

INTRODUCTION

This report is based on an investigation made pursuant to Section 103(a) of the Federal Mine Safety and Health Act of 1977, Public Law 91-173 (83 STAT. 742) as amended by Public Law 95-164 (91 STAT. 1290).

Karen Laverne Welker, general truckdriver, age 40, SSN 3520, was fatally injured at approximately 7:30 a.m. on February 12, 1986. Her head and the upper part of her body were crushed by a metal Dempster Dumpster trash container (Figure 1). She apparently was behind the open dumpster, preparing to clean out the suspended open container with a scraper, when the top portion of the container fell and crushed her. She was killed instantly. Welker had 7 years 8 months total mining experience with 2 years 5 months experience as a general truckdriver, all at this operation.

The Rolla, Missouri field office of the Mine Safety and Health Administration was notified of the fatality at 9:42 a.m., February 12, 1986, by a telephone call from Richard Murray, vice-president of production, for Lone Star Industries, Inc. An investigation was done on February 13, 1986.

Information for this report was obtained by examining the equipment at the site of the accident, and by interviewing company officials and persons familiar with operation of the dumpster equipment.

An MSHA-approved training plan was in place which was in compliance with 30 CFR Part 48. Welker had received refresher training through the State of Missouri on December 11, 1985. Task training had been done by an experienced truckdriver and the foreman. No record of the task training had been kept by the company. MSHA personnel were prohibited from enforcement of 30 CFR Part 48 training regulations at this operation.

GENERAL INFORMATION

Lone Star Quarry and Mill, owned and operated by Lone Star Industries, Inc. was a cement-producing operation at 2524 South Spriggs Street, Cape Girardeau, Cape Girardeau County, Missouri. Operating officials were Richard D. Murray, vice-president of production; Harry Philips, plant manager; and Doug Richards, safety and health coordinator.

A total of 172 employees worked three 8-hour shifts 7 days a week.

Limestone, the principal component of cement, was mined from a quarry by the multi-bench method. Conventional procedures were used for drilling and blasting.

At the quarry, broken rock was loaded with a front-end loader into rear dump haulage trucks and transported to a primary crusher where the material was

sized and conveyed either to a storage building or directly to the mill. In the mill, the rock was blended with other components to produce cement.

Participants in the investigation were:

Lone Star Industries, Inc.

Harry Philips, Plant Manager
Walter Sieberg, Foreman
Jeffery P. Lentz, Electrical and Maintenance Manager
Richard D. Murray, Vice-President of Production
Burl Medlock, Yard Foreman
Doug Richards, Safety and Health Coordinator
Ron Glaus, Miners' Representative
Delbert Phillips, Miners' Representative
Robert Brown, General Truckdriver

Mine Safety and Health Administration

James A. Ruble, Mine Safety and Health Inspector
Ernest D. Decur, Mine Safety and Health Inspector
Howard J. Lucas, Supervisory Mine Safety and Health Inspector
John S. Risbeck, Mining Engineer

The last regular safety and health inspection was conducted December 3-6, 1985.

PHYSICAL FACTORS INVOLVED

The equipment involved in the accident was a model LFW 303-H Dempster Dumpster mounted on a 1974 GMC 2-ton truck. The truck was in good general condition. The truck, with mounted dumpster and five metal containers, was purchased new by the company.

During the investigation the company produced documentation showing that mobile equipment operators conducted pre-shift inspections on their equipment before using it during a shift. A computer printout showing repair work done on the GMC truck and the Dempster Dumpster between 1/1/84 and 2/4/86 was also furnished. None of the inspection statements or repair data indicated that a problem associated with holding a container in the dumping position on the Dempster Dumpster had ever been noted or repaired. It appeared prior to this accident that the routine pre-shift inspection procedures done on the truck-dumpster vehicle were reasonably comprehensive, and that the more key items for operation of the vehicle were being checked such as brakes, lights, tires, gauges, etc. The results of this accident investigation indicate that the condition of a dumping hook on the dumpster unit, which was the only support for containers when they were dumped, should be included in the pre-shift inspection check.

The Dempster Dumpster consisted of a boom assembly, a subframe assembly, and a carriage assembly that were used to load and dump the metal container. Two hydraulic control levers were mounted on the truck cab floor for operating the dumpster unit. Robert L. Brown, another general truckdriver, operated the unit on Monday, February 10, 1986, without experiencing any mechanical problems.

The dumpster assembly and mechanisms, which were mounted on the rear of the truck and were constructed so that they could lift a metal refuse container, place the container on a carrying stand at the far rear of the dumpster for transport, and then dump the container at a disposal site. The dumpster assembly basically consisted of two side arm lifts with chains for raising containers from two lifting pins, one on each side of the hinged bottom of the container, and a hydraulic cylinder operated center ram with a tilted vertical member carriage on the end, for controlling the fore and aft position of a container (Figures 2 and 3).

The refuse container bottom opened downward from the rear lower edge around hinges along the lower front edge of the container (Figure 4). A bail attached to the upper front of the container was held in a dumping hook mechanism on the vertical carriage when the container was opened (Figures 5 and 6). When the hook secured the upper half of the dumpster container, lowering of the two arm lifts dropped the lower jaw of the action (bottom of the container) down against the back of the truck. A detail of the bail and hook arrangement together with a description of the operation is shown in Figure 7.

From this point on, it should be kept in mind that after the bail is in the dumping hook and the arm lifts are lowered to drop the floor of the container, the container is suspended solely by the hook mechanism. For this reason, the company had directed that personnel must not attempt to clean out containers suspended from the hook, or stand close to containers when so suspended. Company personnel and employees associated with trash disposal involving the truck-mounted dumpster were all emphatic that everybody involved understood that this company policy was a rule not to be disregarded, and that the rule had been covered with every operator during on-the-job training, and during safety meetings that the victim also attended. For an unknown reason, Welker dumped the container with the dumpster, and then with the dumpster container suspended off the dumping hook, drove about 10 feet forward and walked up beneath the upper open jaw of the container. She had a long, handled scraper in her hand and apparently was intent on probing at the inner surfaces of the container though the investigators could not see any debris to be probed. As the victim was standing under the left rear edge of the suspended container, the bail slipped off the hook, which had a broken and/or worn off tip (Figure 8). As the open container fell, it closed on the victim, crushing her head and chest at the left rear corner of the unit.

An important factor in this accident was probably that about 3/8 inch of the dumping hook was missing. The outer end of the hook was flat from apparently being broken and/or worn. The investigators concluded that somehow the bail of the container must have become balanced on the flattened, outer end of the dumping hook, possibly as the truck and container were jostled when the victim moved the truck forward over the rutted, frozen ground after dumping. During the investigation, all attempts to cause the above event to occur with actual reenactment failed to dislodge the bail from out of the dumping hook even when the truck was bounced vigorously over the ruts. All employees and supervisory personnel interviewed by the investigators said that it was company policy that the truck was not to be moved when a container was suspended from the dumping hook, and that personnel were made aware of the policy when they were trained to use the equipment by the experienced operators. None of the procedures and rules for operating the Dempster Dumpster were set down in writing, but all of

the persons interviewed were emphatic that company policy dictating that dumpster operators would never move the truck with containers suspended on the dumping hook, or stand close to suspended containers, were thoroughly covered with the operators during initial training and during safety meetings that they and the victim attended.

After interviewing persons associated with work utilizing the Dempster Dumpster, it was determined that personnel were taught mainly by the other operators about how to operate the dumpster equipment. The coverage of safety rules such as not moving the truck or not working close to the container when it was suspended by the dumping hook, was largely left up to the operator trainers.

From the ground elevation, it was not evident that the tip of the dumping hook was missing, and none of the company personnel associated with operation of the dumpster equipment were aware of that fact.

It should be mentioned that the dumpster manufacturer recommends that only the wrist pin of the dumping hook should receive lubrication and that lubrication should be a light film of oil. Additionally, the manufacturer recommends that no grease or oil should contact the shuttle of the hook because grease inside the shuttle guide walls will hamper rather than help operation of the device since the lubrication will trap grit and dust. The dumping hook is shown in Figures 6, 7, and 8. The investigators found the hook mechanism coated with grease. The investigators believe that at the time of the accident, the dumping hook mechanisms were working properly because they performed properly during all of the reenactment tests done the next day.

DESCRIPTION OF ACCIDENT

On February 12, 1986, Karen Laverne Welker, general truckdriver, reported for work at 7 a.m., her regular starting time. She was assigned to use the Dempster Dumpster to haul waste containers to the plant dump.

The first container to be hauled was in the clinker cooler area. This container was filled with clinker dust and coal dust. Welker was observed by Jeff Ford, electrical mechanical repairman and Don Schuete, control room attendant, leaving the clinker cooler area with the container. Robert Brown, another general truckdriver, saw her from his truck as she arrived at the dump and prepared to unload the dusts from the container. Brown was leaving the dump for the plant to pick up another load of material. When he returned to the dump with the next load, he observed that Welker's truck was still parked at the location he had observed earlier. Upon checking, Brown found Welker pinned in the rear left corner of the dumpster. The time was 7:45 a.m. Brown could see that Welker was badly injured and he could not get any response, so he drove back to the plant and notified Joe Cundell, relief foreman and Burl Medlock, yard foreman. At approximately 8 a.m., Cundell, Medlock and Doug Richards arrived at the accident site. The dumpster was parked facing north with the motor running. Welker was pinned in a kneeling position by the left rear corner of the dumpster. Richards checked for a pulse but there was none.

The Cape County Ambulance Service was contacted along with the Cape Girardeau Police Department and the Cape County Coroner Harold Cobb. At 8:35 a.m., the coroner pronounced Welker dead at the site.

CAUSE OF ACCIDENT

The primary cause of the accident was that the victim stood beneath the upper section of the open dumpster container while it was hanging by the bail of the dumping hook contrary to company rules and training received, with the result that she was crushed by the closing action when the bail left the hook and the container fell.

A likely contributing cause of this accident was the worn and/or broken dumping-hook tip, which may have permitted the container box-bail to first be held on the shortened, flat tip and then become released as the victim moved the container in some fashion while apparently attempting to clean it.

Another contributing cause of the accident may have been movement of the truck with the container suspended by the dumping hook, which was contrary to company rules and training received. This action by the victim may have been the event that permitted the bail to become unstably suspended on the flattened tip of the defective dumping hook.

CITATION ISSUED

The following citation was issued as a result of this investigation:

Citation No. 2664581 (104a)

Issued 04/03/86 at 1130 hours for violation of 56.16009:

A fatal accident occurred at this property on February 12, 1986, when the bail of a trash container for a truck-mounted Dempster Dumpster left the dumpster dumping hook which had a shortened, flat tip. The container fell and the closing action of the container crushed the victim. The victim had positioned herself beneath the suspended container after driving the truck about 10 feet forward over rutted, frozen ground with the container suspended solely by the dumping hook. Unpublished company operating rules prohibited persons from standing under a hook-suspended container or moving the vehicle with a container suspended from the dumping hook by the bail. In the future, the company operating rules for safe and proper operation of the dumpster vehicle and mounted equipment, will be provided for each dumpster operator in written form.

RECOMMENDATIONS

1. The company safety and health director has begun job safety analysis (JSA) studies on job tasks being done at this operation. This work should be continued at as fast a pace as possible.
2. The condition of the dumping hook on the Dempster Dumpster should be checked during pre-shift inspections to determine if it has been damaged.

3. Training received by personnel learning how to operate the dumpster equipment should be done in a more formal manner than in the past. The initial training should have more input by supervisors about all tasks concerning correct procedures that are rules because of safety considerations. Supervisors should make sure that their employees understand the reasons behind such kinds of rules concerning procedures.

4. The dumping hook mechanism of the Dempster Dumpster should be lubricated as recommended by the manufacturer. A light film of oil may be applied to the hook-pivot-wrist pin. No grease or oil should come in contact with the shuttle of the hook. Grease or heavy oil inside the shuttle guide walls will hamper rather than help operation of the mechanism.

5. The company rules for proper operation of the truck-mounted Dempster Dumpster equipment should be put down in writing and a copy of the rules should be given to each operator of the equipment.

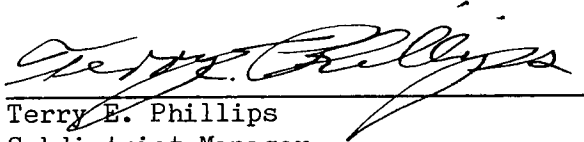
ACKNOWLEDGMENT

The investigators appreciated the courtesy and cooperation of all of the company personnel who participated in the investigation. The investigators particularly appreciated the professional way that Doug Richards, company safety and health coordinator, had assembled pertinent data that was needed to proceed with the investigation, before the investigators arrived.

Approved by:

/s/ James A. Ruble

James A. Ruble
Mine Safety and Health Inspector


Terry E. Phillips
Subdistrict Manager

/s/ Ernest D. Decur

Ernest D. Decur
Mine Safety and Health
Inspector

I concur:

/s/ Howard J. Lucas

/s/ Wayne D. Kanack

Howard J. Lucas
Supervisory Mine Safety and
Health Inspector

Wayne D. Kanack
District Manager

/s/ John S. Risbeck

John S. Risbeck
Mining Engineer

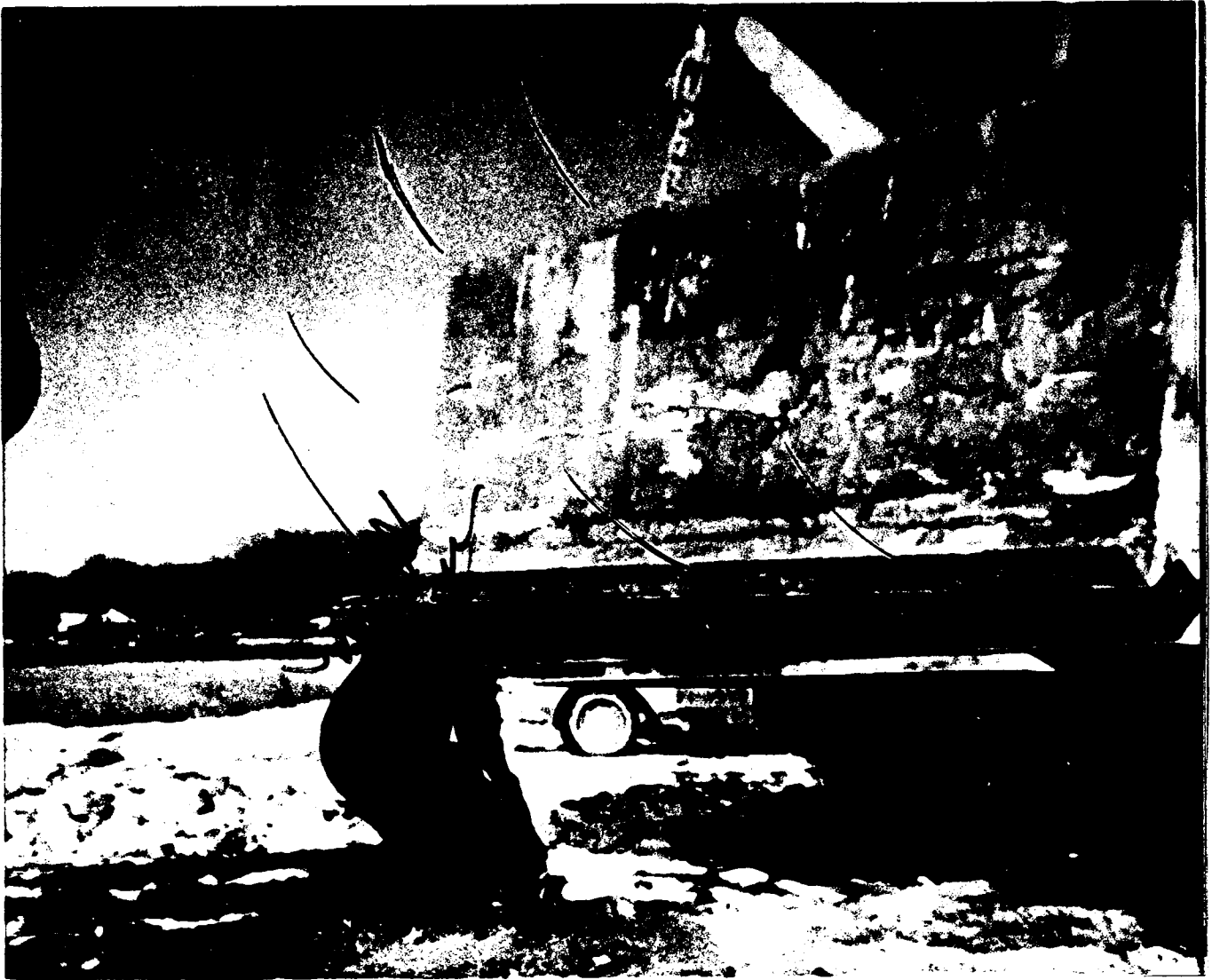


Figure 1. DEPICTION OF THE ACCIDENT



Figure 2. Center ram extended with the vertical member carriage in position for picking up the container.

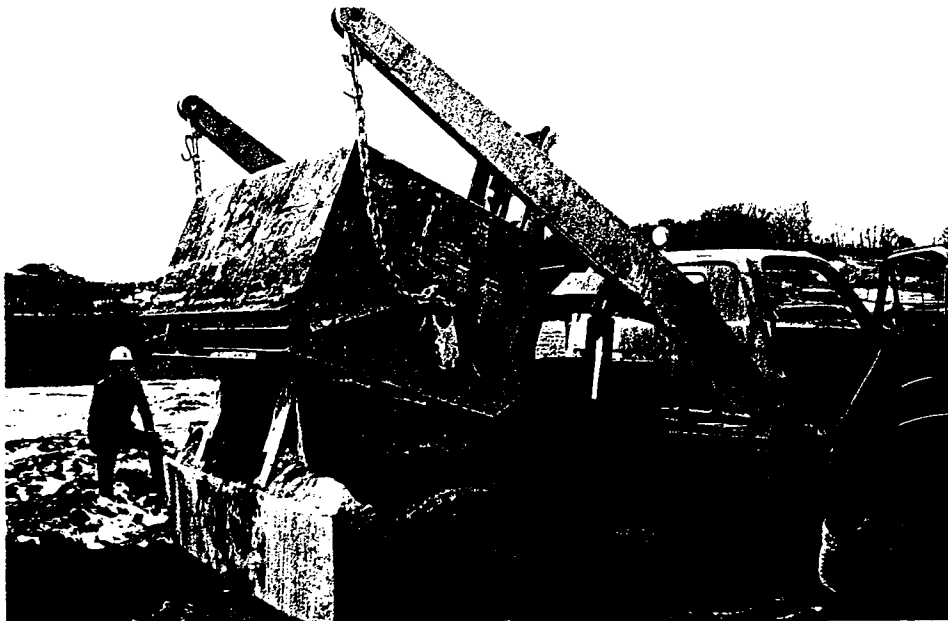


Figure 3. Center ram retracted with the vertical member carriage against the container which is resting on the transporting stand.



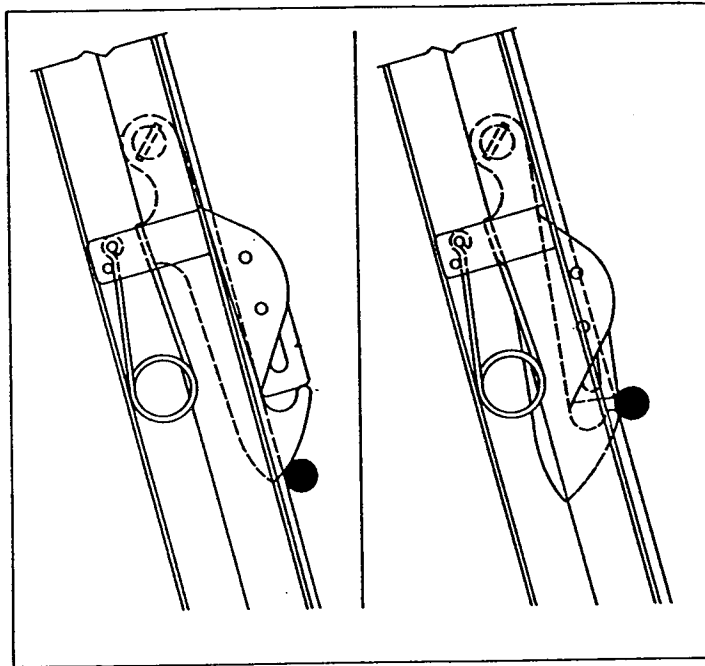
Figure 4. Container in the dump position, hanging off the dumping hook on the vertical member carriage by the bail.



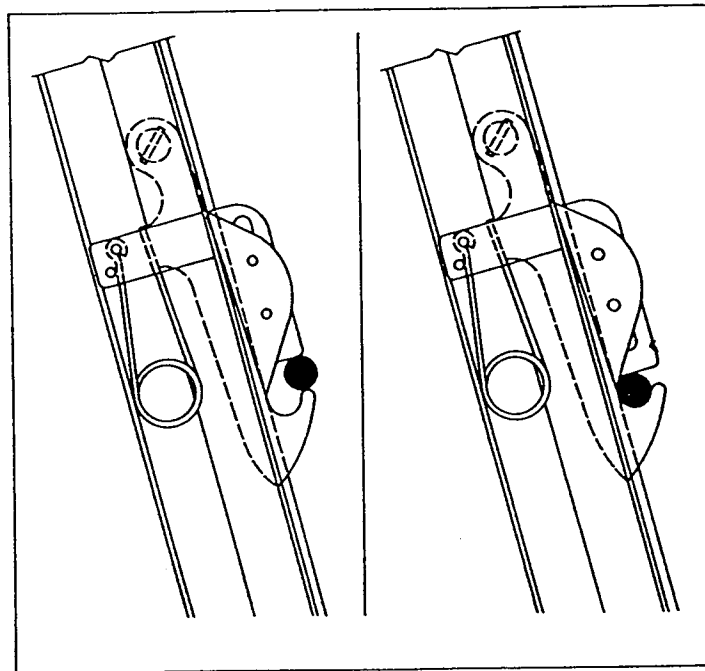
Figure 5. Container bail connected at the front-top-edge of the container.



Figure 6. View of the dumping hook mechanism. Note the wide gap between the broken hook tip and the shuttle piece in the slotted hook shank.



Lower the boom arms and attached container until the container bail is below the top dumping hook. Return the boom control to neutral for a moment, then reverse the control and slowly raise the boom. As the container slides up the face of the carriage, the container bail contacts the bottom of the dumping hook, pushing the hook back into the carriage.



As the bail rises, the dumping hook is further depressed, and the bail catches on the corner of the shuttle moving it upward. As the bail clears the end of the dumping hook, the counterbalancing springs snap the hook back in place engaging the the bail. The shuttle drops back on the bail and the container is locked to the dumping hook on the carriage. Return the boom control to neutral.

Figure 7. Dumping hook mechanism.

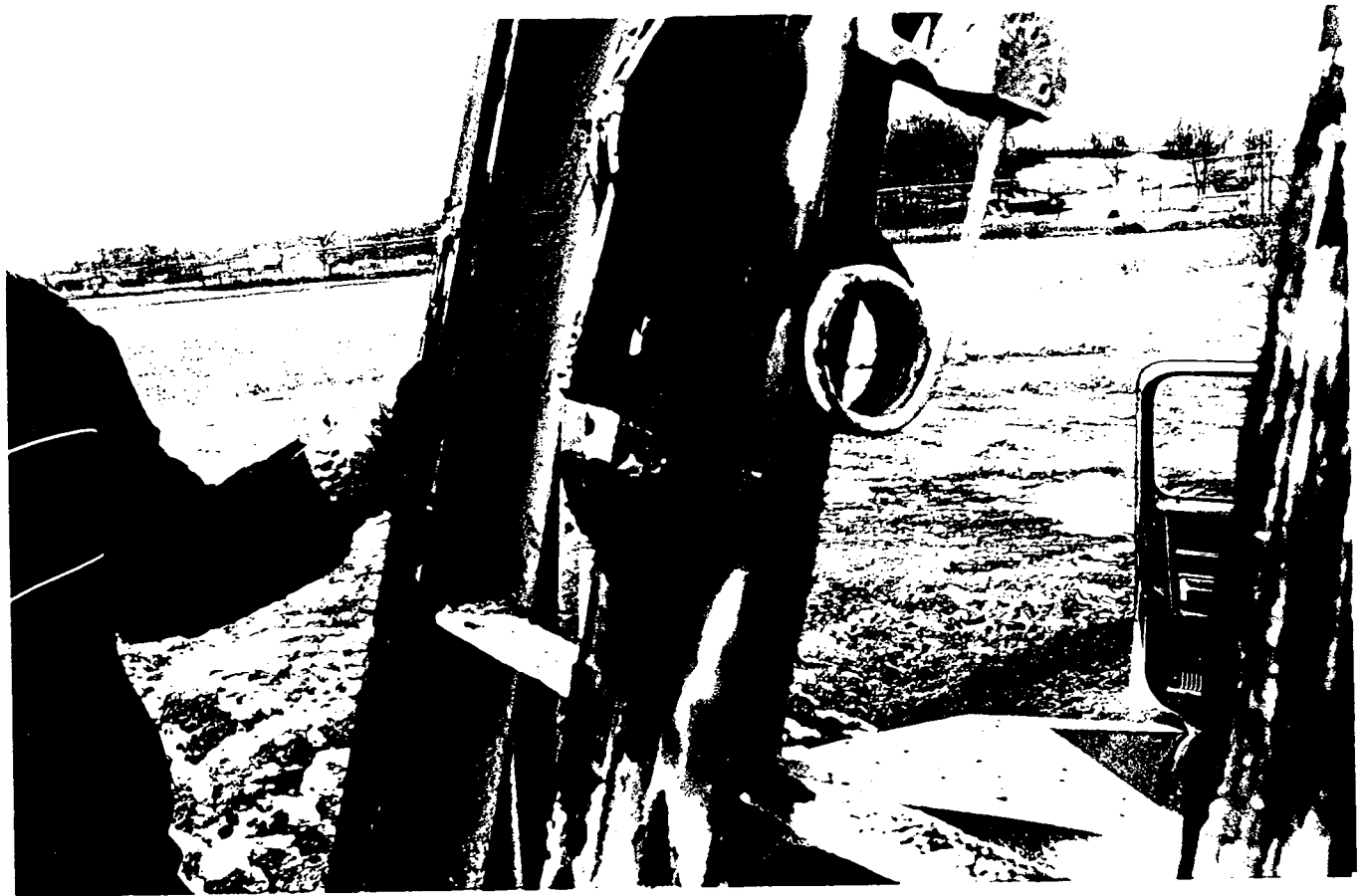


Figure 8. View of the dumping hook showing the short tip and the shuttle.

TRAINING DATA FORM

Mine I.D. No. 23-00134

SECTION II (Metal/Nonmetal and Coal)

The Mine Safety & Health Administration (MSHA) was prohibited from enforcement of 30 CFR Part 48 Subpart B at this operation. [X]

MSHA Training Programs Completed Name: _____

Date of Hire _____ Date Training Plan Approved _____

Required Training (Victim)	Date Training Received	Required Training (Victim)	Date Training Received
<input type="checkbox"/> New Miner (U.G.)	_____	<input type="checkbox"/> Hazard Training (U.G.)	_____
<input type="checkbox"/> New Miner (Sur.)	_____	<input type="checkbox"/> Hazard Training (Sur.)	_____
<input type="checkbox"/> Newly Employed Experienced (U.G.)	_____	Task Training Specify Type: _____ _____ _____ _____	_____
<input type="checkbox"/> Newly Employed Experienced (Sur.)	_____		_____
<input type="checkbox"/> Annual Refresher (U.G.)	_____		_____
<input type="checkbox"/> Annual Refresher (Sur.)	_____		_____

SECTION III

Company Training Program Completed:

TRAINING	OJT/FORMAL	INSTRUCTOR	DATE COMPLETED
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

SECTION IV

Did victim have training specifically related to the task being performed at the time of the accident? YES NO WHEN? _____

By Whom? _____ How was training given? _____

SECTION V

Recommend training plan evaluation by Education and Training Office? YES NO