MAI-2014-19

UNITED STATES
DEPARTMENT OF LABOR
MINE SAFETYAND HEALTH ADMINISTRTION
Metal and Nonmetal Mine Safety and Health

REPORT OF INVESTIGTION

Underground Nonmetal Mine
(Salt)

Fatal Powered Haulage Accident
September 26, 2014

United Salt Corporation
Hockley Mine
Hockley Texas, Harris County, Texas
Mine ID No. 41-02478

Investigators

Laurence M. Dunlap
Supervisory Mine Safety and Health Inspector

Jim B. DoByns
Mine Safety and Health Inspector

Jonathan Hall
Mechanical Engineer

Mark W. Lipe
Mine Safety and Health Specialist (Training)

Originating Office
Mine Safety and Health Administration
South Central District
1100 Commerce Street, Room 462
Dallas, Texas 75242
Michael Davis, District Manager


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09/26/2014 15:45

OVERVIEW

On September 26, 2014, Mark G. Benoit, Mechanic, age 55, was killed while performing maintenance on a forklift in a mill building. Benoit was adjusting the directional solenoid on the transmission from the ground when the forklift began to move forward, pinning him between a wooden support pillar and the forklift's Falling Object Protective Structure (FOPS).

The accident occurred due to management's failure to ensure that persons performed repairs and maintenance on a forklift with the power turned off and the equipment blocked against hazardous motion. The forklift's engine was running when the operator left the seat and performed maintenance on the directional solenoid that controls the transmission. Additionally, the parking brake was not set and the wheels were not chocked to prevent movement. The victim was not effectively protected against hazardous motion.

GENERAL INFORMATION

Hockley Mine, owned and operated by United Salt Corporation, is a single level room and pillar underground mine located near Hockley, Texas. The principal operating official is Mark F. Wiggins, Mine Manager. Fifty-six persons are employed at the mine. Sixteen persons work underground in two 10 hour shifts per day, 5 days per week. Forty persons work on the surface in three 8-hour shifts per day, 5 days per week. The surface of the mine consists of several buildings including a mill/warehouse (mill building), a maintenance shop, a hoist house, and other offices.

Salt is mined by drilling and blasting. Rooms are 60 feet wide and 18 to 20 feet high. Pillars are 90 feet wide and 120 feet long. After blasting, the salt is loaded into a 22 ton haul truck that transports the salt to the primary crusher where it is crushed into four products; coarse salt, medium salt, stock salt, and feed mix salt. The products are stored underground until needed when it is hoisted to the surface and processed in bulk, sacks, or blocks for shipment. During the processing phase, sacked salt and salt blocks can also have additional minerals added prior to packaging. A majority of the salt is shipped in bulk trucks.

The Mine Safety and Health Administration (MSHA) completed the last regular inspection at this operation on August 28, 2014.

DESCRIPTION OF ACCIDENT

On the day of the accident, September 26, 2014, Mark G. Benoit (victim) clocked in at the mine at 5:50 a.m. Benoit was employed as a surface mechanic and typically inspected the forklifts at the mill building at the beginning of his shift as he did on the day of the accident.

At approximately 6:45 a.m., Jose G. Lopez, Mineral Mixer Operator, told Benoit that the forklift he had operated the night before became inoperable and could not travel in either forward or reverse. The forklift was parked on the east side of the mill building, facing east. Benoit walked to the forklift to begin repairs. At approximately 6:50 a.m., he got a can of lubricant from Jose A. Rodriguez, Block Press Operator, who was working nearby. Benoit then was able to tram the forklift in reverse for approximately 86 feet. As he turned the forklift to the south, it became wedged against a wooden support pillar and the forklift stopped. Although the engine was still operating, the machine would not move.

Benoit began repair work on the forklift in its wedged position against the wooden pillar. He removed the floorboard to access the directional solenoid attached to the transmission. Benoit stood on the left side of the forklift between the support pillar and the forklift's FOPS while attempting to change the direction of the forklift by tapping on the solenoid cylinder. When Benoit tapped the cylinder in the forward direction, the forklift moved forward, pinning him between the support pillar and the forklift's FOPS.

Rodriguez was working nearby, heard a noise, and then turned to see Benoit pinned. He attempted to free Benoit but could not move the forklift. Rodriguez left to retrieve another forklift to pull the forklift backwards to free Benoit. He notified Roger Ramirez, Mineral Mixer Operator, of the accident. At approximately 7:08 a.m., Rodriguez and Ramirez pulled the forklift backwards, freeing Benoit.

David Gonzales, Mill Supervisor, arrived at 7:10 a.m. and began Cardiopulmonary Resuscitation (CPR) on the victim with Ramirez assisting. At approximately 7:11 a.m., Gonzalo Perez, Forklift Operator, called 911.

At 7:25 a.m., the Waller County EMS arrived and took over the emergency procedures. James Jones, Waller County Supervisor, arrived and pronounced Benoit dead at 7:37 a.m. The cause of death was attributed to blunt trauma to the chest.

INVESTIGATION OF THE ACCIDENT

MSHA was notified of the accident at 7:16 a.m. on September 26, 2014, by a telephone call from Mark Wiggins, Plant Manager, to the National Call Center. The Call Center notified Joseph O. Steichen, Assistant District Manager, and an investigation started the same day. To ensure the safety of all persons, an order was issued under provisions of section 103(j) of the Mine Act. This order was later modified to section 103(k) of the Mine Act after the arrival of an Authorized Representative at the mine site.

MSHA's accident investigation team traveled to the mine, made a physical inspection of the accident scene, interviewed employees, reviewed documents and evaluated work procedures relevant to the accident. MSHA conducted the investigation with the assistance of mine management and employees.

DISCUSSION

Location of the Accident

The accident occurred just south of the block press in the mill building. The mill building has a flat cement floor.

Operation Procedures

Forklifts are located throughout the mill building. Two Toyota forklifts are primarily used to move pallets of salt. The TCM forklift involved in the accident is used as a backup machine to the other forklifts. Typically, a mechanic inspects all of the forklifts at the beginning of the shift. Equipment operators also conduct a preoperational inspection of a forklift prior to operating it. When a forklift needs any maintenance and can be safely operated, it is driven to the maintenance shop for repairs.

Forklift

The forklift involved in the accident is a TCM model FD30T7. It is a self-propelled, diesel powered, forklift truck with solid rubber tires and is used to move and stack pallets. The machine, manufactured in December 2006, has a maximum travel speed of 12 mph and can lift up to 6,000 lbs.

The forklift is equipped with a parking brake and a service brake. The parking brake is controlled by a lever on the dashboard. The forklift has three pedals of standard automotive orientation. From left to right, they are: the clutch or inching pedal, the brake pedal, and the throttle pedal. The forklift has one forward gear and one reverse gear. An electric gear shifter is on the steering column with forward, neutral, and reverse settings.

Operational Checks of the Forklift

The forklift is equipped with a neutral start feature; when the gear selector is in forward or reverse, the forklift engine will not start. At the time of the investigation, once the machine was started and the brakes released, it was found that the forklift moved forward regardless of the setting of the gear shift. The investigators also found that the parking brake was out of adjustment. A noncontributory citation was issued.

The investigators determined that tapping on the exposed plunger of the directional control valve allowed the forklift to move in the desired direction. Once the direction was manually changed with this method, the machine moved in this direction regardless of the setting of the gear selector. Additionally, the engine would start in forward or reverse gear after the plunger was manually manipulated, which defeated the neutral start feature. The investigators also found that a 10 amp fuse for the transmission was blown due to the defective solenoid.

After a new solenoid operated directional control valve was installed, the forklift moved in the direction the shift lever was set and would not start in gear. The

adjustment screw on the parking brake was adjusted and the forklift stayed in place when in neutral on the steepest slope it traversed.

The steering and hydraulic controls were tested and functioned properly.

Summary of Physical Factors

1. The parking brake was out of adjustment. After adjustment, it held on the steepest grade it was used on when the engine was in neutral.
2. The parking brake held the machine in place in reverse but did not hold against the creep function in forward with the engine idle and the service brake released.
3. The solenoid operated directional control valve remained in the last position it was in despite the position of the gear shift.
4. The electrically actuated neutral start interlock verified the position of the gear shifter, not the actual gear setting of the transmission.
5. The solenoid operated directional control valve in the forklift at the time of the accident did not return to center, negating the neutral start feature.
6. The machine functioned properly when the blown fuse and the solenoid operated directional control valve were replaced and the parking brake was adjusted.

Weather

The weather on the morning of the accident consisted of clear skies with a temperature of 68° Fahrenheit. Weather was not considered to be a factor in the accident.

TRAINING AND EXPERIENCE

Benoit had approximately 1 year and 49 weeks of mining experience all at this mine. A representative of MSHA's Educational Field Services staff conducted a review of the mine operator's training plan and records. The required training for Benoit was up to date and in compliance with 30 CFR Part 48 requirements.

ROOT CAUSE ANALYSIS

The investigators conducted a root cause analysis and identified the following root cause:

Root Cause: The accident occurred due to management's failure to ensure that persons performed repairs and maintenance on a forklift with the power turned off and the equipment blocked against hazardous motion. The unblocked forklift exposed the victim to hazards associated with the potential movement of the machine.

Corrective Action: Management developed safe work procedures for blocking mobile equipment against hazardous motion before persons perform maintenance. Miners were tasked trained to follow these new procedures.

CONCLUSION

The accident occurred due to management's failure to ensure that persons performed repairs and maintenance on a forklift with the power turned off and the equipment blocked against hazardous motion. The forklift's engine was running when the operator left the seat and performed maintenance on the directional solenoid that controls the transmission. Additionally, the parking brake was not set and the wheels were not chocked to prevent movement. The victim was not effectively protected against hazardous motion.

ENFORCEMENT ACTIONS

Issued to United Salt Corporation

Order No. 6315046 -- issued on September 26, 2014, under the provisions of section 103(j) of the Mine Act:

> *An accident occurred at this operation on 09/26/2014 at approximately 7:10 a.m. This order is being issued, under section 103(j) of the Federal Mine Safety and Health Act of 1977, to assure the safety of all persons at this operation. This order is also being issued to prevent destruction of any evidence which would assist in investigating the cause or causes of the accident. It prohibits all activity around the area where the forklift involved in the in the accident is located in the mill building and the forklift itself until MSHA has determined that it is safe to resume normal mining operations in this area. This order was initially issued orally to the mine operator at 7:40 a.m. and has now been reduced to writing.*

The order was modified to a 103(k) order after an Authorized Representative arrived at the mine. This order was terminated on November 18, 2014, after the condition that contributed to the accident no longer existed.

Citation No. 6315047 -- under the provisions of Section 104(a) of the Mine Act for a violation of 56.14105:

> *A fatal accident occurred at this operation on September 26, 2014 when a mechanic was crushed between a forklift and a mill support pole. Repairs and maintenance on the TCM FD30T forklift were being performed without the power turned off and the equipment blocked against hazardous motion. The forklift engine was running when the operator left the seat and performed maintenance on the directional solenoid that controls the transmission. The parking brake was not set, nor was the wheels chocked. The mechanic was not effectively protected against hazardous motion. The forklift moved forward striking the mechanic.*

Citation No. 6315048 -- issued under the provisions of Section 104(a) of the Mine Act for a violation of 56.14207:

> *A fatal accident occurred at this operation on September 26, 2014 when a mechanic was crushed between a forklift and a mill support pole. The mechanic exited the forklift without setting the parking brake and attempted to perform repairs from the ground. The forklift moved forward striking the victim.*

Approved: _____ Date: 12/15/14

Michael D. Davis
District Manager

Appendix A

Persons Participating in the Investigation

United Salt Corporation

Kyle Rash	Vice-President of Operations
Mark Wiggins	Plant Manager
Fred Martinez	Maintenance Supervisor
Katherine McKenzie	Legal

Texas United Management Corporation

Scott Whitelaw	Vice-President of Environmental Health and Safety
Maria Gallegos	Industrial Hygiene Manager

Mine Safety and Health Administration

Laurence M. Dunlap	Supervisory Mine Safety and Health Inspector
Jim B DoByns	Mine Safety and Health Inspector
Jonathan Hall	Mechanical Engineer
Mark W. Lipe	Mine Safety and Health Specialist (Training)

Appendix B

Accident Investigation Data - Victim Information
Event Number: 6 6 0 4 9 1 3

U.S. Department of Labor
Mine Safety and Health Administration

Victim Information: 1

1. Name of Injured/Ill Employee:	2. Sex	3. Victim's Age	4. Degree of Injury:
Mark G. Benoit	*M*	*55*	*01 Fatal*

5. Date(MM/DD/YY) and Time(24 Hr.) Of Death:	6. Date and Time Started:
a. Date: 09/26/2014 b.Time: 7:37	*a. Date: 09/26/2014 b.Time: 7:05*

7. Regular Job Title:	8. Work Activity when Injured:	9. Was this work activity part of regular job?
004 mechanic	*039 Machine maintenance/repair*	Yes X No

10. Experience	Years	Weeks	Days		Years	Weeks	Days		Years	Weeks	Days		Years	Weeks	Days
a. This Work Activity:	*1*	*49*	*2*	b. Regular Job Title:	*1*	*49*	*2*	c: This Mine:	*1*	*49*	*2*	d. Total Mining:	*1*	*49*	*2*

11. What Directly Inflicted Injury or Illness?	12. Nature of Injury or Illness:
105 Forklift	*170 Crushing to chest*

13. Training Deficiencies:
Hazard: | New/Newly-Employed Experienced Miner: | Annual: | Task:

14. Company of Employment: (If different from production operator)	Independent Contractor ID: (if applicable)
Operator	

15. On-site Emergency Medical Treatment:
Not Applicable: | First-Aid: | CPR: X | EMT: | Medical Professional: | None:

16. Part 50 Document Control Number: (form 7000-1)

17. Union Affiliation of Victim: *9999* *None (No Union Affiliation)*