

UNITED STATES
DEPARTMENT OF LABOR
MINE SAFETY AND HEALTH ADMINISTRATION
Metal and Nonmetal Mine Safety and Health

REPORT OF INVESTIGATION

Surface Metal Mine
(Iron Ore)

Fatal Machinery Accident
June 8, 2007

Minorca Mine
Mittal Steel USA – Minorca Mine Inc.
Virginia, St. Louis County, Minnesota
Mine I.D. No. 21-02449

Investigators

James A. Hines
Mine Safety and Health Inspector

Phillip L. McCabe
Mechanical Engineer

Amy A. Lindgren
Mine Safety and Health Specialist

Originating Office
Mine Safety and Health Administration
North Central District
515 West First Street, Room 333
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Steven M. Richetta, District Manager



OVERVIEW

Donavon R. Dunblazier, technician/utility heavy equipment operator, age 49, was fatally injured on June 8, 2007, when the rubber-tired crane he was operating overturned. Dunblazier either jumped or fell from the cab and was pinned under the crane. At the time of the accident, the victim was being trained to operate the crane.

The accident occurred because the procedures used to train a person to safely operate a crane were not effective. The trainer did not remain in immediate contact at all times while task training the victim. The outriggers and stabilizer jacks on the crane were not utilized; the weight of the lift exceeded the crane manufacturer's design lifting capacity on rubber, and the crane's tires were under-inflated for lifting on rubber.

GENERAL INFORMATION

Minorca Mine, a surface iron ore (taconite) milling operation, owned and operated by Mittal Steel USA – Minorca Mine Inc., was located in Virginia, St. Louis County, Minnesota. The principal operating official was Jonathan H. Holmes, operations manager. The mine normally operated three, 8-hour shifts a day and seven days a week. Total employment was 338 persons.

Iron ore was mined from a multiple bench open pit. The material was then crushed and milled in a multiple step process. Iron was separated from the processed taconite ore and the iron rich concentrate added to a binder and rolled to form pellets. The finished heat-hardened pellets were shipped and sold for steel manufacturing.

The last regular inspection of this mine was completed on March 28, 2007.

DESCRIPTION OF ACCIDENT

On the day of the accident, Donavon R. Dunblazier (victim), reported for work at 7:00 a.m., his normal starting time. Dunblazier, who had been receiving task training to operate a crane, was assigned to operate the crane and remove de-watering pumps and steel waterlines to prepare the pit for blasting. Henry W. Sande, senior operator technician, was to conduct the task training. Thomas R. Swanson, Richard C. Saari, and Michael D. Long, millwrights, were assigned to assist with these tasks.

Dunblazier drove the crane to the work site, arriving about 8:00 a.m. He used the crane three times, deploying the outriggers each time, to lift water pumps and set them on a flatbed truck for removal from the area. The crew then removed three, 80-foot sections of 12-inch steel pipe from the pit sump waterlines. Each lift of pipe consisted of two 40-foot sections joined with a coupler.

About 10:50 a.m., the blast was made, the all clear signal was given, and the crew returned to the area and discovered that a 40-foot section of pipe needed to be replaced because the flyrock damaged it. Sande observed Dunblazier set up the crane and complete two lifts without deploying the crane's outriggers. One lift was performed to remove the damaged section of pipe. The replacement pipe was lowered into position in the second lift.

Saari used a truck to pull two 80-foot sections of pipe downhill. Dunblazier set the crane in position near the sections of pipe that Saari moved but did not deploy the crane's outriggers. As Dunblazier was positioning the crane, Sande left the area, walking up the hill to move his vehicle because it was blocking the road and a front-end loader needed to leave the area. The crane's outriggers weren't deployed as one of the 80-foot sections of pipe was rigged and

connected to the crane's boom hook. The pipe was lifted and Swanson connected it to the existing pipeline while Long guided it from the opposite end.

At approximately 12:00 p.m., Sande drove back down the hill, exited his vehicle, and quickly walked over to the open, left side door of the crane. He told Dunblazier that the outriggers should be used for the lift. Dunblazier questioned the need for outriggers based on the weight of the pipe. Sande again told Dunblazier to lower his outriggers and walked to the other side of the crane to see if the unit's non-weight wheels remained on the ground. The crane's motor began to accelerate as Sande turned to see the crane's boom begin to telescope out. He then yelled "Boom down! Boom down!" as the crane began to slowly overturn. He backed away from the machine as Dunblazier either attempted to jump or fell from the crane's open door. As the crane settled on its side, the boom returned to the center position. Sande went back around the crane and found Dunblazier pinned beneath the crane's cab.

Saari witnessed the accident and used a CB radio to call for emergency medical assistance. Sande crawled into the crane cab and shut off the engine as other employees arrived. Cardiopulmonary resuscitation (CPR) was administered until emergency medical personnel arrived. Dunblazier was transported to a local hospital where he was pronounced dead. The cause of death was attributed to multiple blunt force trauma.

INVESTIGATION OF ACCIDENT

On the day of the accident, the Mine Safety and Health Administration (MSHA) was notified at 12:45 p.m., by a telephone call from Jaime L. Baggenstoss, environmental and safety, to MSHA's emergency hotline. Gerald D. Holeman, assistant district manager, was notified and an investigation was started the same day. An order was issued pursuant to Section 103(k) of the Mine Act to ensure the safety of miners.

MSHA's accident investigation team traveled to the mine, conducted a physical inspection of the accident site, interviewed employees, and reviewed conditions and work procedures relevant to the accident. MSHA conducted the investigation with the assistance of mine management, employees, and miners' representative.

DISCUSSION

Location of the Accident

The accident occurred on the de-watering pit road. The road led from the upper benches to the pit floor where the sump and de-watering pumps were located. The crane was positioned approximately midway down the road that had an approximate one percent grade and was composed of dry well- packed ground

material. Global Positioning System (GPS) elevations taken at the estimated location of the crane tires prior to the accident indicated that the crane may have been positioned in an area that was approximately five percent slope out of level. This position would have the left front tire of the crane at the lowest elevation.

Weather Conditions

The weather at the time of the accident was partly cloudy and 60 degrees Fahrenheit with 9 to 20 mile per hour winds. Weather was not considered a factor in the accident.

Mobile Crane

The crane involved in the accident was an Omega, Model No. 20 crane manufactured by P&H Harnischfeger in 1984. It was a rough terrain, self-propelled, mobile hydraulic unit rated at 20 tons capacity. The crane super structure consisted of a rotating turntable, a 62-foot, three section hydraulically powered boom, a 3-sheave hook-block, a single lifting hoist, and operator's cab. The crane carrier was equipped with deep lug tires, four-wheel drive and four-wheel steering. The crane was not provided with a load-moment-indicator shutdown device but was equipped with an anti-two block device.

An outrigger with a stabilizer jack was located on each corner of the carrier. Each outrigger consisted of a horizontal extendable outrigger box beam, a vertical stabilizer jack attached to the end of the beam, and an outrigger float attached to the bottom of the stabilizer jack. These stabilizer jacks/outrigger beams were provided for leveling the crane and stabilizing the lifting platform.

Manual control valves, located in the operator's cab, were used for machine operation. The controls for operating the outriggers were located on the right side console and consisted of four pairs (eight total) of electrical toggle switches. Each switch pair activated the extension or retraction of the individual horizontal outrigger beams and the extension or retraction of the individual vertical outrigger jacks.

Crane Post-Accident Condition

After the accident, the crane was on its left side with the partially extended and raised crane boom resting on top of the pipeline. Nylon web slings were attached to the pipeline and to the hook-block. The outriggers were not extended and the stabilizer jacks were not lowered. The superstructure cab and surrounding crane structures had minimal damage.

Crane Specifications

The crane manufacturer provided specific stipulations regarding the load lifting capacity of the crane. In part, the manufacturer's label in the cab specified the load rating capacities, without using the stabilizer jacks, depended on the capacity and condition of the tires. Information also provided in the cab's jib load chart indicated that the weight of hooks, hook blocks, slings, and other load handling devices needed to be factored for the lift being made. The hook block on the crane weighed 360 pounds. The manufacturer specified "The rated capacity of a crane is determined with the crane leveled within 1% of grade (1 foot drop or rise in 100 foot distance). Out of level more than 1% will drastically reduce the lifting capacity."

Tire Pressures

The manufacturer specified a tire pressure of 80 pounds per square inch (psi) to obtain the maximum load capacity when lifting loads on the crane's tires. The tire pressures were measured at approximately 60 psi on three tires and 58 psi on the left rear opposite the weighted lifting side.

Lifted Load

At the time of the accident, the victim was attempting to move two 40-foot sections of 12-inch inside diameter steel pipe connected together, weighing 1,238 pounds. These two sections of pipe were fastened to the main pipeline. The weight of this pipe and the hook block totaled 1,598 pounds.

The two sections of pipe were connected to the main pipeline and were not a freely-suspended load for weight lifting determination. As the crane boom was extended, the lift exceeded the manufacturer's specified 1,300 pound load limit capacity at the load radius range of 30 to 35 feet. The boom extension increased the load radius.

Training and Experience

Donavon R. Dunblazier (victim) had 30 years, 6 months of mining experience, all at this mine. He had received training in accordance with 30 CFR, Part 48, and had approximately 5 months experience as a technician/utility heavy equipment operator, operating many types of equipment. Dunblazier had received 16 hours of crane classroom training, 24 hours of hands-on training involving the operation of other types of cranes, and 9 hours of actual hands-on instruction for the subject crane prior to the accident. The first time he used the crane in a production lift occurred on the day of the accident.

Henry W. Sande had 30 years and 6 months of mining experience, with 17 years, 5 months experience on the job, as a senior operator technician, all at this mine. He had received training in accordance with 30 CFR, Part 48, and had

participated in numerous crane operations, including set-up and tear-down, for movement of the pumps and waterlines.

Thomas R. Swanson had 29 years and 11 months of mining experience, with 16 years, 9 months experience on this job as a millwright, all at this mine. He had received training in accordance with 30 CFR, Part 48, and had participated in numerous set-ups or tear-downs of pumps and waterlines.

Richard C. Saari had 30 years and 1 month of mining experience, with 4 years, 11 months experience on this job as a millwright, all at this mine. He had received training in accordance with 30 CFR, Part 48, and had participated in the set-ups and tear-downs of the pumps and waterlines.

Michael D. Long had 10 months of mining experience, with 2 months experience on the job as a millwright, all at this mine. He had received training in accordance with 30 CFR, Part 48. This was his first day moving pumps and waterlines.

ROOT CAUSE ANALYSIS

A root cause analysis was conducted and the following root causes were identified:

Root Cause: Management procedures and controls were ineffective and failed to ensure the task trainer remained in the immediate area to closely supervise the trainee during task training sessions.

Corrective Action: Management should implement a procedure to ensure that task trainers always remain in the immediate area of a trainee to maintain close supervision as training and work is conducted.

Root Cause: Management policy and controls were inadequate and did not ensure that crane operators followed correct procedures when making a lift. The crane was positioned on a grade without the outriggers and stabilizer jacks being deployed and with under-inflated tires.

Corrective Action: Management should implement a policy ensuring that when crane lifts are made, outriggers will be used and the crane will be operated within the manufacturer's design parameters.

CONCLUSION

The accident occurred because the procedures used to train a person to safely operate a crane were not effective. The trainer did not remain in immediate contact at all times while task training the victim. The outriggers and stabilizer jacks on the crane were not utilized; the weight of the lift exceeded the crane

manufacturer's design lifting capacity on rubber, and the crane's tires were under-inflated for lifting on rubber.

ENFORCEMENT ACTIONS

Order No. 6192940 was issued on June 8, 2007, under the provisions of Section 103(k) of the Mine Act:

A fatal accident occurred at the mine on June 8, 2007, when three millwrights and two equipment operators (one of which was being trained on the rubber-tired crane) were attempting to construct the de-watering line along the pipeline access road. This order is issued to assure the safety of all persons at this operation. It prohibits all activity in the barricaded area around the crane, the P&H Omega Crane, Serial # 50898, itself, and with the designated sections of waterline until MSHA has determined that it is safe to resume mining operations in this area. The mine operator shall obtain prior approval from an authorized representative for all actions to recover and or restore operations to the affected area.

The order was terminated on June 11, 2007. The conditions which contributed to the fatal accident no longer exist.

Citation No. 6197335 was issued on July 23, 2007, under the provisions of Section 104(a) of the Mine Act for violation of 30 CFR 48.27(a)(2)(ii):

A fatal accident occurred at this mine on June 8, 2007, when a crane tipped over, pinning the miner beneath the cab. The victim was being task trained regarding proper operation of the crane. The victim was not provided direct and immediate supervision as he performed some aspects of this task.

The citation was terminated on August 6, 2007. The mine operator established a policy requiring a trainer to remain in immediate contact with a mobile crane trainee at all times during task training. Work activity will cease if contact is broken.

Citation No. 6197337 was issued on July 23, 2007 under the provisions of Section 104(a) of the Mine Act for violation of 30 CFR 56.14205:

A fatal accident occurred on June 8, 2007, when a rubber-tired crane tipped onto its side and the miner was pinned beneath the cab. The lift was being initiated beyond the manufacturer's design lifting capacity due to a combination of factors that included a load exceeding the manufacturer's specification, work from a sloped surface, tires that were under-inflated, and the failure to utilize the

outriggers. The crane manufacturer's design lifting capacity, when lifting from the side without outriggers at this radius, was 1,300 pounds. The load being lifted exceeded this weight.

The citation was terminated on August 6, 2007. The mine operator conducted a meeting with personnel involved in pit de-watering pipeline movement and informed them of the mandatory use of mobile crane outriggers. The procedures to relocate pit de-watering pipelines will be reviewed by a certified mobile crane trainer. The miners were notified that prior to mobile crane usage, the tire pressures must be checked to ensure they are within the manufacturer's recommendations.

Approved By:

Date:

Steven M. Richetta
District Manager
North Central District

APPENDIX A

Persons Participating in the Investigation

Mittal Steel USA – Minorca Mine Inc.

Jonathan H. Holmes	operations manager
Gustav R. Josephson, Jr.	manager of safety and environmental

United Steel Workers of America

Ray L. Pierce	president
Gerald A. Knaeble	safety representative
David J. Mlakar	health, safety and environmental advisor

St. Louis County

Barry B. Lesar	mine inspector supervisor
Paul T. Wier	mine inspector

Mine Safety and Health Administration

James A. Hines	mine safety and health inspector
Phillip L. McCabe	mechanical engineer
Amy A. Lindgren	mine safety and health specialist

Accident Investigation Data - Victim Information



Event Number: 1 0 0 5 5 9 9

Victim Information: 1

1. Name of Injured/Ill Employee: Donavon R. Dunblazier	2. Sex M	3. Victim's Age 49	4. Last Four Digits of SSN:	5. Degree of Injury: 01 Fatal
6. Date(MM/DD/YY) and Time(24 Hr.) Of Death: a. Date: 06/08/2007 b. Time: 12:05			7. Date and Time Started: a. Date: 06/08/2007 b. Time: 7:00	
8. Regular Job Title: 163 Technician/Utility Heavy Equipment Optr		9. Work Activity when Injured: 072 Crane operation		10. Was this work activity part of regular job? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
11. Experience a. This Work Activity: 0 0 6		b. Regular Job Title: 0 20 0		c. This Mine: 30 20 0
12. What Directly Inflicted Injury or Illness? 076 Crushed by crane as it overturned		13. Nature of Injury or Illness: 170 Crushing		
14. Training Deficiencies: Hazard: New/Newly-Employed Experienced Miner: Annual: Task: <input checked="" type="checkbox"/>				
15. Company of Employment:(If different from production operator) Operator			Independent Contractor ID: (if applicable)	
16. On-site Emergency Medical Treatment: Not Applicable: First-Aid: <input checked="" type="checkbox"/> CPR: <input checked="" type="checkbox"/> EMT: Medical Professional: None:				
17. Part 50 Document Control Number: (form 7000-1)			18. Union Affiliation of Victim: 9000 Other not listed	

Victim Information:

1. Name of Injured/Ill Employee:	2. Sex	3. Victim's Age	4. Last Four Digits of SSN:	5. Degree of Injury:
6. Date(MM/DD/YY) and Time(24 Hr.) Of Death:			7. Date and Time Started:	
8. Regular Job Title:		9. Work Activity when Injured:		10. Was this work activity part of regular job? Yes <input type="checkbox"/> No <input type="checkbox"/>
11. Experience: a. This Work Activity:		b. Regular Job Title:		c. This Mine:
12. What Directly Inflicted Injury or Illness?		13. Nature of Injury or Illness:		
14. Training Deficiencies: Hazard: New/Newly-Employed Experienced Miner: Annual: Task:				
15. Company of Employment: (If different from production operator)			Independent Contractor ID: (if applicable)	
16. On-site Emergency Medical Treatment: Not Applicable: First-Aid: CPR: EMT: Medical Professional: None:				
17. Part 50 Document Control Number: (form 7000-1)			18. Union Affiliation of Victim:	

Victim Information:

1. Name of Injured/Ill Employee:	2. Sex	3. Victim's Age	4. Last Four Digits of SSN:	5. Degree of Injury:
6. Date(MM/DD/YY) and Time(24 Hr.) Of Death:			7. Date and Time Started:	
8. Regular Job Title:		9. Work Activity when Injured:		10. Was this work activity part of regular job? Yes <input type="checkbox"/> No <input type="checkbox"/>
11. Experience: a. This Work Activity:		b. Regular Job Title:		c. This Mine:
12. What Directly Inflicted Injury or Illness?		13. Nature of Injury or Illness:		
14. Training Deficiencies: Hazard: New/Newly-Employed Experienced Miner: Annual: Task:				
15. Company of Employment: (If different from production operator)			Independent Contractor ID: (if applicable)	
16. On-site Emergency Medical Treatment: Not Applicable: First-Aid: CPR: EMT: Medical Professional: None:				
17. Part 50 Document Control Number: (form 7000-1)			18. Union Affiliation of Victim:	