevent fire from occurring, or if fire is caused by another source, limit fire intensity and damage.

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