

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

REPORT OF INVESTIGATION

**Surface Metal Mine
(Gold)**

**Fatal Machinery Accident
July 19, 2007**

**Alaska Mechanical, Incorporated
Contractor I.D. No. LWI**

at

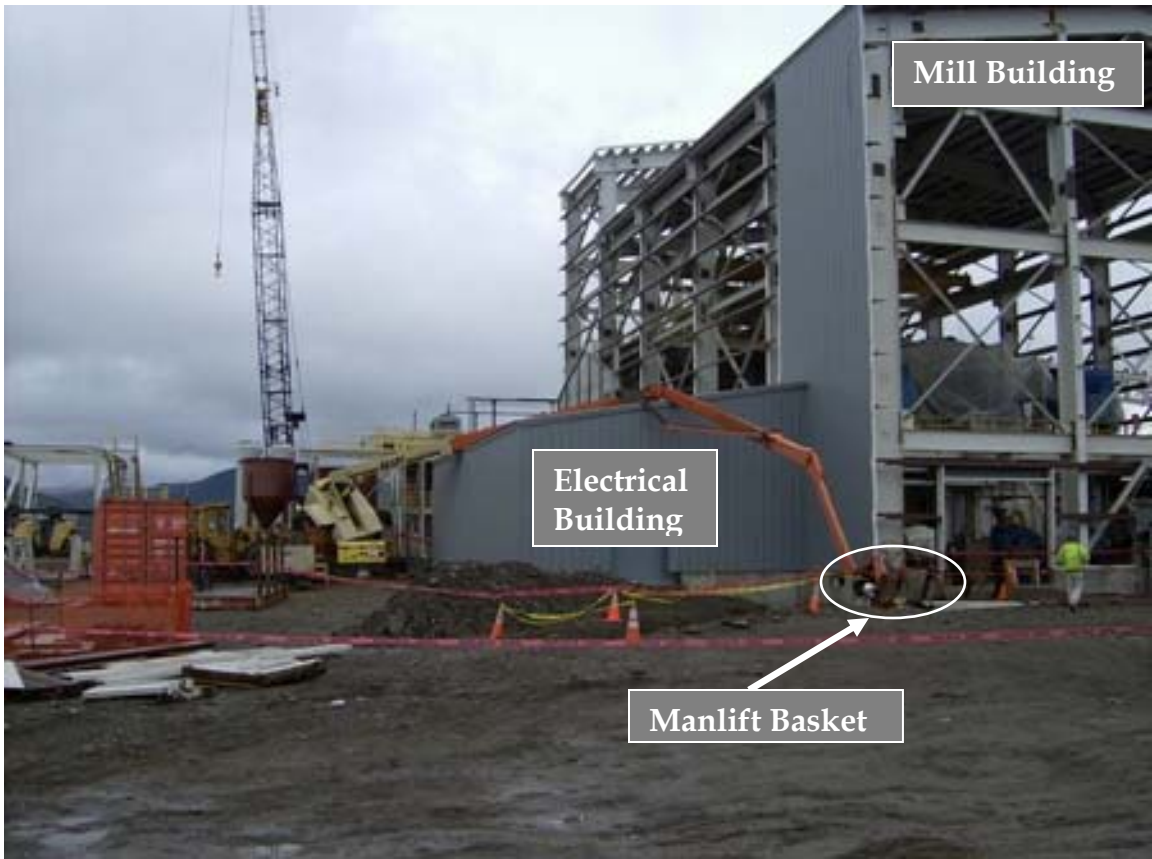
**Nome Operations
Alaska Gold Company
Nome, Nome County, Alaska
Mine I.D. No. 50-01850**

Investigators

**Stephen A Cain
Supervisory Mine Safety and Health Inspector**

**Eugene D. Hennen P.E.
Mechanical Engineer**

**Originating Office
Mine Safety and Health Administration
Western District
2060 Peabody Road, Suite 610
Vacaville, California 95687
Arthur L. Ellis, District Manager**



Mill Building

Electrical Building

Manlift Basket

OVERVIEW

Craig Bagley, contract ironworker, age 28, and Tyler Kahle, contract iron worker, age 19, were fatally injured on July 19, 2007, when a manlift they were operating toppled over. The victims were descending from an elevated location with the boom extended when the unit became unstable and toppled on its side.

The accident occurred because management policies and procedures were inadequate. The manlift was not positioned on solid, level ground and the center hydraulic lift cylinder was being utilized improperly. Task training for persons operating the manlift was incomplete and did not address the load management system provided on the unit.

GENERAL INFORMATION

Nome Operations, an open pit mine and mill, owned by Alaska Gold Company, was located in Nome, Nome County, Alaska. The principal operating official was Warren D. Woods, mine manager. The mine normally operated two 12-hour shifts per day, seven days per week. Total employment was 55 persons.

The mill was being constructed at the time of the accident. Open pit mining had not begun but overburden was being removed.

Alaska Gold Company contracted Alaska Mechanical Incorporated, Anchorage, Alaska, to construct the mill and related processing facilities. The principal operating official was Larry Buss, president.

The contractor began the construction phase in November, 2006, and normally operated two 12-hour shifts per day, 7 days a week. Total contractor employment was 138 persons.

The last regular inspection at this operation was completed on July 14, 2007.

DESCRIPTION OF THE ACCIDENT

On the day of the accident, Tyler Kahle and Craig Bagley (victims) reported for work at 7:00 am, their normal starting time. They were assigned to install roofing bolts to secure the metal roof of the mill building which was under construction. Kahle was working on the top portion of the mill roof while Bagley was operating a manlift and installing bolts along the mill roof's edges.

About 6:40 p.m., the end of the work shift, Bagley, positioned the manlift basket at the upper portion of the roof of the mill building where Kahle entered the man basket with Bagley to be transported to the ground. Bagley rotated the turntable of the manlift toward the southern end of the mill building until the boom and man basket were clear of the mill roof line. As Bagley maneuvered the boom the manlift began to topple. The man basket hit the side of the mill building below roof line. The boom struck the ground. Both miners were tied off to the basket. The cause of death was attributed to blunt force trauma.

INVESTIGATION OF THE ACCIDENT

The Mine Safety and Health Administration (MSHA) was notified of the accident at 7:33 p.m., on July 19, 2007, by a telephone call from Richard Martin, safety manager Alaska Gold Company. The information was reported to John Perez, acting assistant district manager. An investigation was started on July 20, 2007,

when the MSHA investigators arrived at the mine. An order was issued under the provisions of Section 103(k) of the Mine Act to ensure the safety of the miners.

MSHA's accident investigation team made a physical inspection of the equipment and the accident site. They interviewed employees, and reviewed conditions and work procedures relevant to the accident. MSHA conducted the investigation with the assistance of mine management, employees, and contractor management.

DISCUSSION

Location of Accident

The accident occurred on the southwest side of the main mill building that was under construction.

Weather

On the day of the accident, the airport reported the weather as clear and wind speed as 1.9 knots per hour. Weather was not a contributing factor to the accident

Equipment

The equipment involved in the accident was a JLG Model 120HX Aerial Man basket (manlift). The machine had a maximum boom extension of 120 feet and a maximum boom horizontal reach of 60 feet. The operator's man basket (man basket) was 36 inches wide by 72 inches long with a maximum rated weight capacity of 500 pounds.

The self propelled manlift consisted of a main body, chassis, and the main boom. The main body (turntable) was mounted on the chassis and rotated 360 degrees while the chassis remained stationary. The main boom was attached to the turntable and could be positioned from slightly below the horizontal position to an almost vertical position. The boom had 3 multiple stages which allowed it to be telescoped out to a maximum length of 120 feet.

The manlift had two operator control consoles. The main operator control console was located in the man basket at the end of the boom. This control console enabled the manlift operator to start and drive the machine and control the aerial man basket's movements. The machine had a second control console located at the rear of the turntable that could be utilized to override the control console in the man basket. The controls installed on the turntable were operated from the ground and intended to be used in an emergency to lower the aerial man basket to the ground if the operator in the man basket needed assistance.

The turnable control console did not have controls to move the chassis. A remote control box connected to a control cable was provided to move the machine while standing on the ground.

JLG Axle Extension Design

The JLG was not equipped with outriggers but did have the ability to extend and retract the axles to assist in the side stability and to maneuver the JLG through tight places. One hydraulic jack with a flat circular plate (footplate) attached to the cylinder end was equipped on the center of both the front and rear of the chassis. When one of the hydraulic cylinders was extended, the tires on that end of the machine were lifted off the ground. With the tires off the ground, the axle could be extended and pinned in place. A set of switches on the front and rear of the chassis controlled the lift and axle extension cylinders. The axles were found to be fully extended and pinned.

JLG Load Management System Design

A decal showing the allowable operating envelope of the man basket was placed on both the ground and aerial man basket control consoles. These decals showed that the end of the man basket should never be extended more than 60 feet from the pivot point of the turntable of the JLG. The machine had a load management system designed to warn the operator visually and audibly when approaching the edge of the permitted man basket operating envelope and to prevent extending the man basket beyond the maximum radius of 60 feet from the pivot point of the turntable.

The load management system had two potentiometers located in a sealed box mounted at the rear of the main boom. One potentiometer measured the angle of the boom and the other measured the extension of the boom. The extension of the boom was sensed by a multi-turn potentiometer driven by means of a cable attached to the telescoping part of the boom. The signals from these sensors (elevation angle and extension distance) were fed into a load radius card which calculated the boom radius and extension. These potentiometers provided the electrical system logic circuit with the information needed to determine the location of the man basket. After the electrical system determined the location of the man basket, this information was relayed to both the ground and man basket control stations. A blue light indicated the man basket was within the allowable operating envelope and a red light indicated the man basket was approaching the edge of the allowable operating range. If there was a failure in either signal, both consoles gave an audible warning. The system had an over moment control monitoring system that constantly monitored the circuit cards. If any fault in output or input was detected, all movements that could affect stability were shut down.

Additionally, the turntable was pivoted at one end and was supported with a compression spring at the other end. The change of weight on the compression spring caused by the extension of the boom provided a movement that could be detected by the load management system. The over movement control system had two independent switches to detect the movement caused by extension of the boom. One switch was a mechanical activated switch and the other was a proximity switch.

The switches were set to detect the movement created when the extension of the boom caused the man basket to be extended to the maximum radius of 60 feet. When the switches detected that the man basket was at the maximum radius, the switches sent a signal to the electrical system logic circuit. When the electrical system logic circuit received the signal indicating the man basket was at its maximum radius, the logic circuit prevented the boom lift from being lowered and telescoped out. The disabling of the boom from lowering and telescoping was designed to prevent the operator from extending the man basket to the point that would cause the JLG to tip over.

JLG Load Management Test Procedures

A decal located at the ground control station outlined a test to be used to determine if the load management system was operating properly. This test was intended by the manufacturer to be part of the daily preoperational checks and was listed in the Operators and Safety Manual. The man basket boom must be operational in order to conduct this test. Before the load management test was started the boom had to be fully retracted and placed in a horizontal position. After placing the boom in the test starting position, the operator was to extend the boom until it stopped. The operator held the test switch on the right side of the control panel during this test. If the load management system was operating properly, a piece of white tape on the inter boom section became visible on the edge of the main boom section.

Because it was damaged in the accident, the man basket boom could not be operated preventing the load management system test from being conducted during the investigation. The electrical circuits, bulbs, and wiring which operated the Load Management System were inspected and found to be intact and in proper operating condition. The dead man foot switch, emergency stop device, and chassis level bubble were tested and found to be operational.

JLG Boom

The boom on the JLG was found to have been extended 93 feet as measured from the front of the turntable on the chassis to the pivot point of the man basket. The only structural damage found to the boom was a fracture at the third stage of the boom.

JLG Machine Set Up

During the accident, the JLG tipped over and the JLG's boom came to rest on the roof of the electrical main control building for the mill, which had prevented the JLG's chassis from tipping all the way onto its side.

The manufacturer's safety manual for the JLG located at the mine indicated the machine was to be operated on a level solid surface. The surface area where the JLG was parked was not level and was made up of loose unconsolidated gravel. The front tires had left substantial imprints in the gravel showing where they had been located prior to the accident. Measurements based on the location of the two front tires at the time of the accident revealed the JLG man basket had been setting on a 6 percent side slope. In an attempt to level the machine, two 3 ½ inch by 3 ½ inch wooden blocks approximately 2 feet long, had been placed under the right rear tire prior to the accident. Both blocks were found broken after the manlift tipped over.

The rear hydraulic cylinder for lifting the rear axle of the JLG (for the purpose of extending the axle) was found extended below the rear tires. The round plate (foot plate) normally located on the end of the hydraulic cylinder was missing from the end of the cylinder. A short piece of metal channel was found that had apparently been used in place of the round plate. When the JLG was up righted with a crane, the end of the protruding hydraulic cylinder rod extended into the ground. The crane was used to raise the JLG and the channel was once again placed under the hydraulic cylinder.

The weight of the chassis was left on the hydraulic cylinder to determine if the hydraulic cylinder would leak down. The rear axle hydraulic lift cylinder supported the load of the JLG for 36 hours without leaking, indicating that the rear hydraulic cylinder was extended at the time of the accident. Having the weight of the rear of the JLG supported by the hydraulic cylinder rather than being supported on the extended tires as intended by the manufacturer reduced the stability of the machine when the boom was rotated to the right side.

JLG Aerial Man basket (Man Basket) Weight

The weight of the items in the man basket and the weight of the victims were estimated to be slightly less than maximum allowable weight of 500 pounds specified by the manufacturer.

Training and Experience

The task training for the persons assigned to operate the manlift did not identify the safe operating procedures and limitations of the load management system that was critical to safely operate the manlift.

Craig Bagley had 3 years experience as an iron worker and had worked for the contractor at this mine for 22 weeks. He had received hazard awareness training in accordance with 30 CFR, Part 48.

Tyler Kahle had 44 weeks experience as an iron worker and had worked for the contractor at this mine for 22 weeks. He had received hazard awareness training in accordance with 30 CFR, Part 48.

ROOT CAUSE ANALYSIS

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

Causal Factor: Management policies and procedures were inadequate. The task training provided to the persons assigned to operate the JLG 120HX manlift did not identify the specific safe operating procedures and limitations of the load management system that were critical to safely operate this machinery. Management failed to ensure the training addressed all safe operating procedures.

Corrective Action: Management should fully task train all persons before assigning them to operate machinery they are not familiar with. The training should make persons aware of all safe operating procedures and all safety devices recommended by the manufacturer.

Causal Factor: Management policies, procedures, and controls were inadequate. The manlift was used beyond the design capacity intended by the manufacturer creating a hazard to persons. The rear center jack on the manlift was being used as a stabilizer or outrigger and the manlift was not positioned on a solid and level surface during use. Management failed to conduct an assessment of the risk when they allowed the equipment to be positioned on a surface that was not solid and level.

Corrective Action: Management should ensure the manufacturer's criteria for safe operation and limitations are provided to equipment operators, understood, and followed. Management should ensure that persons monitor machinery operation to identify possible hazards and initiate action to establish and ensure safe operating procedures are followed.

CONCLUSION

The accident occurred because management policies and procedures were inadequate. The manlift was not positioned on solid, level ground and the center hydraulic lift cylinder was being utilized improperly. Task training for persons

operating the manlift was incomplete and did not address the load management system provided on the unit.

ENFORCEMENT ACTIONS

Alaska Mechanical, Inc

Order No. 6395834 was issued on July 19, 2007, under the provisions of Section 103(k) of the Mine Act:

Two miners were fatally injured at this operation on July 19, 2007, when a man lift they were riding in toppled over. This order was issued to ensure the safety of all persons at this operation. It prohibits all activity involving the man lift and the immediate vicinity where the accident occurred until MSHA has determined that it was 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 26, 2007. Conditions that contributed to the accident had been corrected and normal mining operations can resume.

Citation No. 6398234 was issued on October 5, 2007, under the provisions of Section 104(a) of the Mine Act for a violation of 30 CFR 48.27a:

On July 19, 2007, two miners were fatally injured at this mine when a manlift they were riding in toppled over. One of the victims was operating the manlift and had not received task training instruction regarding all safety aspects and all safe operating procedures regarding this man lift. The task training did not identify the specific safe operating procedures and limitations of the Load Management System that was critical to safely operate this manlift.

The citation was terminated on October 5, 2007. All employees operating manlifts were retrained in the safe operating procedures and limitations of the Load Management System.

Citation No. 6398235 was issued on October 5, 2007, under the provisions of Section 104(d1) of the Mine Act for a violation of 30 CFR 56.14205:

On July 19, 2007, two miners were fatally injured at this mine when a manlift they were riding in toppled over. The manlift was used beyond the design capacity intended by the manufacturer where such use created a hazard to persons. The rear center jack on the manlift was being used as a stabilizer or outrigger and the manlift was not positioned on a solid and level surface during use. The manlift

had been positioned at this location for three days prior to the accident. Management engaged in aggravated conduct constituting more than ordinary negligence because this condition was obvious and supervisors had conducted workplace examinations in the area. This violation was an unwarrantable failure to comply with a mandatory safety standard.

This citation was terminated on October 5, 2007. All employees operating manlifts were retrained in the safe operating procedures, limitations, and capabilities intended by the manufacturer.

Approved By:

Arthur L. Ellis
District Manager

Date

Appendix A

Persons Participating in the Investigation

Alaska Gold Company

Doug Nicholson..... vice president
Warren D. Woods general manager
Rick Martin safety manager

Alaska Mechanical, Inc.

Frank Torres project manager/superintendent
Russ Schwartz vice president
Paul Ebien safety manager
William F. Gilpin electrician

Mine Safety and Health Administration

Stephen A. Cain..... supervisory mine safety and health inspector
Eugene Hennen P.E. mechanical engineer

Appendix B

Victim Information

Accident Investigation Data - Victim Information

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



Event Number:

Victim Information: 1

1. Name of Injured/Ill Employee: <i>Tyler T. Kahle</i>		2. Sex: <i>M</i>	3. Victim's Age: <i>19</i>	4. Last Four Digits of SSN:	5. Degree of Injury: <i>01 Fatal</i>
6. Date(MM/DD/YY) and Time(24 Hr.) Of Death: <i>a. Date: 07/19/2007 b. Time: 19:50</i>				7. Date and Time Started: <i>a. Date: 07/19/2007 b. Time: 7:00</i>	
8. Regular Job Title: <i>110 Steel Worker</i>			9. Work Activity when Injured: <i>098 Riding in manlift</i>		10. Was this work activity part of regular job? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
11. Experience Years Weeks Days a. This Work Activity: <i>0 22 3</i>		b. Regular Job Title: <i>0 44 0</i>		c. This Years Week Days Mining: <i>0 22 3</i>	
12. What Directly Inflicted Injury or Illness? <i>002 Bodily motion</i>				13. Nature of Injury or Illness: <i>390 Blunt Force Trauma</i>	
14. Training Deficiencies: Hazard: _____ New/Newly-Employed Experienced Miner: _____ Annual: _____ Task: _____					
15. Company of Employment: (If different from production operator) <i>Alaska Mechanical Inc</i> Independent Contractor ID: (if applicable) <i>LWI</i>					
16. On-site Emergency Medical Treatment: Not Applicable: <input type="checkbox"/> First-Aid: <input type="checkbox"/> CPR: <input checked="" type="checkbox"/> EMT: <input type="checkbox"/> Medical Professional: <input type="checkbox"/> None: <input type="checkbox"/>					
17. Part 50 Document Control Number: (form 7000-1)			18. Union Affiliation of Victim: <i>9999 None (No Union Affiliation)</i>		

Victim Information: 2

1. Name of Injured/Ill Employee: <i>Craig A. Bagley</i>		2. Sex: <i>M</i>	3. Victim's Age: <i>28</i>	4. Last Four Digits of SSN:	5. Degree of Injury: <i>01 Fatal</i>
6. Date(MM/DD/YY) and Time(24 Hr.) Of Death: <i>a. Date: 07/19/2007 b. Time: 21:09</i>				7. Date and Time Started: <i>a. Date: 07/19/2007 b. Time: 7:00</i>	
8. Regular Job Title: <i>110 Steel Worker</i>			9. Work Activity when Injured: <i>098 Operating Manlift</i>		10. Was this work activity part of regular job? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
11. Experience: Years Weeks Days a. This Work Activity: <i>0 22 3</i>		b. Regular Job Title: <i>3 0 0</i>		c. This Years Week Days Mining: <i>0 22 3</i>	
12. What Directly Inflicted Injury or Illness? <i>002 Bodily Motion</i>				13. Nature of Injury or Illness: <i>390 Blunt Force Trauma</i>	
14. Training Deficiencies: Hazard: _____ New/Newly-Employed Experienced Miner: _____ Annual: _____ Task: <input checked="" type="checkbox"/>					
15. Company of Employment: (If different from production operator) <i>Alaska Mechanical Inc</i> Independent Contractor ID: (if applicable) <i>LWI</i>					
16. On-site Emergency Medical Treatment: Not Applicable: <input type="checkbox"/> First-Aid: <input type="checkbox"/> CPR: <input checked="" type="checkbox"/> EMT: <input type="checkbox"/> Medical Professional: <input type="checkbox"/> None: <input type="checkbox"/>					
17. Part 50 Document Control Number: (form 7000-1)			18. Union Affiliation of Victim: <i>9999 None (No Union Affiliation)</i>		

Victim Information:

1. Name of Injured/Ill Employee:		2. Sex:	3. Victim's Age:	4. Last Four Digits of SSN:	5. Degree of Injury:
6. Date(MM/DD/YY) and Time(24 Hr.) Of Death:				7. Date and Time Started:	
8. Regular Job Title:			9. Work Activity when Injured:		10. Was this work activity part of regular job? Yes <input type="checkbox"/> No <input type="checkbox"/>
11. Experience: Years Weeks Days a. This Work Activity:		b. Regular Job Title:		c. This Years Week Days Mining:	
12. What Directly Inflicted Injury or Illness?				13. Nature of Injury or Illness:	
14. Training Deficiencies: Hazard: _____ New/Newly-Employed Experienced Miner: _____ Annual: _____ Task: _____					
15. Company of Employment: (If different from production operator) Independent Contractor ID: (if applicable)					
16. On-site Emergency Medical Treatment: Not Applicable: <input type="checkbox"/> First-Aid: <input type="checkbox"/> CPR: <input type="checkbox"/> EMT: <input type="checkbox"/> Medical Professional: <input type="checkbox"/> None: <input type="checkbox"/>					
17. Part 50 Document Control Number: (form 7000-1)			18. Union Affiliation of Victim:		