MAI-2006-16

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 Fall of Person Accident
June 28, 2006

Tilden Mine
Tilden Mining Company L.C.
Ishpeming, Marquette County, Michigan
Mine I.D. No. 20-00422

Investigators

George F. Schorr
Supervisory Special Investigator

Lonnie L. St. Aubin
Mine Safety and Health Inspector

Michael C. Superfesky
Civil Engineer

James B. Pfeifer
Civil Engineer

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


06/28/2006

OVERVIEW

Carl D. Rintamaki, pellet plant utilityman, age 49, was fatally injured on June 28, 2006, when he fell through a roof hatch cover to the preheat grate level 55 feet below. Rintamaki was using a hose to clean off a build-up of material from the pellet plant unit #1 stack-cap roof when he stepped on the hatch cover. The hatch cover had corroded over time, causing it to collapse when the victim stepped on it.

The accident occurred because safe operating procedures had not been established to clean material build-up on the stack-cap roof. No barricades or warning signs were provided to warn employees of the deteriorated hatch cover or other hazards that were not immediately obvious.

GENERAL INFORMATION

Tilden Mine, a surface iron ore (taconite) mine, was operated by Tilden Mining Company L.C., and was located in Ishpeming, Marquette County, Michigan. The principal operating official was Clifford T. Smith, general manager and vice president. Miners at the mine were represented by United Steel Workers of America, Local 4974. The mine normally operated various multiple shifts, 24 hours a day, seven days a week. Total employment at the mine was 624 persons.

Taconite, a form of iron ore, was drilled, blasted, and removed from a multiple bench quarry. The raw ore was crushed and milled in a multiple step process. The iron was separated from the processed taconite ore either by flotation (hematite) or magnetic (magnetite) separation. The iron rich concentrate was then processed for shipping by adding a binder and then rolling the mixture into pellets. Pellets were then subjected to heating to produce hardened pellets. Pellets were shipped via rail and boat to blast furnaces where they were manufactured into iron and steel.

The last regular inspection at this operation was completed on March 31, 2006.

DESCRIPTION OF ACCIDENT

On the day of the accident, Carl D. Rintamaki (victim) reported for work at 6:45 a.m., his usual starting time. Rintamaki was a member of a five person pellet plant operations crew responsible for general facility maintenance and clean-up in the pellet plant.

Shortly after the start of the shift, David A. Keto, crew coordinator, gave Rintamaki his work orders for the day. Since the Tilden #1 furnace was down for repairs, Rintamaki was assigned to clean the build-up of material from the Tilden #1 stack-cap roof area and to inspect the roof area. The accumulated material was effluent dust from the Tilden #1 straight-grate induration furnace.

The roof area was inaccessible when the Tilden #1 furnace was in production because the stack-cap could be raised without warning. The heat exhausted through the stack would be immediately dangerous to anyone on the roof.

Richard A. Dymond, pellet plant utility worker, helped Rintamaki prepare for the task by running water hoses to the stack-cap roof area. At approximately 8:15 a.m., they completed the preparatory work. Dymond then left the area and Rintamaki began cleaning the roof.

Although there were no witnesses to the accident, investigators determined that about 12:55 p.m., Rintamaki stepped onto the hatch cover for an access opening in the roof and fell to the level below.

At around 1:00 p.m., employees observed dust and daylight coming from the roof area where Rintamaki was working. Keto called Rintamaki on the radio and got no response.

Several employees then went to the preheat grate level and found Rintamaki lying on the grating. Tilden emergency response personnel were summoned to the scene and administered first aid. Emergency medical personnel arrived in a few minutes and transported the victim to a local hospital where he was pronounced dead. The cause of death was attributed to a massive head injury.

INVESTIGATION OF THE ACCIDENT

MSHA was notified on June 28, 2006, at approximately 1:30 p.m., by a telephone call from Clifford Smith, vice president and general manager, to Steven M. Richetta, district manager. An investigation began the same day. An order was issued pursuant to Section 103(k) of the Mine Act to ensure the safety of the miners.

MSHA's accident investigation team 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' representatives.

Location of the Accident

The accident occurred on the Tilden pellet plant unit #1 stack-cap roof.

Roof Opening and Cover

The opening in the #1 stack-cap roof was 42 inches wide and 50 inches long. This opening was used to transport tools and other materials to the roof (Diagram A). The last time the cover was determined to have been taken off the opening was when the #1 stack-cap roof was refurbished in 2000.

The cover of the opening was approximately 42.25 inches by 50.5 inches and constructed of four pieces of 2-inch by 2-inch by ¼-inch angle stock welded together to form a rectangular frame. The frame was covered with No. 16 gage, A36 sheet metal that was fastened to the frame with puddle welds along the perimeter. The sheet metal had two diagonal bends along the diagonal dimensions. The cover had two u-shaped handles that were 7.5 inches long and 4 inches high. These handles were welded to the angle stock frame (Diagram B). The sheet metal was severely corroded and contained corrosion holes.

About 8 to 9 inches of effluent dust had accumulated on the roof of the building. The accumulation of dust would have covered the roof opening cover, including the handles. The dust weighed approximately 120 to 145 pounds per cubic foot, creating a load on the cover of approximately 1,600 pounds. Investigators determined that the cover did not collapse under the weight of the dust because this weight was spread out over the entire area of the cover. This situation translated to a uniform load of approximately 90 to 110 pounds per square foot and possible bridging of the dust over the existing corrosion holes.

The failure of the roof opening cover occurred when Rintamaki inadvertently stepped on the cover. When Rintamaki stepped on the roof cover, his weight (230 pounds) would have induced high stresses in the area of the roof cover, causing the severely corroded metal to fail. Corrosion of the cover allowed sections of the sheet metal to detach from the frame. Once enough of the sheet metal was detached from the frame, it was no longer able to transfer the weight from the sheet metal to the frame. This caused Rintamaki to break through the sheet metal and fall through the opening.

A post-accident assessment of the design of the roof opening cover showed that the cover, in a non-deteriorated condition, should have possessed enough stiffness and strength to have supported Rintamaki when he stepped on the cover.

Weather Conditions

Weather conditions were reported to be sunny and 65 degrees Fahrenheit and were not considered a factor in the accident.

Training and Experience

Carl D. Rintamaki had 27 years mining experience and had been employed at this mine for approximately 12 years. He had received training in accordance with 30 CFR, Part 48, and was performing his regular duties at the time of the accident.

ROOT CAUSE ANALYSIS

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

Root Cause: Policies and procedures were inadequate. Prior to assigning the task, management failed to complete a risk assessment to identify possible hazards associated with cleaning material build-up on the stack-cap roof area. The location of the roof access cover was not identified and no warning signs were posted on the roof.

Corrective Action: Procedures should be established to ensure a risk assessment is conducted prior to performing clean up tasks on the stack-cap roof area. Areas where hazards exist that are not obvious should be posted with warning signs or barriers.

CONCLUSION

The accident occurred because safe operating procedures had not been established to clean material build-up on the stack-cap roof. No barricades or warning signs were provided to warn employees of the deteriorated hatch cover or other hazards that were not immediately obvious.

ENFORCEMENT ACTIONS

Order No. 6179299 was issued on June 28, 2006, under provisions of Section 103(k) of the Mine Act:

> A fatal accident occurred at this operation on June 28, 2006, when one miner was attempting to clean off the roof area by unit #1 stack cap on the south side of the pellet plant. This order is issued to assure the safety of all persons at this operation. It prohibits all activity at the unit #1 roof stack cap area 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.

The order was terminated on July 3, 2006, after the conditions that contributed to the accident no longer existed.

Citation No. 6135220 was issued on August 2, 2006, under provisions of Section 104(a) of the Mine Act for violation of 30 CFR 56.20011:

> On June 28, 2006, while working on the Tilden #1 stack-cap roof, a miner was fatally injured when he fell through a hatch over an opening. This hatch presented a safety hazard that was not immediately obvious in that the hatch was covered up with material so that neither the opening nor the hatch were noticeable or known to miners working in that area. At the time of the fatal accident, the material that the metal hatch was constructed of had deteriorated to such a degree that it no longer provided protection from persons falling through the opening. No warning signs were posted.

The citation was terminated on August 14, 2006, after warning signs were posted at the approach to the #1 stack-cap roof to warn miners regarding the hazards of the roof opening and what precautions to take to protect themselves. The first sign reads "DANGER ROOF OPENINGS COULD EXIST THAT ARE NOT IMMEDIATELY OBVIOUS" and the second reads "FALL PROTECTION REQUIRED BEYOND THIS POINT".

Approved By: Date:

Steven M. Richetta
District Manager
North Central District

APPENDIX A

Persons Participating in the Investigation

Cleveland-Cliffs Michigan Operations

Gerald C. Deschaine	manager-safety and loss control
James J. Jarvi	president, USWA Local 4974

Jackson Kelly, Attorneys at Law

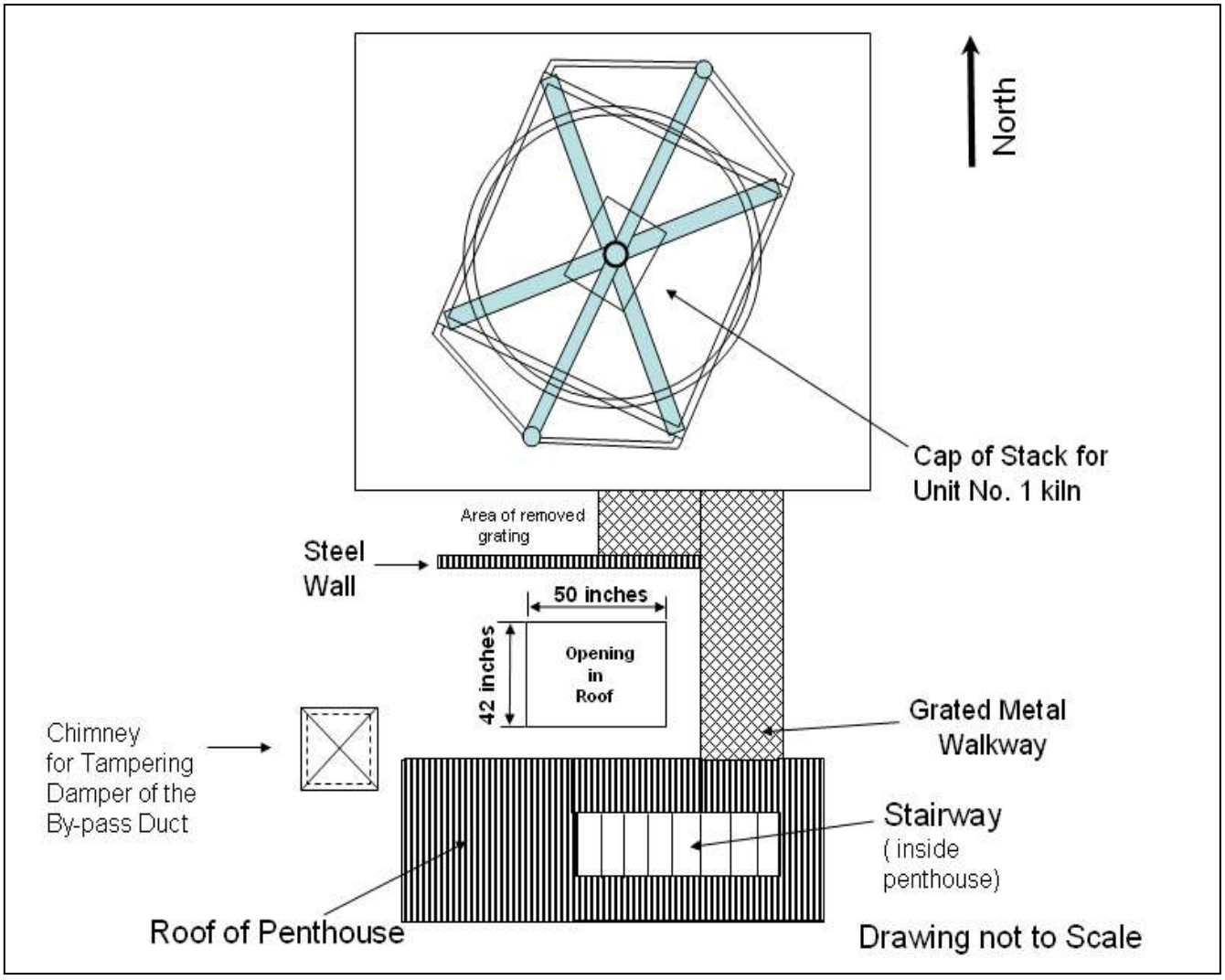
R. Henry Moore	attorney

Mine Safety and Health Administration

George F. Schorr	supervisory special investigator
Lonnie L. St. Aubin	mine safety and health inspector
Michael C. Superfesky	civil engineer
James B Pfeifer	civil engineer

APPENDIX B

Diagram A



APPENDIX C

Diagram B