

MIFACE Investigation #01MI064

Subject: Restaurant Maintenance Worker Wedged between Sump Pump Pipe Support Bar and Sump Pump Crock Rim

Summary

On March 18, 2001, a 54-year old restaurant maintenance worker died of asphyxiation when he became wedged between a metal support bar for sump pump piping and the rim of the sump pump crock. The uncovered sump pump was located in a storage area behind a row of refrigerators in the restaurant basement. The victim used the storage area as an area to hang his coat. After punching out, the victim went downstairs to retrieve his coat. The victim's coat pocket may have contained several pieces of jewelry. The owner thinks that some jewelry may have fallen out of his coat pocket while he was putting on his coat and/or getting car keys. The victim may have thought that some jewelry fell into the open sump pump crock and he attempted to retrieve the jewelry. During the retrieval process, the victim became pinned between the metal support pipe and the sump pump well rim. Another restaurant employee found the victim and called the restaurant co-owner. The co-owner called 911. The victim was found bent at the waist, headfirst in the sump crock with his head in the water. Rescue workers used a reciprocating saw to cut the metal support to free the victim. The victim was pronounced dead at the scene.



RECOMMENDATIONS

- Employers should evaluate the workplace to identify any confined spaces and develop and enforce written work procedures for entry into these areas.
- Employers should cover sump crock openings with a solid cover to prevent items and/or people from falling into the sump pump area.
- Employers should develop and enforce written work procedures, including general electrical safety-related work practices.

INTRODUCTION

On March 18, 2001, a 54-year-old man died from asphyxiation when he became wedged between the metal support for the sump pump pipes and the sump crock. MIFACE was notified on September 24, 2001 of this incident when the victim's death certificate was received. On October 23, 2001, a MIFACE investigator visited the restaurant, interviewed one of the restaurant co-owners, and viewed the sump pump location. MIFACE utilized the interview information as well as the police and MIOSHA reports to suggest a sequence of events surrounding this unwitnessed incident.

The MIOSHA investigation determined that the death was not the result of a job-related duty; therefore it did not fall under the scope of the Michigan Occupational Safety and Health Act (Act 154 of 1974, as amended).

INVESTIGATION

The restaurant has been in business for 31 years, expanding and relocating to their current location approximately 9 years ago. The restaurant employs approximately 110 people. The restaurant has a kitchen, two dining rooms, and the bathrooms on the main floor. The basement area stores restaurant supplies, refrigerators, general food storage, etc.

The sump pump was located in a 12'x5' storage area behind a row of refrigerators in the basement. The sump pump handles effluent from the refrigerators as well as any peripheral building drainage; the design was a standard basement commercial sump pump. The sump was approximately 6" away from the wall. The crock diameter was approximately 23". The crock had a "lip" of approximately 4 1/2"; the total crock diameter was 28". The crock was approximately 3 1/2 feet deep. The sump pump had one PVC pipe and one copper pipe that carried condensation from the downstairs storage area refrigeration units. Also across the opening of the sump pump was a singular 2 1/4" plastic pipe. The sump pump piping was stabilized by an 1 1/2" metal bar bolted to the cement floor. The sump pump has a high water sensor that signals an alarm when the water rises above the sensor. The restaurant has a keypad at the top of the basement stairs that beeps when the sensor is activated and an external alarm monitoring company is alerted. The sump pump back up system is not electrical.

On the day of the MIFACE investigation, standing water in the crock was approximately 1 foot deep, which according to the owner, was a normal level. On the day of the site visit, the sump crock was uncovered and cleaning equipment was stored in the storage area. The co-owner stated that sometimes a metal grate was placed over the front of the sump crock, but it was not there on the day of the incident.

The victim had been working at the restaurant for 13 months, cleaning the restaurant's two dining rooms and bathrooms after the restaurant closes. He worked the midnight shift with another coworker, beginning at 12:00 am, ending work at approximately 7:00 am. The coworker cleans the kitchen only. The victim worked at several locations each

day; following cleaning the restaurant dining rooms, the victim would “punch out” and travel to another business to provide cleaning services.

When the victim arrived for work, it was common practice for him to go downstairs to the sump pump area to hang his coat on a pipe located behind the refrigerators. The co-owner stated the victim usually placed his coat in this storage area. The victim sold jewelry as an additional way to earn money, and had shown several pieces in the past to the co-owner for potential purchase. The co-owner stated that the victim often carried the jewelry in his coat pockets, and that the victim felt his coat was safer located in this area instead of where the rest of the employees placed their coats.

On the day of the incident, the victim had punched out at 0533 prior to going downstairs to retrieve his coat. The sump pump sensor alerted the alarm company at 0549. The alarm company notified the company co-owner at approximately 0600. The co-owner stated that the alarm went off at multiple times in the last few months, and thought that it was a malfunction. The co-owner had previously had the alarm company out to the restaurant to check the alarm for a malfunction, but no mechanical or electrical reason was found for the alarm sounding. The co-owner called the restaurant, but did not receive an answer. The morning cook was to arrive an hour later, and the co-owner decided to wait until approximately 0700 to call the restaurant to ask the cook to check the sump. The morning cook arrived, and upon direction from the co-owner, checked the sump pump to see why the alarm had sounded. It was then that the victim was found and 911 called. The victim was found face down in the sump pump, bent at his waist, with his head under water. He was found wedged between the rim of the sump pump crock and the metal support bar. He was declared dead at the scene.

The sump pump plug was disconnected from the wall outlet, and the plug for the reciprocating saw was plugged in. The reciprocating saw was used to cut through some piping and the metal support bar to free the victim. The sump pump circuits had not been tripped. The depth of the water in the sump crock on the day of the victim’s death was 24 inches.

The city electrical inspector and plumbing inspector performed an investigation following the incident and found there were no electrical or plumbing problems or code violations. The MIFACE investigator spoke with the plumbing inspector about the plumbing inspection of this incident. The plumbing inspector stated that there was no sewage going into the sump pump crock, only drain tile water. The sump pump water is pumped directly to the storm sewer; it is not pumped into the sanitary sewer system. The condensate water from the freezers enters another floor drain, which connects to the sump crock. Based on the configuration of the system, it is unlikely that Freon could have entered into the sump pump crock.

When the victim was found, the victim’s hat, car keys, a gold colored ring and gold colored earring were found on the floor next to the sump pump crock. The victim’s jacket was hanging on the pipe near the sump pump. The police removed the remaining water in the sump crock with a wet vacuum to determine if there was any jewelry at its base; no

jewelry was found. It is unknown if the police took the sump pump apart to check the sump pump filter.

The co-owner, based on his knowledge of the victim, postulated the following sequence of events. The victim, after punching out, went downstairs to retrieve his coat. While in the storage room, he reached into his coat pocket to get his keys. Perhaps when the victim pulled out his keys, some jewelry stored in his pockets fell out, and he may have believed that a piece of jewelry fell into the uncovered sump pump crock. The lighting in the storage area made it difficult for the victim to see if the jewelry fell into the sump pump crock. To attempt to retrieve the piece of jewelry from the sump pump crock, the victim laid on the floor, bending at the waist into the sump pump crock to try to reach down to the bottom of the crock to locate the missing piece of jewelry. During this process, he became wedged between the support bar and the crock rim.

The police report indicated that the victim would sometimes lay the mop head on the piping over the sump pump. The alarm company indicated that if water runs on the sensor, it would activate the sump pump sensor, the keypad at the top of the basement stairs as well as the notify the alarm company, even though the water level may not be above the sensor.

The medical examiner determined that the victim died before his head was underwater; the victim did not inhale any water since there wasn't water in the victim's stomach or lungs. To determine if there was a hazardous atmosphere within the sump crock that may have caused the employee to collapse, the medical examiner requested MIOSHA to conduct air sampling. MIOSHA conducted air sampling a day after the death occurred for the presence of carbon monoxide, carbon dioxide, hydrogen sulphide, oxygen and explosive vapors within the sump pit. On the day of the air sampling in the pit, MIOSHA determined the levels of the above contaminants were within acceptable levels.

The victim was found with one arm under the sump pump, and had fine metal shavings in his hand. The co-owner stated that the victim's job duties did not include any repair or maintenance activities, only cleaning the restaurant.

CAUSE OF DEATH

The cause of death as determined by the medical examiner was asphyxiation. Arteriosclerotic coronary artery disease contributed to the cause of death. No alcohol or drugs of abuse were detected in the victim's blood and urine.

RECOMMENDATIONS/DISCUSSION

- Employers should evaluate the workplace to identify any confined spaces and develop and enforce written work procedures for entry into these areas.

Employers must evaluate their workplaces to identify spaces that are considered “confined” i.e., their configurations hinder the activities of any employees who must enter, work in and exit them.

The design of the sump pump crock meets the definition of a confined space. MIOSHA adopted the provisions of 29 C.F.R. §1910.146 entitled “Permit Required Confined Spaces” as Part 490 of the General Industry Safety Standards. 1910.146 defines a confined space as a space that: (1) Is large enough and so configured that an employee can bodily enter and perform assigned work; and (2) Has limited or restricted means for entry or exit; and (3) is not designed for continuous employee occupancy. The sump pump crock met all the requirements of a confined space: it was large enough for the victim to enter; the metal support bar restricted entry and exit; and it was not designed for continuous employee occupancy.

A permit-required confined space is a confined space that has one or more of the following characteristics: (1) Contains or has a potential to contain a hazardous atmosphere; (2) Contains a material that has the potential for engulfing an entrant; (3) Has an internal configuration such that an entrant could be trapped or asphyxiated by inwardly converging walls or by a floor which slopes downward and tapers to a smaller cross-section; or (4) Contains any other recognized serious safety or health hazard.

If a workplace is found to contain permit-required confined spaces, the employer must inform exposed employees by posing danger signs or any other equally effective means of the existence, location and danger posed by the permit space. Employers must prevent entry by unauthorized persons. If an employer determines that employees will enter the permit-required confined space, the employer must develop and implement a written permit space program that complies with the requirements of 1910.146 (d) – (k). Entry is considered to have occurred as soon as any part of the employee’s body breaks the plane of an opening into the space posing a hazard to employees.

The sump pump crock potentially could be considered a permit-required confined space. Although the sump crock plumbing passed the plumbing inspection and the development of a hazardous atmosphere from restaurant effluents was unlikely, cleaning agents and dirty water from the restaurant maintenance were disposed of using the crock as a drain. A hazardous atmosphere could develop from decomposition products from the contaminants found in the dirty water. Additionally, the crock also had a potentially serious safety hazard – electric shock and/or electrocution. The electrically powered sump pump, if damaged, could cause a serious safety hazard to employees who may place their body into the water at the base of the sump pump crock.

MIOSHA determined the sump pump crock did not meet the requirements for a permit-required confined space. 1910.146(c)(7) provides an opportunity for an employer to reclassify a permit-required confined space to a non-permit required confined space if the permit space poses no actual or potential atmospheric hazards and if all hazards within the space are eliminated from outside the space.

Although not required by MIOSHA, a written entry procedure should be developed for non-permit confined spaces. When work is planned within a non-permit confined space, the supervisor and the employee(s) working in the space should discuss the entry procedure, the work to be done, all potential energy sources that may need isolation, any hazards that may arise while working in the space and necessary protective measures to be taken, such as personal protective equipment, special tools, or communication requirements. At this workplace, the use of the sump crock as a disposal area for cleaning solutions should have been prohibited so as to reduce the potential for the development of a hazardous atmosphere. In addition, the electrical hazard should have been eliminated by unplugging the sump pump from the electrical socket prior to reaching into the crock.

An overview of the MIOSHA Occupational Health Standard Part 490, Permit-Required Confined Spaces is included in this report. The Occupational Safety and Health Administration's (OSHA) Confined Space Advisor contains a Summary of OSHA Permit-Required Confined Space Rule. The entire OSHA Confined Space Advisor can be found at www.elaws.dol.gov/osha/confined/.

- Employers should cover sump crocks with a solid cover to prevent items and/or people from falling into the sump pump crock.

MIOSHA General Industry Safety Standard Part 2, Floor and Wall Openings, Stairways and Skylights provides guidance to employers who have employees who could be injured by falling from, into or through walking or working surfaces. Restaurant employees entered the storage area to retrieve needed items. The uncovered sump pump crock was in the walking path of the employee. The sump pump crock meets the MIOSHA definition of a floor opening. Rule 205(4) of Part 2 defines a "Floor Opening" as an opening measuring 12 inches or more in its least dimension, in a floor, platform, pavement or yard, through or into which persons, material or equipment may fall, including but not limited to a hatchway, stair or ladder opening, pit or large manhole. MIOSHA Rule 215 (2) (a-c) describes acceptable methods to cover the floor opening. On the day of the MIFACE visit, the cleaning equipment was being stored in the storage area, and an employee needed to walk by the uncovered sump pump crock to get the mop bucket and mop. A copy of the rule is enclosed with this report.

- Employers should develop and enforce written work procedures, including general electrical safety-related work practices.

The sump pump used at the restaurant is considered to be a cord- and plug-connected piece of equipment, i.e. powered by electrical current. The sump pump used was submersible. Water is a very good conductor of electricity. If the sump pump became

energized by a break in the cord insulation or if there was damage to the method of “grounding” the sump, the person reaching into the water could become part of the electrical circuit and experience an electrical shock or perhaps be electrocuted.

The restaurant owner should establish safe work practices to provide employee protection from unintended/unexpected motion, energization, start-up or release of stored energy from the equipment, when he/she is performing repair, maintenance and associated activities on equipment, processes or machines. To protect employees from these machine hazards, MIOSHA adopted the provisions of 29 C.F.R. §1910.147 entitled “Control of Hazardous Energy Sources (Lockout/Tagout) at MIOSHA General Industry Safety Standard Part 85, the Control Of Hazardous Energy Sources.

Although the victim was not performing repair or maintenance activities in the sump crock, when he reached into the sump pump crock with the sump pump energized, he potentially exposed himself to an electrical shock. It is prudent practice to eliminate potential electrical hazards when working around water. Prior to entering the crock for any purpose, the sump pump should be unplugged to eliminate the potential for electrocution.

The employer did not have written safe work practices for cleaning the restaurant. One aspect of the job procedure would be how to dispose of any cleaning solution and how/where cleaning equipment should be stored. The alarm monitoring company suggested the repeated activation of the high water alarm sensor could be due to emptying the cleaning solution into the crock or when water flowed over the sensor. The police report stated that the victim had used the sump crock opening in the past to drain the mop bucket and dry out the mop head, perhaps activating the sensor alarm. Work practices by the victim may have contributed to the repeated sensor activation, and thus the delay to investigate the cause of the sump alarm.

REFERENCES

MIOSHA Standards cited in this report can be directly accessed from the Consumer and Industry Services, MIOSHA website www.michigan.gov/mioshastandards.

The Standards can also be obtained for a fee by writing to the following address: Department of Consumer and Industry Services, MIOSHA Standards Division, P.O. Box 30643, Lansing, MI 48909-8143. MIOSHA phone number is (517) 322-1845.

1. MIOSHA Occupational Health Standard, Part 490, Permit-Required Confined Space Entry, adopted by reference 29 C.F.R. §1910.146 “Permit Required Confined Spaces”.
2. MIOSHA General Industry Safety Standard Part 2, Floor and Wall Openings, Stairways and Skylights.
3. MIOSHA General Industry Safety Standard Part 85, Control of Hazardous Energy Sources, adopted by reference 29 C. F. R. §1910.147 “Control of Hazardous Energy (Lockout/Tagout).

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10/9/03

MIFACE

Investigation Report # 01 MI 064

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Please rate the following on a scale of:

Excellent	Good	Fair	Poor
1	2	3	4

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1	2	3	4

Was the report...	Excellent	Good	Fair	Poor
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