

Case 336. 48-year-old plumber/pipefitter died when methane gas emitted from an active sewage digester tank was ignited by another contractor's cutting torch while conducting demolition work in a digester tank.

A 48-year-old male plumber/pipefitter died when methane gas emitted from an active sewage digester tank was ignited by another contractor's cutting torch while conducting demolition work in a digester tank. The incident occurred at the secondary digester tank that was in the process of being demolished. The 60-foot diameter cylindrical tank had exterior walls measuring 18.5 feet from the ground to the top of the wall. The 450,000 gallon secondary digester had a floating lid made mostly of steel, but had a wood "lid" which permitted gases to escape. This lid was engineered to move up and down according to the level of wastewater in the tank and was used to hold in the methane gas as well as other harmful gases. The lid weighed approximately 100,000 pounds and rode on steel vertical rails attached to the interior of the tank walls. In the center of the lid was a hub located 30 feet from the interior walls. The secondary digester had approximately 150,000-200,000 gallons of wastewater in it at the time of the incident. The decedent and an employee from another demolition firm (Employee #2) were in the process of demolishing the tank, which had an active sewage flow. The lid had two open manholes and other cracks from demolition which allowed gases to escape while hot work was being performed. The decedent had used a cutting lance to remove the floating lid. The guiderails were rigged (hooked) to a 50 ton crane for removal while being torched to cut them free of the digester tank's walls. Employee #2 was cutting the bolts using a torch on the center hub. The decedent was walking on the surface of the tank next to the exit ladder while sparks and slag was sprayed onto the digesters lid. Employee #2's cutting torch ignited the methane gas that had accumulated under the lid and was escaping from cracks and open man holes. The resulting explosion propelled the lid approximately eight to ten feet into the air. The decedent was thrown out of the digester and landed outside of the tank, while Employee #2 was propelled up but stayed inside the digester when the lid dropped back into the digester. Emergency response transported both workers to the hospital, where the decedent died of his injuries approximately one hour after the incident.

MIOSHA Construction Safety and Health Division issued the following alleged Serious citation at the conclusion of its investigation.

SERIOUS: GENERAL RULES, PART 1, RULE 1114(1):

An accident prevention program was not developed, maintained, and coordinated with employees. ---

The company's accident prevention program is not being coordinated with employees. Employees are performing mechanical demolition.

SERIOUS: WELDING AND CUTTING, PART 7

- RULE 711(2):

Welding operations were permitted in the following situations:

(a) In an area not authorized by the building or structure occupant.

(b) In a sprinklered building while the sprinkler system was impaired, without a fire watch being provided.

(c) In the presence of a potentially explosive atmosphere, such as mixtures of flammable gases, vapors, liquids, or dusts with air.

Employees are performing cutting operations in work area that contains explosive gasses. Employees are performing plumbing and mechanical work.

- RULE 713(1):

Before the start of a welding operation in a confined space, the atmosphere was not tested and recorded.

Employees are performing hot work in a confined space without the atmosphere tested and recorded. Employees are performing plumbing and mechanical work.

- RULE 761(2):

Cracks or openings through which sparks could pass in the floor or wall that are within 35 feet of a welding operation were not covered with a fire-resistant material. ---

Employees are performing hot work where cracks and holes were not covered. This digester contains approximately 200,000 gallons of sewage and sludge. Employees are performing plumbing and mechanical work and hot work.

- RULE 761(3):

A wood floor within 10 feet of a welding operation shall be protected by either wetting down, covering with sand, or covering with a fire-resistant material. ---

Employees are performing hot work and not protecting the wood floor and area. Parts of the digester exploded and exposed wooden flooring. Employees are performing plumbing and mechanical work and hot work.

SERIOUS: FIRE PROTECTION, PART 18, RULE 184 (1):

A fire protection and prevention program is not developed or being maintained during all phases of construction to reduce the chance of fire and injury to employees. ---

Employees are performing hot work and demolition work without maintaining a fire prevention and protection plan.

SERIOUS: DEMOLITION, PART 20

- RULE 2031(1)(a):

It was not ensured that all of the following were done before the start of a demolition operation:

(a) An engineering survey of the structure and equipment is conducted by a competent person knowledgeable in demolition to determine all of the following:

- (i) The condition of the foundation, roof, walls, and floors.
- (ii) Whether any adjacent structure will be affected by the demolition.
- (iii) The utility service entered the building.
- (iv) Any other conditions and equipment affecting the safety of an employee.

Employees are engaged in demolition work without a demolition survey in place.

- RULE 2031(8):

Daily inspections were not made to detect hazards and unsafe conditions during demolition. ---

Employees are working in a confined space where daily inspections and testing to discover hazards and unsafe conditions were not performed.