

# Accident Investigation Report

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

REPORT OF FATAL FALLING EQUIPMENT ACCIDENT  
MINNTAC MINE  
UNITED STATES STEEL CORPORATION  
MOUNTAIN IRON, ST. LOUIS COUNTY, MINNESOTA

FEBRUARY 28, 1980

By

Leon J. Mertesdorf  
and

Arne E. Nasi  
Metal and Nonmetal Mine Inspectors

and

Edward A. Tekautz  
Supervisory Mine Inspector

Joseph B. Stepan  
District Manager

Originating Office  
228 Federal Building  
Duluth, Minnesota 55802  
Robert L. Moore  
Subdistrict Manager

## 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).

Shelly R. Salo, pit laborer, age 21, Social Security Number 475-82-7598, was fatally injured at 10:30 a.m., on February 28, 1980, when the base of an electric power cable support stand she was working near fell over pinning her underneath. The victim had 20 months of mining experience with the U. S. Steel Corporation, 5 of which were as a pit laborer. Salo was single with no dependents.

The Mine Safety and Health Administration Field Office at Hibbing, Minnesota, was informed of the fatal accident by a telephone call at 11:40 a.m., on February 28, 1980, by Steve Starkovich, acting safety supervisor. An investigation was started the same day. Information for this report was obtained by attending an investigative meeting, visiting the scene of the accident, and interviewing company officials and witnesses.

## GENERAL INFORMATION

The Minntac Mine, a taconite iron ore operation, was located at Mountain Iron, St. Louis County, Minnesota. The mine was owned and operated by Minnesota Ore Operations, a Division of U. S. Steel Corporation. Operating officials were: C. W. Niemi, general superintendent; M. D. Van Delinder, superintendent of taconite mining; and Steve Starkovich, acting supervisor of safety.

Employment in the mine totaled 2,102 persons on three, 8-hour shifts a day, 7 days a week.

Broken ore was loaded by electric-powered shovels with 14-cubic-yard-capacity buckets into 50-cubic-yard-capacity railroad cars and transported to the primary crusher. Overburden was stripped ahead of mining operations utilizing electric shovels and haulage trucks. Stripped material was transported to various waste dump areas.

Persons participating in the accident investigation were:

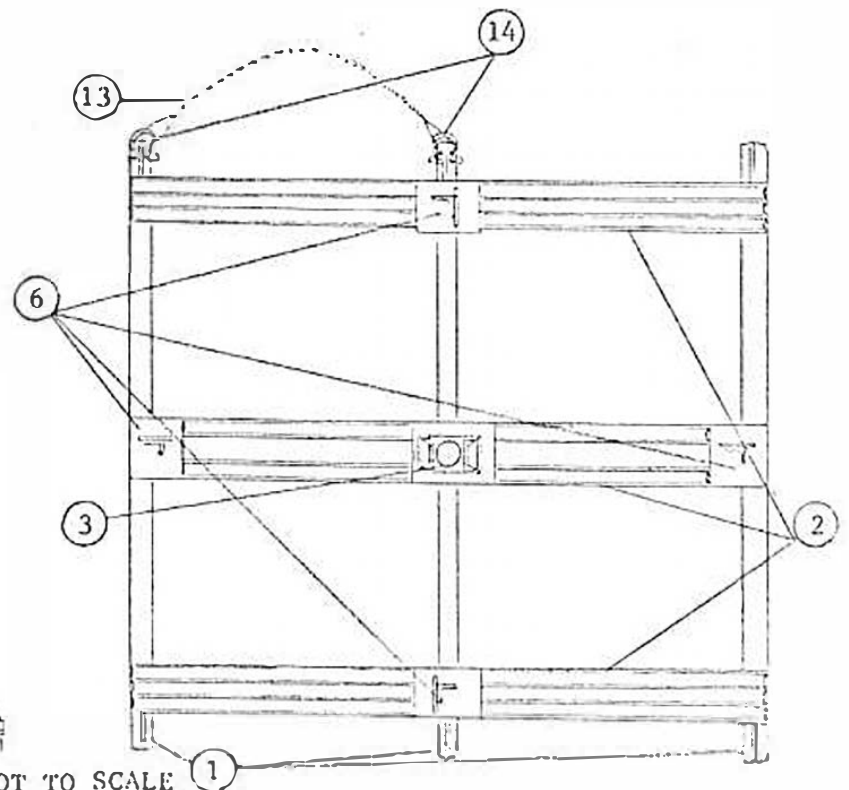
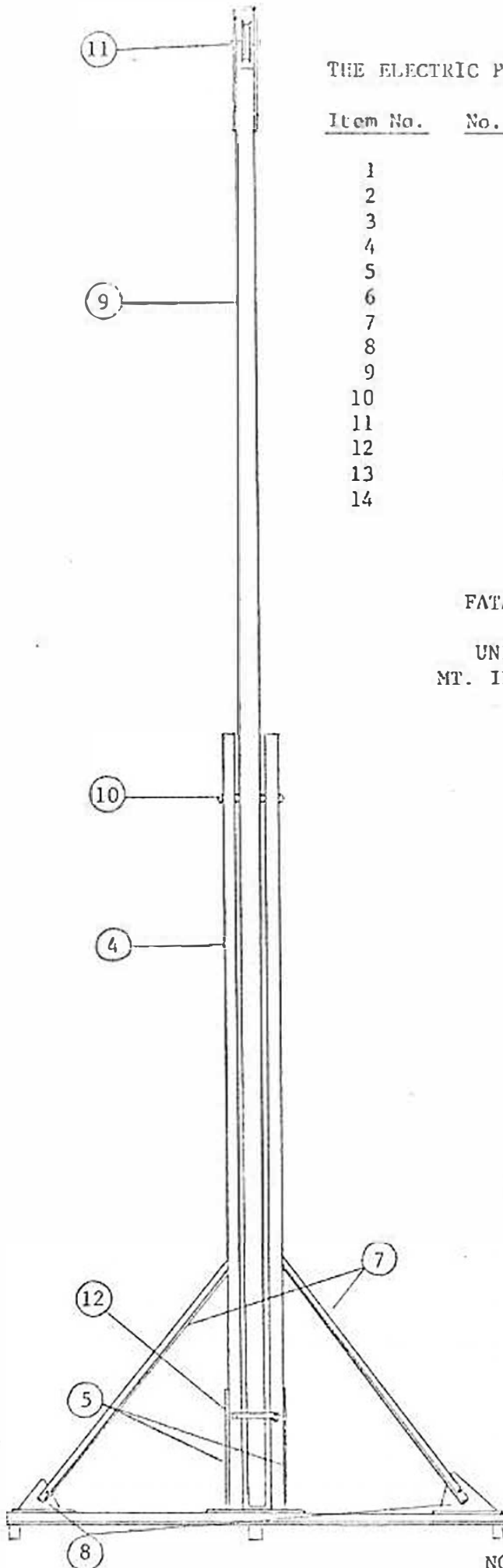
### U. S. Steel Corporation

C. W. Niemi, General Superintendent  
M. D. Van Delinder, Mine Superintendent  
D. Hestetune, Assistant Superintendent of Production  
S. Starkovich, Acting Supervisor of Safety  
R. Rantala, Safety Engineer  
J. Barmore, Safety Engineer  
E. Snidarich, Foreman (witness)  
M. Golden, General Foreman  
L. Rasen, Draftsman  
J. Brust, Tractor Operator (witness)  
W. Zavoral, Front-end Loader Operator (witness)  
T. Kuzma, Laborer (witness)  
R. Schrautmeyer, Laborer (witness)  
R. Paine, Laborer (witness)

# THE ELECTRIC POWER CABLE SUPPORT STAND

<u>Item No.</u>	<u>No. Pieces</u>	<u>Description</u>
1	3	Skid Rail
2	8	Base Top
3	1	Mast Base Plate
4	2	Mast Support
5	2	Mast Support Reinforcing
6	4	Anchor Pads and Gussets
7	4	Mast Support Braces
8	8	Connecting Bolts
9	1	Mast Pole
10	1	Pivot Pin
11	1	Sheave
12	1	Hinged Lock Plate
13	1	Tow Cable
14	2	Clevis w/pins

FATAL FALLING EQUIPMENT ACCIDENT  
MINNTAC MINE  
UNITED STATES STEEL CORPORATION  
MT. IRON, ST. LOUIS COUNTY, MINNESOTA  
FEBRUARY 28, 1980



NOT TO SCALE

United Steelworkers of America, Local 1938

W. Coombe, Acting Chairman, Safety Committee  
L. Claude, Co-Chairman, Safety Committee  
J. Dunstan, Safety Committeeman  
J. Gornik, Safety Committeeman

St. Louis County

D. Sandstrom, County Mine Inspector  
J. F. Pershern, Assistant County Mine Inspector  
B. Klemensich, Assistant County Mine Inspector  
S. J. Rojeski, Jr., Assistant County Mine Inspector

Mine Safety and Health Administration

E. Tekautz, Supervisory Mine Inspector  
A. Nasi, Metal and Nonmetal Mine Inspector  
L. Mertesdorf, Metal and Nonmetal Mine Inspector

The last regular inspection of this operation was completed on December 7, 1979.

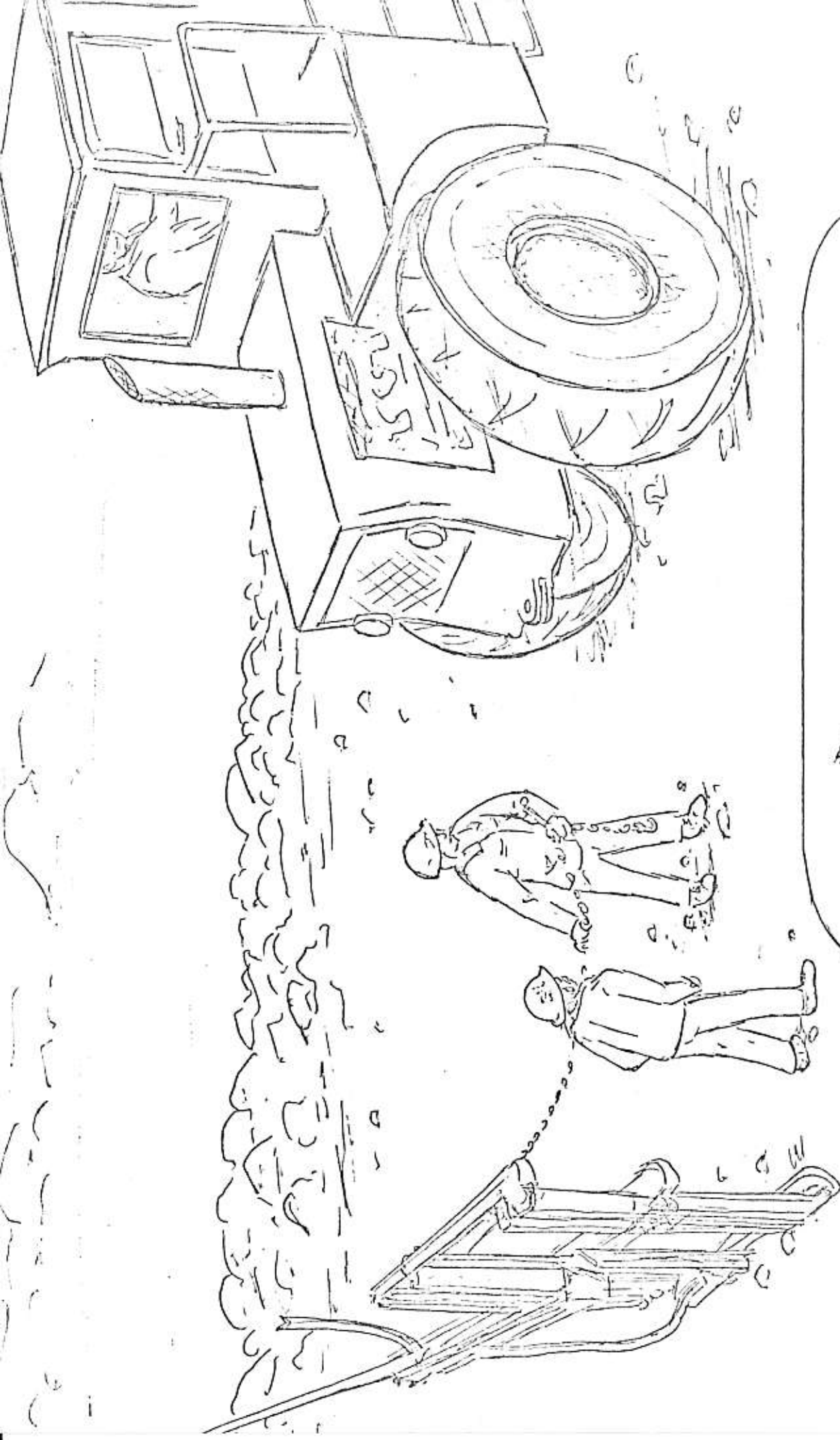
PHYSICAL FACTORS INVOLVED

Portable electric power cable support stands, locally called cable trees or cable stands, were utilized throughout the pit area for the purpose of elevating all types of power cables above haulage roadways to prevent contact and possible damage to the cables from vehicular traffic.

The 8-foot-square base of the company fabricated cable stand involved in the accident was of welded construction. The base of the stand consisted of eleven, 8-foot-long, 100 pound rails. Three equally spaced rails turned upside down served as skids for moving. Eight rails positioned with flanges down were welded across the skid rails. Three of the eight rails were welded side by side over each end of the skid rails and the other two rails were welded 8-inches apart over the centers of the skid rails. A mast plate 12-inches-wide, 14-inches-long, and  $\frac{1}{2}$ -inch-thick was welded on top of the two center rails at the center of the cable tree base. Two,  $\frac{3}{8}$ -inch-thick by 6-inches-wide by 13-foot-long channel irons were welded vertically to the mast plate, reinforced at the bottom by 2  $\frac{3}{8}$ -inches thick by 6-inches-wide by 2-foot long plates welded to the mast plate and bolted onto the 6-inch channel uprights.

Anchor pads with upright gussets measuring  $\frac{1}{2}$ -inch-thick by 10-inches-wide were evenly placed and welded on all four sides of the base. Four,  $\frac{3}{8}$ -inch-thick by 2-inches-wide by 6-foot-long angle iron braces were attached to the anchor pads and extended to the 13-foot, vertical-mast channel irons forming a four-way diagonal brace effect. The 2-inch angle iron braces were attached to the anchor pads and the 13-foot channel irons with  $\frac{1}{2}$ -inch by 3-inch-long bolts (two bolts per anchor point).

A 4-inch by 24-foot-long iron pipe was positioned vertically between the 13-foot channel irons and attached to the channel irons with a 1-inch by 9-inch-long pivot pin. The pivot pin was inserted through the middle of the channel irons and pipe 12-feet above the mast anchor plate. An 8-inch sheave was



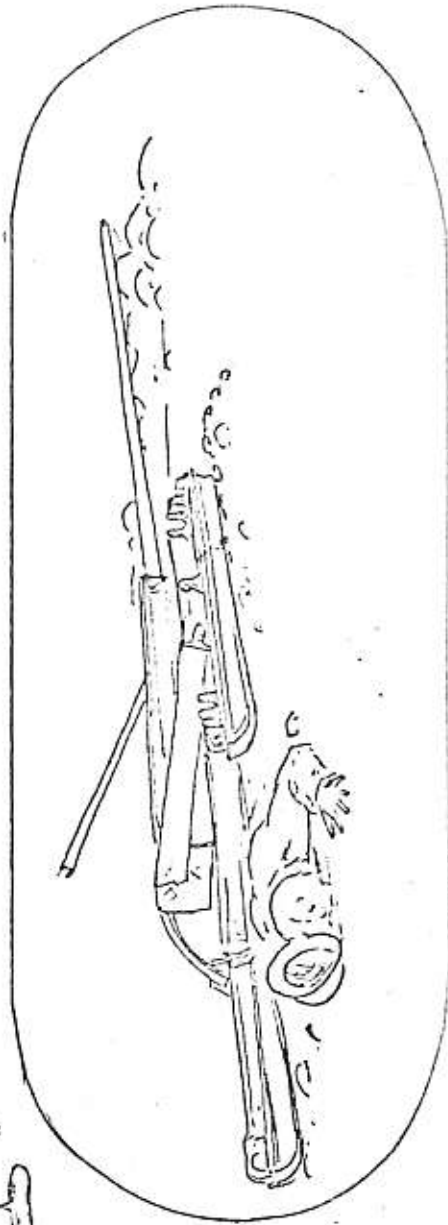
# FATAL FALLING EQUIPMENT ACCIDENT

MINNTAC MINE

UNITED STATES STEEL CORPORATION

MT. IRON, ST. LOUIS COUNTY, MINNESOTA

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NOT TO SCALE

mounted at the top of the 4-inch mast pipe. A 3/4-inch, 60-foot-long manila rope was reeved through the sheave and was used to raise the electric power cables from ground level to the top of the mast. A 1/2-inch by 3-inch-wide by 10-inch-long hinged locking plate mounted across each side of the 13-foot channel irons, three feet above the mast plate, was used to secure the mast in position and to allow the mast to be lowered. A 1 1/2-inch by 5-foot-long wire cable was attached to the end and center skid rails with a clevis and pin at each eye of the cable.

The cable stand base had numerous old cracks or breaks in the rails that indicated the stand had been damaged previous to the date of the accident. This evidence was supported by the heavy oxidation and discoloration observed on the crack surfaces.

The approximate weights of the cable stand base and mast sections were 3,145 pounds and 586 pounds, respectively.

The surface condition of the ground at the accident site was uneven with scattered rock, ice, and snow. The temperature at 10:30 a.m., was 0 degrees. The wind was from the north at eight knots per hour with a chill factor of -22 degrees Fahrenheit.

#### DESCRIPTION OF THE ACCIDENT

About 8:45 a.m., on the morning of the accident, the operator of a Caterpillar rubber-tired front-end loader, Model 992B, Company Number 188, equipped with a 10-cubic-yard-capacity rock-bucket was instructed to move the cable stand approximately 15-feet from the top of a 3-foot-high rock pedestal to the accident site. The front-end loader and operator were part of a track maintenance crew working nearby. Ed Snidarich, foreman, decided that the front-end loader be used to move the stand because the No. 48 rubber-tired dozer could not safely move the stand off the elevated rock pedestal.

After the stand was removed from the rock pedestal, a Michigan rubber-tired dozer, Company Number 48, Model 280, Serial Number 456B 173C, was used to move cable stands from the 7th bench south area to the new location where power shovel No. 8 had been previously relocated to another site approximately 600 yards north of 7th bench south area.

The operator, using the blade of No. 48 dozer, attempted to move the cable stand involved in the accident about 9 a.m., the morning of the accident, when the mast toppled over, resulting in the base of the stand flipping and coming to rest on its vertical edge. The operator informed supervision as to the condition of the stand and was advised the stand would be removed to a repair area. The stand remained in that position for approximately one hour and 15 minutes until the time of the accident.

On the day of the accident, Shelly R. Salo (victim) began work at 7:30 a.m., her regular starting time. She was a member of a four person labor crew assigned to move cable stands from the 7th bench south area to a new location.

About 10:20 a.m., the labor crew arrived at the site by pickup for the purpose of removing the damaged cable stand to a repair area.



Rick Paine, pit laborer (witness), obtained a 3/8-inch by 15-foot-long chain from a nearby pickup and walked to the cable stand where Snidarich issued hookup instructions. Snidarich noted that the dozer hitch-pin was missing and went to his pickup for a replacement. At this time, Salo, who was in a truck with witnesses Terry Kuzma and Robert Schrautmeyer, stated that she was going out to help Paine hook up. Paine had already put the chain over the top rail when Salo arrived. Salo, noting that the base was hooked, moved along with Paine (back toward stand) in preparation for the hookup to No. 48 rubber-tired dozer. Snidarich, while returning to the site, observed the rail-base falling and shouted to warn Paine and Salo. Paine stated that he was about 10 feet from the base when he heard the shout, turned to see the stand falling, and jumped out of its way. Paine stated Salo, who was a few feet behind him, sort of crouched over as the stand struck her upper back, knocking her to the ground. Salo was pinned with the end rail resting on her shoulder blades with the rest of her body completely beneath the base.

The cable stand base was raised from the victim using the dozer blade and chain. Salo was removed from beneath the base and was covered with garments for warmth. J. Brust, No. 48 dozer operator, reported that the victim's pulse was weak and resuscitation efforts were initiated promptly. The ambulance arrived at 10:48 a.m., and transported the victim to the Virginia, Minnesota Municipal Hospital. The victim suffered a transection thoracic aorta with medintestinal hemorrhage. Salo was pronounced dead shortly after arrival at the hospital.

#### CAUSE OF THE ACCIDENT

The cause of the accident was the failure of all persons involved to recognize the falling equipment hazard created by the position of the cable tree base and to take measures to correct the unsafe condition. Contributing factors may have been the ice, packed snow, rock, wind, and uneven ground conditions at the immediate accident site.

#### ORDER ISSUED AND TERMINATED

Order No. 292072, 103j, issued 2/28/80 at 1045 hours.

The Minntac Mine had experienced a fatal accident in the East Pit. This order is issued until an examination and investigation is made of the accident site and equipment to determine the possible cause. Equipment shall not be moved or disturbed until completion of the investigation.

Area or Equipment: East Pit

Terminated 2/28/80 at 1640 hours.

The on-site inspection of the accident is completed. Equipment may be moved as desired.

#### CITATIONS ISSUED AND TERMINATED

Citation No. 292128, 104a, 55.14-26, issued 5/19/80 at 1000 hours.

Scene of fatal accident on February 28, 1980, East Pit, 7th Bench South. A piece of defective equipment identified as a portable, skid mounted, power cable (electric) support stand involved in the February 28, 1980 mine fatality

was not taken out of service prior to the moving of the stand towards a serviceable position. The operators of a Caterpillar rubber-tired front-end loader (Mine Number 188) and Michigan rubber-tired dozer (Mine Number 48) used in moving the stand reported that the cable support stand involved in the accident was structurally defective immediately prior to being moved towards service. Their statements revealed that the 25-foot mast of the cable stand was listing off center, a top axial rail was broken and twisted upwards (toward the top of the mast) and away from the stand base. The operators further reported that two (2) of the four (4) braces positioned at 90° intervals to support the mast structure in an upright position were bent and detached from their designated position on the base. The post-accident investigation of the cable support stand also revealed approximately eight (8) well weathered old fractures throughout the rail ball surfaces, web, and base. Several of the new fractures through webs and along the rail bases originated from the old breaks in the rail. As a point of information the major components of the cable stand base was constructed of 100-pound class rail. This citation was prepared and issued on 5/19/80 due to the duration of the investigation.

Terminated 5/19/80 at 1330 hours.

The cable stand base was removed from service.

Citation No. 292129, 104a, 55.14-36, issued 5/19/80 at 1100 hours.

Scene of fatal accident on February 28, 1980, East Pit, 7th Bench South. A piece of defective, unsafe equipment identified as a portable, skid mounted, power cable stand (electric) base involved in the February 28, 1980 mine fatality weighing approximately 3,145 pounds was permitted to remain standing vertically on its edge (an unnatural position beyond the design capacity of the equipment) without the equipment being braced, propped, supported in a safe, manner, or laid down flat to secure it against movement. The cable stand base remained on its edge for a period of approximately 1-hour and 15-minutes prior to falling down on the victim. This citation was prepared and issued on 5/19/80 due to the duration of the investigation.

Terminated 5/19/80 at 1330 hours.

The cable stand base was removed from service.

#### RECOMMENDATION

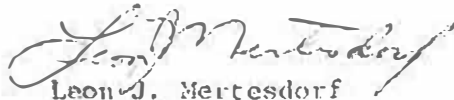
All cable stands at the mine should be inspected and any defects should be corrected or the defective cable stands should be discarded if necessary.

Employees should exercise extreme caution prior to and during the movements of any stationary type equipment to insure that safe working procedures and attitudes are always practiced.

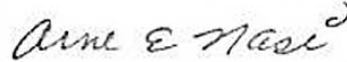


ACKNOWLEDGEMENT

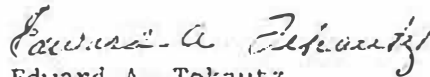
The courtesy and cooperation of the company, union officials, and employees was appreciated.



Leon J. Mertesdorf  
Metal and Nonmetal Mine Inspector



Arne E. Nasi  
Metal and Nonmetal Mine Inspector



Edward A. Tekautz  
Supervisory Mine Inspector

Approved by: /s/ Robert L. Moore  
Robert L. Moore, Subdistrict Manager

Training Info. "B"  
FATAL ACCIDENT REPORT  
PART 48 TRAINING RECORD

Company Name: U.S. Steel Corporation

Mine Name: Minntac Mine

Mine I.D.: 21-00282

Occupation: Pit labor

Subpart A - Surface Mine

Training Plan filed March 12, 1979

Training Plan Approval date - May 2, 1979

Training Plan Revisions None date -----

Date of Hire - June 13, 1978

48.5 New Miner Training - Grandfathered

48.6 Experienced Miner Training - Grandfathered

48.7 Task Training Dates Aug-79 Feb-80

48.8 Annual Refresher Training 8 hrs. Completed yes. (SEE ATTACHMENTS)

Records of Training (5000-23 Certificates)- Signed by Shelly R. Salo

dated Feb. 27, 1980.

Received Task Training as a - Production Truck Operator

Training Info. "B"

ANNUAL REFRESHER TRAINING: February 77, 1980

1) Introduction	5 Minutes
1.1 Mandatory Health and Safety Standards	25 Minutes
1.2 Health and Respiratory Devices	45 Minutes
1.3 Transportation Controls & Communication Systems	30 Minutes
1.4 Ground Controls	30 Minutes
1.5 Explosives	15 Minutes
1.6 Electrical Hazards	15 Minutes
1.7 Emergency Evacuation Plans, Fire Warning and Fire Fighting	30 Minutes
2) Accident Prevention	
2.1 Accident Slides	30 Minutes
2.2 Accident Movie	30 Minutes
3) First Aid	
3.1 Heartsaver Course	60 Minutes
3.2 First Aid & CPR (with handouts)	1 Hr. 25 Minutes

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

This certificate is required under Public Law 91-173 as amended by Public Law 95-154. Failure to comply may result in penalties and other sanctions as provided by sections 109 and 110, Public Law 91-173 as amended by Public Law 95-174.

Issue Certificate Immediately  
Upon Completion of Training

Serial Number (for operator's use)

1. Print Full Name of Person Trained (first, middle, last)

SHELLY R. SALO 77115

2. Check Type of Approved Training Received:

- ☐ New Miner ☒ Annual ☐ Newly Employed ☐ New Task  
☐ Hazard Training ☐ Refresher ☐ Experienced (specify)  
☐ Other (specify)

3. Check Type of Operation and Related Industry:

- A. ☒ Surface ☐ Construction ☐ Underground ☒ Shaft & Slope  
B. ☐ Coal ☒ Metal ☐ Nonmetal

4. Date Training Requirements Completed

FEB. 27 '80

☐ Check if not completed

If completed, go to item 6, below.

and go to item 5, below.

5A. Date Training Requirements Partially Completed

5B. Check Subjects Completed (use only for partially completed training)

- ☐ Introduction to Work Environment ☐ Electrical Hazards  
☐ Hazard Recognition ☐ First Aid  
☐ H&S Aspects of Tasks Assigned ☐ Mine Gases  
☐ Statutory Rights of Miners ☐ Explosives  
☐ Self-Rescue & Respiratory Devices ☐ Prevention of Accidents  
☐ Transport & Communication Systems ☐ Other (specify)  
☐ Roof/Ground Control & Ventilation ☐  
☐ Health ☐

6. False certification is punishable under section 110 (g) and (f) of the Federal Mine Safety & Health Act (P.L. 91-173 as amended by P.L. 95-154).

I certify that the above training has been completed  
(signature of person responsible for training)

Paul M. Stevens

7. Mine Name, ID, & Location of Training  
(if Institution, give name & address)

USS  
MCO  
MT. IRAN MN.

8. Date

I verify that I have completed the above training  
(signature of person trained)

FEB. 27 '80

Shelly R. Salo