

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

Report of Investigation

Surface Nonmetal Mine
(Sand and Gravel)

Fatal Machinery Accident

August 21, 2003

Delight Plant
Hanson Aggregates West, Inc.
Delight, Pike County, Arkansas
I.D. No. 03-01587

Investigators

Wyatt S. Andrews
Supervisory Mine Safety and Health Inspector

James M. Page
Mine Safety and Health Inspector

Charles M. Morrison
Mine Safety and Health Inspector

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Mechanical Engineer

Originating Office
Mine Safety and Health Administration
South Central District
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Overview

On August 21, 2003, Daniel R. Young, mechanic, was fatally injured when he was struck by a 30 feet long section of conveyor suspended from a rubber tired mobile crane. Young was standing near the crane that was lifting the conveyor on a lowboy trailer. While the load was being positioned, the crane became unstable and tipped over. The falling load struck the victim.

The accident occurred because the procedures used to load the conveyor were inadequate. Persons were not positioned clear of the suspended conveyor. The weight of the load exceeded the rated lift capacity of the crane with the outrigger configuration used at the time of the accident.

General Information

Delight Plant, a surface sand and gravel mine, owned and operated by Hanson Aggregates West, Inc., was located in Delight, Pike county, Arkansas.

The Delight plant had been permanently closed in January, 2001, thirty one months prior to the accident. Prior to that time, sand and gravel had been mined from a single bench pit using drag lines. It was then loaded directly into a mobile track mounted hopper, conveyed to a primary crusher, crushed and conveyed to the plant for processing into construction sand and various sizes of gravel. The finished product had been sold to the construction industry.

After the Delight Plant was closed, an existing stockpile was sold to the Pike County Road Department. Intermittently, Pike County used their front end loaders to load material on to county trucks.

The persons, who were salvaging equipment at the Delight Plant at the time of the accident, worked at the Hanson Aggregates West, Inc., Little River Plant ID# 03-01541. The principal operating official at the Little River Plant was Luther D. (Daryl) Grimes, plant manager.

The last regular inspection for this operation was completed on August 23, 2000.

Description of the Accident

On August 21, 2003, Daniel R. Young, (victim) reported for work at the Little River Plant at 6:00 a.m., his normal starting time. After a meeting with Luther D. Grimes, supervisor, Young, Grimes, and Gregory L. Terry and Donald R. Troup, utility persons left the Little River Plant and drove to the Delight Plant, arriving about 7:45 a.m.

The crew was assigned to complete the task of dismantling a feeder conveyor along with a mobile track mounted hopper and loading it on a lowboy trailer. A Hanson Aggregates' truck driver, Ronnie B. Holloway, had already arrived at the pit area and had spotted a lowboy type trailer.

Grimes assigned Young to replace a fuel switch on the Grove RT518 rubber tired crane that was to be used to load the equipment. The crane was repaired by about 9:00 a.m. and the crew began loading sections of the hopper on the trailer. Grimes was

operating the crane and loaded the lower track section of the hopper on the trailer. The upper bin section had previously been placed adjacent to the roadway along the south side.

The crew then rigged the 30 feet long feeder conveyor, which was located about 50 feet from the trailer. Grimes lifted the conveyor and placed the drive end on the front frame structure of the crane to help stabilize it. He noticed that the left front tire of the crane appeared to be under inflated. Grimes then lowered the two front stabilizer jacks to a position a few inches above the ground in an attempt to stabilize the crane before he drove it approximately 50 feet to the loading site. There was just enough clearance between the upper bin section and dirt bank/wooded area for the crane to move into position behind the trailer.

At 11:00 a.m., as the crane was being moved into position, the lowboy trailer was backed to the loading site. Troup was positioned on the off operator (north) side of the crane while Young, Holloway and Terry were standing on the operator (south) side. Grimes extended the boom and swung the conveyor to place it on the trailer.

During this process, one end of the conveyor swung toward the operator's side of the crane which was slightly downhill. The crane became unstable and tipped over on the operator side. Terry fell to the ground as the conveyor passed over him. Young turned and started to run, but the edge of the conveyor struck and pushed him to the ground.

The employees rushed to Young but he was non-responsive. They began cardio pulmonary resuscitation and called for emergency assistance. Young was transported to a local hospital where he was pronounced dead. Death was attributed to crushing injuries.

Investigation of the Accident

Wyatt Andrews, supervisory inspector, Little Rock, Arkansas field office, was notified of the accident at 1:06 p.m. on August 21, 2003, by Herschel R. GGeo, regional production manager, Hanson Aggregates West, Inc. An investigation was started the same day. MSHA accident investigators traveled to the mine, made a physical inspection of the accident scene and equipment involved in the accident, interviewed employees, and reviewed conditions and work procedures relevant to the accident. MSHA conducted the investigation with the assistance of mine management and employees.

Discussion

Accident Location

The accident occurred on the haulroad that was parallel to the pit. In the area where the equipment was being loaded, the roadway was relatively flat, about 9 feet wide, and sloped slightly towards the pit.

Overland Conveyor

An overland conveyor had been in place between the haul road and the pit (south of roadway) with a track mounted mobile hopper which moved to different locations along the conveyor. The conveyor had been dismantled and sections of the structure were located at various places alongside the roadway. The mobile hopper had also been previously dismantled into three sections and placed alongside the roadway. The bin section had been placed about 10 feet from the bank south of the roadway. The 30 feet long, section of conveyor was located about 50 feet east of the feeder bin.

Access

A wooded area, with a two feet high bank, was located adjacent and north of the roadway.

A lowboy type trailer had been spotted on the roadway on the south side of the upper bin. The track section and some metal bracing material had been loaded on the trailer from the front end with the crane.

Crane

The crane was a Grove Model RT518, rough terrain mobile hydraulic crane. The nominal rated capacity was 18 tons. It was equipped with 28 feet to 70 feet three section full power main boom. A Caterpillar 3208, V-8 diesel engine rated at 121 horsepower, coupled to a Clark powershift six-speed transmission with PTO, provided the prime mover power and hydraulic pump power.

The outrigger system consisted of front and rear hydraulic telescoping box beams which would extend from eight feet to seventeen feet, center to center, with 5.5 inch diameter by 21 inch long full stroke double acting vertical jacks with float pads, one outrigger on each corner. The outrigger system was functional. The front and rear outrigger beams were completely retracted. The rear jacks were completely retracted in the upper most position; however, the front stabilizer jacks were extended down to a few inches off the ground. The front jacks had been used in the lowered position to stabilize the load due to the under inflated tire.

The swing brakes for the crane consisted of three separate and independent systems. These systems included a foot activated multiple disc swing brake, an electric/hydraulic swing parking brake, and a hand operated plunger type house lock. When tested, the systems were functional. The wiring to the swing parking brake switch had been altered by placing a jumper wire from a positive terminal in the electrical panel fuse block to one side of the single pole toggle switch. The jumper permitted the swing parking brake to function.

The toggle switch was installed in an opposite orientation, according to the permanent labeling on the cab console. When the toggle switch was in the disengaged position, the swing park brake was actually engaged. When the toggle switch was in the engaged position, the swing park brake was actually disengaged.

The load chart, anti-two-blocking system, and boom angle indicator pendulum were missing from the crane. The crane was equipped with four 16.00 X 25 rough terrain deep lug rubber tires. The crane operator indicated that the air pressure in left front tire appeared low.

The crane boom radius was measured at 19 feet 6 inches and had been swung more than 6 degrees to the left of the center line of the crane with a 12,000 pound conveyor load.

Feeder Conveyor

The conveyor, which was being maneuvered at the time of the accident, had the drive unit with the conveyor belt and rollers installed as a complete unit. The nominal size of the conveyor was 31 feet 9 inches long, 65 inches wide and 25 inches high. The conveyor and harness had a combined total weight of approximately 12,000 pounds.

The conveyor was rigged using a four-point wire rope harness that was factory made with four open hooks connected to the wire rope on one end. The four ends were then connected to a master link. The master link was attached to the crane hook and the four hooks were attached to the I-beam structures on the conveyor.

Training

Young had 8 years and 25 weeks of mining experience, all at the Hanson Aggregates West, Inc., Little River Plant. He had been a mechanic for the entire period. Young had received all of his training in accordance with CFR 30, Part 46.

ROOT CAUSE ANALYSIS

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

Causal Factor: A risk assessment to determine possible hazards and to establish safe work procedures was not conducted prior to the lift.

Corrective Action: Procedures should be established that require a risk assessment be conducted to identify and correct potential hazards associated with the task to be performed.

Causal Factor: The outriggers on the crane had not been properly extended prior to lifting and swinging the load.

Corrective Action: Establish procedures to ensure that equipment operators know and follow the manufacturer's requirements and recommendations. Equipment operators should consult the operator's manual for proper procedures prior to performing tasks.

Causal Factor: Instructions in the operator's manual were not followed prior to making the lift with the crane. The weight of the load being lifted was not within the manufacturer's specified lift capacity based on the positions of the outriggers.

Corrective Action: Procedures should be established that require equipment operators to be familiar with and use the manufacturer's load charts when loads are being lifted and moved.

Causal Factor: No procedures were in place to ensure persons were clear of suspended loads. The conveyor was not being loaded in a manner that protected persons from the hazard of the suspended load.

Corrective Action: Develop and implement safe crane operating procedures that ensure persons are protected from the hazards of working around suspended loads.

Causal Factors: Tag lines were not used to enable employees to guide the suspended load. When the section of conveyor began to move off center, the momentum caused the load to swing to the downhill side, which caused the crane to become unstable.

Corrective Action: Procedures should be established that provide a safe method for loading material on trailers utilizing cranes.

CONCLUSION

The accident occurred because the procedures used to load the conveyor were inadequate. The weight of the load exceeded the rated lift capacity of the crane with the outrigger configuration used at the time of the accident.

The front outriggers were not properly set, persons were not clear of the suspended load when the lift was made, and the left front tire on the crane was under inflated.

Enforcement Action

Citation No. 6254109 was issued on April 23, 2004, under the provisions of Section 104(d)(1) of the Mine Act for violation of 30 CFR 56.9201.

A fatal accident occurred at this mine on August 21, 2003, when a mobile crane overturned while loading a conveyor section on a lowboy trailer. The conveyor was being loaded in a manner that created a hazard to the persons on the ground when the conveyor shifted causing the crane to overturn. The foreman, who was operating the crane and supervising the operation, was an experienced crane operator. The foreman engaged in aggravated conduct constituting more than ordinary negligence in that he did not follow proper procedures while loading the conveyor. This violation is an unwarrantable failure to comply with a mandatory standard.

Order No. 6254110 was issued on April 23, 2004, under the provisions of Section 104(d)(1) of the Mine Act for violation of 30 CFR 56.16009.

A fatal accident occurred at this mine on August 21, 2003, when a mobile crane overturned while loading a conveyor section on a lowboy trailer. Persons had not been positioned outside of the path of the suspended section of conveyor. The foreman, who was operating the crane and supervising the operation, was an experienced crane operator. The foreman engaged in aggravated conduct constituting more than ordinary negligence in that while he was operating the crane he did not require the miners to stay away from the immediate area of the suspended load. This is an unwarrantable failure to comply with a mandatory standard.

Order No. 6254111 was issued on April 23, 2004, under the provisions of Section 104(a) of the Mine Act for violation of 30 CFR 56.14205.

A fatal accident occurred at this mine on August 21, 2003, when a mobile crane overturned while loading a conveyor section on a lowboy trailer. The crane was used beyond the designed capacity intended by the manufacturer in that the load exceeded lift capacity of the crane on rubber tires when the boom swung beyond 6 degrees of centerline and the outriggers were not used.

Order No. 6254112 was issued on April 23, 2004, under the provisions of Section 104(d)(1) of the Mine Act for violation of 30 CFR 56.16007(a).

A fatal accident occurred at this mine on August 21, 2003, when a mobile crane overturned while loading a conveyor section on a lowboy trailer. Taglines had not been used to steady and guide the suspended load. The end of the conveyor with the drive unit swung to the left of the crane operator, while suspended over the truck, just prior to the crane overturning. The foreman, who was operating the crane and supervising the operation, was an experienced crane operator. The foreman had instructed the miners to hold onto the conveyor frame with their hands for control of the load during the lift and carry to the trailer. The foreman engaged in aggravated conduct constituting more than ordinary negligence in that he was operating the crane and did not require the miners to utilize taglines to steady the suspended load. This violation is an unwarrantable failure to comply with a mandatory standard.

Approve by: _____ Date: April 23, 2004
Edward E. Lopez
District Manager

APPENDICES

1. Persons Participating in the Investigation
2. Persons Interviewed

APPENDIX A

Persons Participating in the Investigation

Hanson Aggregates West, Inc.

Herschel R. Geoo	regional production manager
David W. Pfile	safety director
Royce L. Ruddick	safety manager
Luther D. Grimes	production foreman

Mine Safety and Health Administration

Wyatt S. Andrews	supervisory mine safety and health inspector
James M. Page	mine safety and health inspector
Charles M. Morrison	mine safety and health inspector
Phillip McCabe	mechanical engineer

APPENDIX B

Persons Interviewed during the Investigation

Hanson Aggregates West, Inc.

Luther D. Grimes	production foreman
Gregory L. Terry	utility person
Donald R. Troup	utility person
Ronnie B. Holloway	truck driver