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

REPORT OF INVESTIGATION

Surface Nonmetal Mine
(Sand and Gravel)

Fatal Powered Haulage Accident
June 29, 2005

Oddee Smith & Sons, Inc.
Macedonia Pit
Brookhaven, Lincoln County, Mississippi
Mine I.D. No. 22-00548

Investigators

Donald B. Craig
Supervisory Mine Safety and Health Inspector

Joe R. Fritz
Mine Safety and Health Inspector

James L. Angel
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CATERPILLAR
JUL 1 2005

OVERVIEW

Gervarius M. Dickey, equipment operator, age 21, was fatally injured on June 29, 2005, when the pan scraper he was operating overturned, pinning him under the cab.

The accident occurred because policies, standards, and controls were not in place to ensure that a berm or similar impeding device was maintained on the elevated edge of the stockpile. The pan scraper brakes had not been maintained and the equipment operator was not wearing the provided seat belts which contributed to the severity of the accident.

GENERAL INFORMATION

The Macedonia Pit, a surface sand and gravel operation, owned and operated by Oddee Smith & Sons, Inc., was located adjacent to Macedonia Road in Brookhaven, Lincoln County, Mississippi.

The principal operating official was Joel O. Smith, president. The mine operated one 10-hour shift per day, five days per week. Total employment at this mine was nine persons.

Sand and gravel was extracted from the pit with a track excavator and transported to the plant stockpile by off road trucks and scrapers. A loader fed the material into the plant hopper where the sand was separated and slurried to a stockpile to drain.

The washed gravel was sized and stockpiled for sale or used by Oddee Smith & Sons, Inc.

The last regular inspection at this operation was completed June 15, 2005.

DESCRIPTION OF ACCIDENT

On June 29, 2005, Gervarius M. Dickey (victim) reported to work at 6:50 a.m., his normal starting time. Dickey and Jon Windham, scraper operators, inspected their scrapers and fueled them. They drove to the stripping area where they met Hubert Ramsey, dozer operator.

Normal stripping operations required the dozer to push the scrapers through the loading cycle to assist filling them. The scrapers then hauled the dirt material to the drive-over stockpile where the material was dumped as the pan traversed the length of the stockpile.

Stripping proceeded normally until 11:00 a.m. when Ramsey told Dickey and Windham to start another stockpile two hundred yards east of the previous stockpile. They dumped at the new location until 12:00 p.m. when they took a lunch break. After lunch, they continued stockpiling at the new location.

Ramsey was positioning his dozer to push Windham's scraper when he glanced toward the old stockpile. He saw Dickey's scraper overturn and Dickey fall from the cab. The scraper continued to roll over onto its left side, pinning Dickey underneath. Ramsey immediately drove to the accident site.

Windham observed the dozer moving toward the old dump area and saw the scraper on its side but couldn't see Dickey. Ramsey waved to Windham, stopped his machine, and ran to the overturned scraper.

Ramsey found Dickey on his back under the left rear portion of the Roll-Over Protective Structure (ROPS). He and Windham attempted to lift the scraper with the dozer and free Dickey but could not. Windham then phoned Paul Smith, co-owner, to report the accident.

Windham drove Ramsey's truck to the plant area to summon aid. He picked up Bryan Smith, front-end loader operator, and Raul Sosa, plant employee, and returned to the accident scene and with the additional help they freed the victim.

Emergency medical personnel arrived but could not revive Dickey. He was pronounced dead by the Lincoln County Coroner.

INVESTIGATION OF THE ACCIDENT

MSHA was notified of the accident at 1:50 p.m. (CST), on June 29, 2005, by a telephone call from Janice Smith, administrative assistant, to Wyatt S. Andrews, acting assistant district manager. An investigation was started the same day. An order was issued under the provisions of Section 103(k) of the Mine Act to ensure the safety of miners. MSHA's accident investigators traveled to the mine, made a physical inspection of the accident scene, 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 in the pit area on a finished stockpile that was approximately 384 feet long, 24 feet wide, and zero to 6 ½ feet high. The stockpile ran in a west to east direction. The stockpile was built with sand and gravel hauled from the pit by two pan scrapers. Routine procedure for building the stockpiles had the scrapers eject the material from the pan as they drove across the pile.

The pan scraper had accessed the stockpile from the east end and had traveled about 294 feet along the south edge of the stockpile where it overturned. At this area, the average width of the stockpile was 24 feet and the height was about 6 ½ feet. Berms, guard rails, or similar impeding devices had not been provided nor maintained along the edges of the stockpile.

Pan Scraper

The wheel tractor-scraper involved in the accident was a Caterpillar, model 621F, manufactured in 1995. The scraper weighed approximately 35 tons and had a maximum payload of 20 cubic yards. It was empty at the time of the accident.

The scraper was powered by a 327 hp Caterpillar model 3406C, 6 cylinder, turbocharged and aftercooled diesel engine connected to an automatic transmission with 8 forward speeds, neutral, and reverse.

The scraper was manufactured with a ROPS and equipped with seat belts. Both items were properly maintained.

The pan scraper was equipped with service, secondary, and parking brake systems but was not equipped with an optional retarder. A pedal in the operator's compartment supplied air pressure to the brake actuators (canisters) to engage the "S" cam-operated, expanding shoe, and drum service brakes at each of the scraper's four wheels. The front and rear wheel service brakes were independent circuits.

The secondary and parking brake systems engaged the same brake shoes at all four wheels as applied by the service brakes. However, this system applied the brakes by springs

contained in the secondary/parking brake section of the brake canisters. The secondary/parking brakes were released by using air pressure to compress the springs. The system had an anti-compounding feature that prevented application of the service and secondary/parking brake at the same time.

The secondary/parking brakes were applied by pulling out a brake control valve. Pushing the knob inward released the brakes. If the air pressure in the brake system fell below 40 pounds, the secondary/parking brake control automatically moved to the "apply" (out) position and applied the brakes. This system functioned as designed.

The scraper was initially inspected while turned on its side, and all wheels except the left front wheel were off the ground. The right front wheel and both rear wheels could be turned by hand. The braking system's air pressure gage read approximately 20 psi, and the secondary/parking brake control was in the apply (out) position. This indicated that, although the secondary/parking brakes were applied, the brake shoe linings of the wheels were not contacting the drums.

Initial inspection of the brake system found the air lines to both the service and secondary/parking brake sections of the right front brake canister were disconnected. A cap had been installed on the air line fitting that connected the parking brake section of the canister. Another cap had been installed on the outlet of the tractor relay valve to the air line for the service brake section of the right front brake canister. The end of the service brake air line had been disconnected from the relay valve and was taped to the relay valve. The components were covered with a build up of dirt and grease indicating that the condition had existed before the accident.

All the air lines to the left front brake chamber were in place. When the service brake was applied, the canister activated to apply the brake. The canister's stroke was measured and found to be 1-1/8". The canister had a maximum stroke of 3" and the slack adjuster had to be adjusted to 1.6" if the stroke was 2-1/2" or more.

The investigators found the air line to the rear brake air reservoir blocked by locking pliers clamped on the air line between the double check valve and the next check valve.

The pliers prevented air from being supplied to the rear brake system.

An audible air leak was heard in the area of the service brake valve, but no other air leaks were found. When the secondary/parking brake control was moved to the release position, only the left front brake canister functioned to release the brake. When the service brake pedal was applied, only the left front brake canister functioned to apply the service brake.

The air system was monitored for leaks after the engine was repaired. Investigators found that, with the air system pressurized to 118 psi and the engine off, air leaked out of the system at a rate of approximately 4 psi/min which was attributed to the audible and other small leaks in the system.

The pliers were removed from the air line to the rear brake air reservoir and air was heard filling the reservoir. Both rear brake canisters functioned to release and apply the brakes. However, when the service brake pedal was activated, air escaped from a hole in the service brake air line between the scraper's relay valve and the service brake section of the left rear canister at a rate of 70 psi/min.

Hydraulic power steering was provided by two double acting steering cylinders that could articulate the machine to an angle of 90° to either side.

Operational tests for steering wheel free play, steering wheel force, slip of steering wheel, and steering time were performed on the steering system. The test results indicated that the steering system did not contribute to the cause of the accident.

TRAINING AND EXPERIENCE

The victim had two weeks mining experience, all at this operation. He had received training in accordance with 30 CFR, Part 46.

ROOT CAUSE ANALYSIS

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

Causal Factor: Policies, standards, and controls were inadequate and failed to ensure that berms were maintained along the elevated edge of the stockpile.

Corrective Action: Procedures should be established that require berms to be maintained on elevated edges of stockpiles where material is dumped.

Causal Factor: Procedures were not in place to ensure that seat belts were worn when persons operated mobile equipment.

Corrective Action: Procedures should be established that require management to regularly check equipment operators to ensure seat belts are being worn.

Causal Factors: Procedures for performing a pre-operational inspection of the machine were not followed and failed to implement corrective actions in a timely manner. Three of four wheel brakes provided on the machine had been purposely disabled a month prior to the accident.

Corrective Action: Procedures should be established to ensure that pre-operational inspections of mobile equipment are conducted. The procedures should require self propelled mobile equipment with safety defects to be removed from service until repairs have been made.

CONCLUSION

Management policies and controls were inadequate. The mine operator failed to ensure that a berm or similar impeding devices were maintained on the elevated edges of the stockpile. The pan scraper brakes had not been maintained and the equipment operator was not wearing the provided seat belts which contributed to the severity of the accident.

VIOLATIONS

Order No. 6088405 was issued on June 29, 2005, under the provisions of Section 103(k) of the Mine Act:

> A fatal accident occurred at this operation on June 29, 2005, when a Caterpillar 621 pan scraper operating at the barn area of the pit overturned and crushed the operator. This order is issued to assure the safety of all persons at this operation. It prohibits all activity in the barn area of the pit until MSHA has determined that it is safe to resume normal mining operations in the 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.

This order was terminated on August 22, 2005. The conditions that contributed to the accident have been corrected and normal mining operations can resume.

Order No. 6101534 was issued on August 18, 2005, under the provisions of Section 104(d)(1) of the Mine Act for a violation of 30 CFR 56.14101(a)(3):

> On June 29, 2005, a fatal accident occurred at this operation when a pan scraper overturned, pinning the operator under the cab. The accident occurred when the scraper's wheels ran over the edge of a stockpile. All braking systems on the scraper were not maintained in a functional condition. Management was aware of the problem with the scraper's braking system for a month. Failure to maintain all braking systems on the scraper in functional condition constitutes more than ordinary negligence and is an unwarrantable failure to comply with a mandatory safety standard.

This order was terminated on August 31, 2005. The Co. No. J20, Caterpillar, model 621F pan scraper was removed from the mine. Prior to the pan scraper's removal, the brakes were not repaired by the mine operator. The mine operator was notified that prior to resuming mining activities with this pan scraper at another site, the condition must be corrected.

Order No. 6101535 was issued on August 18, 2005, under the provisions of Section 104(d)(1) of the Mine Act for a violation of 30 CFR 56.14100(c):

> On June 29, 2005, a fatal accident occurred at this operation when a pan scraper overturned, pinning the operator under the cab. The accident occurred when the scraper's wheels ran over the edge of a stockpile. Defects on the service brake system, including an in-operative low air pressure warning alarm were not corrected prior to operation. Failure to remove defective mobile equipment from service constitutes more than ordinary negligence and is an unwarrantable failure to comply with a mandatory safety standard.

This order was terminated on August 22, 2005. All employees were instructed to immediately report any defects which could make further operation of mobile equipment hazardous and to immediately remove the equipment from service and tag it out until repairs are made.

Citation No. 6101536 was issued on August 18, 2005, under the provisions of Section 104(a) of the Mine Act for a violation of 30 CFR 56.9301:

> On June 29, 2005, a fatal accident occurred at this operation when a pan scraper overturned, pinning the operator under the cab. The accident occurred when the scraper's wheels ran over the edge of a stockpile. A berm or guardrail had not been provided for approximately 300 feet along the edge of the stockpile where a five to eight feet drop off existed.

This citation was terminated on September 13, 2005. The mine operator has sloped the sides of the stockpile to an angle removing the hazard of over travel.

Approved by: _____ Date: _____
Michael A. Davis
Southeastern District Manager

APPENDIX A

Persons Participating in the Investigation

Oddee Smith & Sons, Inc.

Joel O. Smith	president
James Ronny Smith	vice president/safety
Danny Ray Falvey	gravel pit supervisor
Hubert Deering Ramsey	heavy equipment operator
Jon Blake Smith	heavy equipment operator
Dempsey Joe Hays	heavy equipment operator
Jeffrey Bryan Smith	heavy equipment operator
Bobby Glenn Reed	mechanic
Jereme C. Smith	road construction supervisor

Puckett Machinery Company

Floyd Macom	field technician

Mine Safety and Health Administration

Donald B. Craig	supervisory mine safety and health inspector
Joe R. Fritz	mine safety and health inspector
Terry E. Phillips	mine safety and health specialist
James L. Angel	mechanical engineer