Bulldozer Owner / Operator Drowns While Trying to Repair a Pond
Incident Number: 03KY073

Location where bulldozer and operator were found. The depth of the water is difficult to determine. The pond is to the left in the photograph.

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Kentucky Fatality Assessment and Control Evaluation (FACE) Program
Incident Number: 03KY073
Subject: Bulldozer Owner / Operator Drowns While Trying to Repair a Pond

Summary

The Kentucky Fatality Assessment and Control Evaluation program was notified July 31, 2003, via newspaper surveillance, of an occupational fatality involving a 55-year-old bulldozer owner/operator. On July 29, 2003, a bulldozer owner / operator drowned in the cab of his machine as he was trying to find a leak in a pond dam. The operator had been hired by a local farm owner to find and repair a leak in one of the ponds on her farm. As the operator dug a trench through the earthen dam, a section at the top collapsed sending sludge into the trench. The water/sludge mixture filled the cab of the bulldozer, trapping the operator inside. When the owner/operator did not return home as expected, his wife called the pond owner. The pond owner and the operator's wife searched the pond area for the bulldozer operator. They found the water-filled trench next to the pond, but not the bulldozer or the operator. Emergency medical services (EMS) were called to the pond. After arriving at the scene, EMS contacted a diver who then found the bulldozer submerged in the water with the decedent inside. The coroner stated the cause of death as due to drowning.

Recommendations

Recommendation No. 1: Ponds should be drained down before repairs begin.

Recommendation No. 2: Bulldozer owner / operators should follow Occupational Safety and Health safety guidelines.

Recommendation No. 3: Bulldozer operators should leave themselves an escape route when working in dangerous spaces.

Background

On July 31, 2003, the Kentucky Fatality Assessment and Control Evaluation program, via newspaper surveillance, became aware of an occupational fatality that occurred on July 29, 2003, involving a bulldozer. The local coroner was contacted that same day and a site visit was made on August 4, 2003. The coroner and his assistant, an emergency services medical professional, the bulldozer repairman and other bulldozer operators were interviewed. A visit was made to the pond where the incident occurred and photographs were taken. The bulldozer involved in the fatality had been removed from the scene and taken to another location to be examined and repaired. On August 27, 2003, a visit was made to the repair shop and the repairman was interviewed and photographs were taken of the bulldozer.

The decedent had owned and operated a bulldozing business for approximately 15 years. Prior to opening his own business, he had worked in the construction industry for approximately 13 years operating heavy equipment. He owned one bulldozer. It was a 1999 model, purchased new and had side windows and air conditioning. The bulldozer was 10 feet in height and had a blade 12 feet wide.

For this particular job, the decedent had been contracted by a farm owner to find a leak in a pond dam. He had previously worked on a different pond on the same farm. Because the owner of the pond did not want the fish in the pond disturbed, she requested the bulldozer operator not drain the pond while repairs to the dam were being made. The bulldozer owner honored this request.

He was meticulous in his habits and was a very organized businessman. His wife made his lunch for him to take to work every day, which he ate between noon and 1:00 pm. When his plans changed, he would call his wife and inform her of his new schedule. According to those who knew him, he kept the bulldozer clean and had regular maintenance work performed.

The pond on the farm had been made by creating an earthen dam between two hills. This captured rain run-off from the hills and spring water entered from the side of the pond opposite the earthen dam.

Investigation

On the morning of July 29, 2003, at 6:30 am, the bulldozer owner left his house and drove to a farm 15 minutes away. He told his wife he was going to work for eight hours that day and would be home at 4:00 pm. His job that day was to locate a leak in the pond dam and repair it. He had fueled the bulldozer the day before, and was ready to begin work upon his arrival to the pond site.

At 4:00 pm, the decedent did not return home and had not called to inform his wife that his schedule had changed. Knowing his habit of always being punctual, she became alarmed and immediately called the farm owner who had been out-of-town that day and was returning to the house. The bulldozer owner's wife left a message that the bulldozer owner had not returned home on time and she was concerned.

Upon receiving this message shortly after 4:00 pm, the farm owner drove to the pond site and saw the bulldozer owner's truck, but not the bulldozer or the owner. At the same time, the bulldozer owner's wife arrived at the pond site. The farm owner and the bulldozer owner's wife did not see any evidence of the bulldozer or operator at the site and thought that perhaps he had taken the bulldozer to another pond he had previously worked on.

The two women drove to the other pond but did not find the bulldozer or the operator. They returned to the first pond and looked again at the water in the trench beside the pond. It was difficult for the two women to tell how deep the water was in the trench. There was no oil on top of the water to indicate where the bulldozer might be if it were underwater. The farm owner stood on the dam side of the trench and poked a long stick into the water. She thought she could

feel the stick hit something, but could not be sure if it was a muddy bottom to the trench or a piece of machinery.

The two women went to the farm house and called emergency services who arrived shortly after receiving the call. Emergency services and the women returned to the pond. Emergency service personnel took the same stick the farm owner had used previously and poked around in the water-filled trench, but again, the results were inconclusive. The operators' wife and emergency personnel found the bulldozer operator's truck with his lunch uneaten. Emergency services requested a scuba diver and a bulldozer with an operator to be brought to the scene.

The scuba diver arrived and entered the water and found the bulldozer. Visibility was near zero due to the murkiness of the water and the diver could not see well into the cab of the bulldozer. The depth of the trench became apparent when the diver stood on top of the bulldozer and his head was barely above the water. Two bulldozers and operators arrived at the scene. One bulldozer cut a path in the outside trench wall to release the water in the trench. As the water was released and the trench drained, the bulldozer appeared. It was caked in mud and water/sludge filled the cab. By the force of the water from the pond, the backend of the bulldozer had moved so the right side cab door was against the trench wall opposite from the pond. A bottom window on the pond side of the cab had blown into the cab allowing water, mud and sludge to enter the cab. Emergency personnel broke the front window out of the cab and retrieved the decedent from the bulldozer.

There were no witnesses to the exact events which caused the bulldozer operator to drown. In examining the scene together with what was known of the operator's habits, the following is the consensus as to what actually occurred during this incident.

The bulldozer had been fueled the day before so the operator began the day at 6:45 am with a full tank of fuel. He had not eaten lunch and an examination of the fuel tank revealed it was ¾ full when the incident occurred. Under normal operating conditions this time frame suggests the incident occurred around 10:00 am. The width of the trench was the width of the bulldozer blade, 12 feet with a depth of 17 feet. It appears the pond side of the trench was too thin. This allowed the vibration of the bulldozer to vibrate the side of the trench enough to make the top of the dam by the pond partially collapse. The backend of the bulldozer had moved off the track it had been making in the trench from the force of the water, mud and sludge pushing the right side against the outside trench wall. This impeded the operator from opening the right side door and escaping. The cab filled with water, sludge and mud because of the blown-out window. The pressure from the outside may have been too great for the trapped operator to break out the front window. By the time the cab filled with the water/sludge/mud mixture, it was too late for the operator to escape. Typically when repairing dams, the pond water is drained down to a level below the top of the bulldozer. When excavating begins into the dam wall, a "keyway" is made. A keyway is a pathway excavated in the outside trench wall that will allow water to escape should the pond side of the trench collapse. This creates a drain so the pond water can drain out of the trench instead of filling it up. Had the bulldozer operator excavated a keyway in the earthen dam, the water/sludge would have drained out of the trench when the dam collapsed and the bulldozer operator may have been able to escape.

Cause of Death

The cause of death was due to drowning.

Recommendations & Discussions

Recommendation No. 1: Ponds should be drained before repairs begin.

Whenever an operator is repairing a pond, the water in the pond should be drained. The level to be drained is determined by how deep the cut needs to be to find and repair the leak. For instance, the top of the pond water should not be over the top of the bulldozer.

Recommendation No. 2: Bulldozer operators should leave themselves an escape route when working in dangerous spaces.

According to bulldozer operators and repairmen, there are escape routes when working in situations such as this incident. One, it was stated that bulldozers sold in Florida (because they are under sea level) automatically have a hammer above the front window. This provides the operator a tool to break out a window and create an escape route if necessary. Another safety practice is called "cutting a keyway". A keyway is a pathway excavated in the outside trench wall that allows water to escape the trench should the pond side of the trench collapse. This keeps the trench from filling up. The depth of the trench in this case was 17 feet deep and the height of the bulldozer 10 feet.

Recommendation No. 3: Bulldozer owner / operators should follow Occupational Safety and Health safety guidelines.

Kentucky Occupational Safety and Health statute Subpart P 1926.652(a) states that employees are to be protected from cave-ins during excavations and does not apply to owner / operators. However, owner / operators should follow the Occupational Safety and Health safety guidelines to keep themselves safe from injury and possible death. Subpart P 1926.652(b) states the requirements for sloping the sides of an excavation. Both walls of the trench were too high. The nature of the job would not have allowed the sides to be shored; however, they could have been sloped or banked. Also, the dam soil should have been classified and worked with accordingly. Appendix A to Subpart P 1926 describes different soil classifications and their structures.

Keywords & Phrases

Bulldozer
Owner / Operator
Pond
Dam
Sludge
Trench

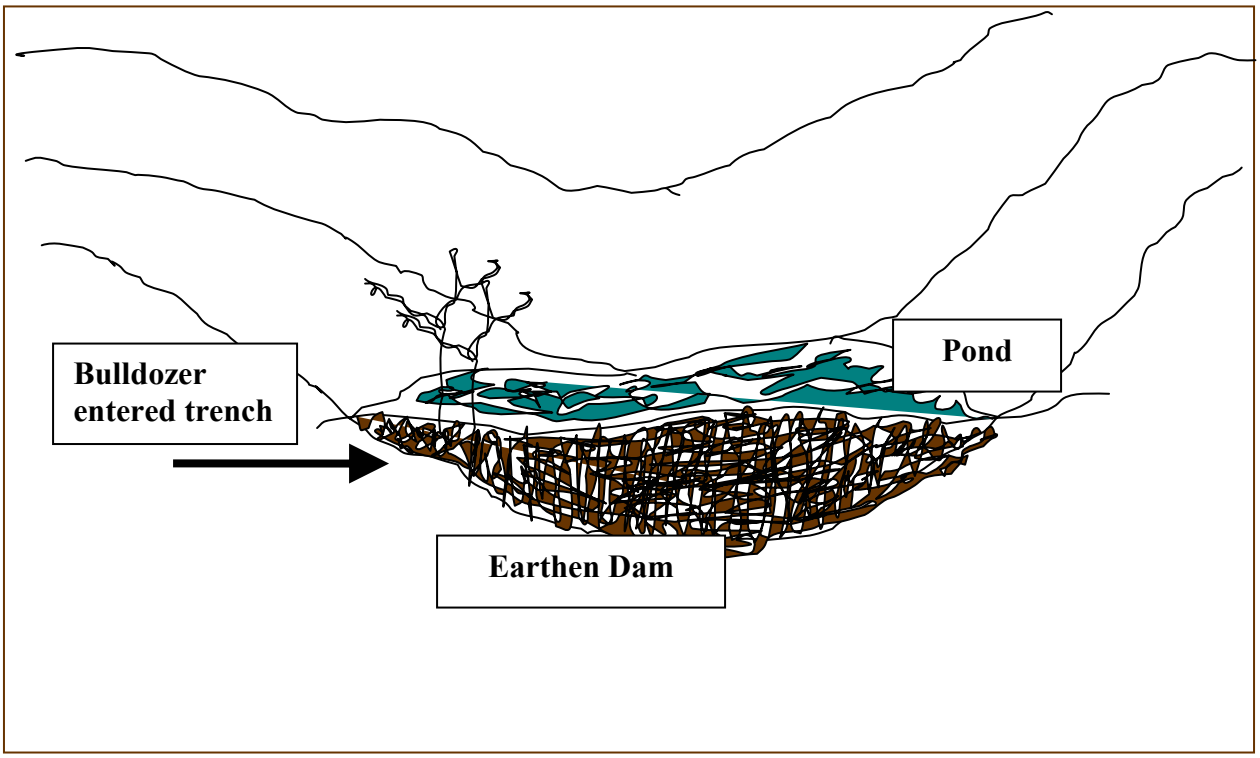
References

Kentucky Occupational Safety and Health statute Subpart P 1926.652(a); Subpart P 1926.652(b); Appendix A to Subpart P 1926

Acknowledgements

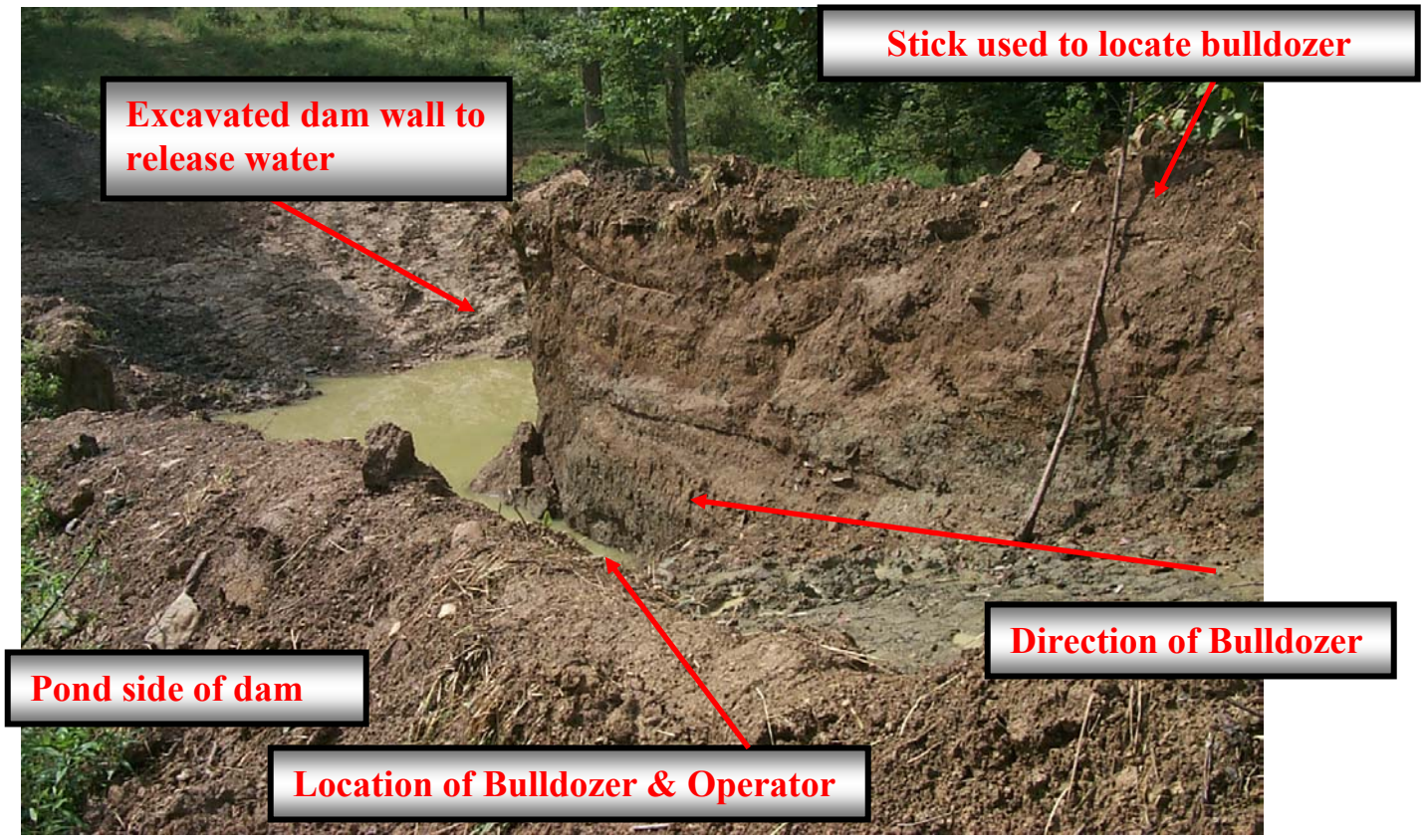
Local coroner
Emergency Management Service
Several Independent bulldozer operators
Bulldozer repairman

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. FACE's purpose 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 aid employers and employees to have a safer work environment. The current foci of the program are occupational fatalities involving: construction, machinery, immigrant workers (particularly Hispanics) or youths. For more information about FACE and KIPRC, please visit our website at: www.kiprc.uky.edu



Rendering of view of pond site from earthen dam end

Where the pond side of the trench gave way, flooding the trench with mud, sludge and water.



The trench where the bulldozer was. The far wall is 17 feet high and extended to the hillside. One of the responding bulldozers excavated the dam wall away to release the water in the trench. The stick is the one used to poke in the water to try to determine the depth of the water and if the bulldozer was there.

A picture of the bulldozer after it had been partially cleaned up and repaired. Notice the diagonal line on the window. This line shows the amount of pond water that remained in the cab after the decedent had been removed from the cab.