

UNITED STATES
DEPARTMENT OF LABOR
MINE SAFETY AND HEALTH ADMINISTRATION

REPORT OF INVESTIGATION

Surface
(Construction Sand and Gravel)

Fatal Powered Haulage Accident
May 2, 2023

Plant 280
Bowes Construction Inc
Brookings, Brookings County, South Dakota
ID No. 39-01505

Accident Investigators

Cory Niemi
Mine Safety and Health Inspector

Timothy McPherson
Mine Safety and Health Inspector

Elwood Burriss
Staff Assistant

Originating Office
Mine Safety and Health Administration
Duluth District
515 W. 1st Street #323
Duluth, MN 55802
Christopher Hensler, District Manager

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OVERVIEW

On May 2, 2023, at approximately 12:30 p.m., Izak Wixon, a 19 year-old ground man, with approximately three months of mining experience, died when his left foot contacted the left drive tire of an automated telescopic portable radial stacker (radial stacker). Wixon became trapped and the radial stacker's tires ran over Wixon.

The accident occurred because the mine operator did not: 1) provide conspicuous markings to warn against access to the radial stacker left side drive tire area adjacent to the hydraulic jacking cylinder controls, 2) conduct or record workplace examinations in the area in which the radial stacker was located, and 3) provide the new miner with adequate training.

GENERAL INFORMATION

Bowes Construction Inc owns and operates Plant 280. The mine is a portable surface construction sand and gravel mine located near Brookings, Brookings County, South Dakota. Plant 280 employs four miners and operates intermittently one shift per day, five days per week. Material is pushed into a feeder by a bulldozer and then conveyed to the crushing plant for processing. A radial stacker stockpiles the finished product for sale to the construction industry.

The principal management officials at Plant 280 at the time of the accident were:

Jason Bowes
Timothy Granum

President
Aggregate Manager

The Mine Safety and Health Administration (MSHA) completed the last regular safety and health inspection at this mine prior to the accident on March 28, 2022. The 2022 non-fatal days lost incident rate for Plant 280 was zero, compared to the national average of 1.65 for mines of this type.

DESCRIPTION OF ACCIDENT

On May 2, 2023, at 5:30 a.m., Wixon started his shift. According to interviews, sometime between 6:00 a.m. and 6:15 a.m., Wixon; Jake Waddell, Plant Operator; Austin Dexter, Front-End Loader Operator; and Brian Mogler, Bulldozer Operator, arrived at Plant 280 located at the East Pit. At approximately 6:45 a.m., the plant started after the miners completed normal pre-shift maintenance and pre-operational inspections of the mine equipment. Wixon completed checks of the plant and travelled about the plant performing cleanup as needed. The plant ran until approximately 10:30 a.m. when Waddell identified a defective return roller on the radial stacker. Waddell shut down the plant, lowered the radial stacker to access the defective roller and removed it. Waddell started the plant approximately 30 minutes later and cleaned up material beneath the conveyors. On his way to check the scale conveyor, Waddell noticed that Wixon appeared to be laying down. Waddell went to Wixon, discovered his injuries, and ran to the radial stacker control panel to de-activate the radial stacker's automatic travel function. Waddell attempted to contact Mogler and Lyle Bowes, Bulldozer Operator, via radio but did not receive a response. Mogler recognized the urgency in the radio transmission and stopped feeding the plant. Mogler noticed that the radial stacker was no longer traveling, so he parked his bulldozer and went to the radial stacker. Waddell found L. Bowes and told him what happened.

At 12:44 p.m., L. Bowes called 911 and travelled to the East Pit entrance to escort first responders to the accident scene. The Brookings Sherriff's Department arrived at 12:54 p.m. followed by the Aurora Fire Department. Richard Heib, Brookings County Coroner, arrived and pronounced Wixon dead at 1:43 p.m.

INVESTIGATION OF THE ACCIDENT

On May 2, 2023, at 2:17 p.m., Kerrie Bolzer, Human Resources Generalist, called the Department of Labor National Contact Center (DOLNCC). The DOLNCC contacted Daniel Goyen, Assistant District Manager. Goyen sent Cory Niemi and Timothy McPherson, Mine Safety and Health Inspectors, and Elwood Burriss, Staff Assistant, to the mine. At 5:30 p.m., McPherson arrived at the mine and secured the scene. All miners and first responders had departed. McPherson contacted Kevin Murfield, Sergeant-Investigator with the Brookings Police Department. Murfield returned to the scene to provide additional information about the accident.

On May 3, 2023, at 7:00 a.m., McPherson arrived at the mine and issued an order under the provisions of Section 103(k) of the Mine Act to ensure the safety of the miners and preservation of evidence. At 7:40 a.m., Niemi and McPherson arrived at the East Pit and continued the investigation by conducting an examination of the accident scene, interviewing miners and mine management, and reviewing conditions and work practices relevant to the accident. See Appendix A for a list of persons who participated in the investigation.

DISCUSSION

Location of the Accident

The accident occurred at the plant's radial stacker, located on the north end of the mine (see Appendix B). Interviews revealed that Waddel found Wixon with a crushed can of penetrating oil at his side. A pattern of oily residue distributed throughout the left side radial axle restricted access area indicates the location of the accident (see Appendix C). The manufacturer designed the area to allow miners to have access to the controls for the hydraulic jacking cylinders while the radial stacker was not in motion. The radial axle support, the left radial axle arm, the undercarriage, and the left radial arm locking bar enclose the left side radial drive access area, with no signage or conspicuous markings to warn against entry into this area when the equipment is operating. To travel into the area, a miner must step on or over the left radial arm locking bar which is approximately eight feet long and 19 inches above grade.

Wixon was 23¼ feet from the east end of the radial stacker's travel runway, in line with the drive wheels, which corresponds with the left side radial drive restricted access area at the time of the accident (see Appendix D). Investigators determined the mine operator did not conspicuously mark this restricted area, which contributed to the accident.

Weather

The weather at the time of the accident was windy with temperatures in the mid-60s. Investigators determined that weather did not contribute to the accident.

Equipment Involved

The radial stacker involved in the accident was a Model 136x36 TEL800, manufactured by Thor Conveyors. The radial stacker travels radially about a pivot point in a defined arc-shaped path and has a telescoping conveyor system to distribute material in an arc-shaped stockpile.

The radial stacker can be operated either manually or automatically from the control panel located on the left side of the radial stacker. There are radial limit switches on each side that reverse the direction of movement when activated. The switches activate by contacting large heavy objects that have been placed in the path of the switches. The radial stacker travels at an observed speed of approximately 0.3 miles per hour (0.43 feet per second). The radial stacker operating manual states, "No person(s) shall be within (three) meters of any moving part, drive wheel, loading or discharge chute while the conveyor is in operation."

While Granum and Donald Bingham, Mechanic, demonstrated the automated functionality, investigators observed the right-side drive motor chain had excess slack. When movement produced tension on the top portion of the chain, the chain did not fall from the small upper

drive sprocket. This tendency to maintain contact with the small sprocket teeth allowed the chain to nearly wrap upon itself. When movement produced tension on the bottom portion of the chain, the upper portion produced a slapping action. This slack in the chain caused erratic motion of the right-side drive wheels (see Appendix E). Once the radial stacker was at rest, the deflection in the top portion of the chain measured approximately 14 inches. Investigators determined the mine operator did not maintain the right-side drive chain and keep the runway level at the time of the accident, both of which contributed to the accident.

Safe Operation

The operation of the radial stacker demonstrated inconsistency between the wheel speeds along the runway which caused the wheels to dig into the ground. According to interviews, when the radial stacker no longer advanced, normal practice was to bump the radial stacker with the bucket of the skid steer loader and fill in the displaced material immediately with the skid steer's bucket. When investigators attempted to stop the radial stacker near the inclined area at the east end of the runway, the radial stacker stopped unreliably and rolled approximately six to 12 inches in an inconsistent direction correlating to which portion of the right-side drive chain had slack. At the east end of the runway, the final six feet inclines approximately 2½ inches. The operations manual states, "IMPORTANT – The "runway" for the radial wheels must be level."

The conditions observed through operational testing of the radial stacker demonstrated that it was not operating in a safe manner regardless of slow-paced movement, in that the operation of the radial stacker exposed miners to inconsistent and unpredictable motion. The confluence of factors which made operation of the radial stacker unsafe include: 1) operation on loose, unconsolidated material, 2) operation on an un-level runway, 3) uneven and inconsistent movement because the right-side drive chain erratically cycled from slack to tension, and 4) inconsistent stopping distances because slack causes portions of the chain to catch and bind. These factors created the conditions that caused the radial stacker to become stuck.

Training and Experience

Wixon had approximately three months of mining experience all at Bowes Construction Inc. Investigators determined that Wixon's new miner training was not properly conducted. Wixon was not adequately instructed on the safety aspects and safe work procedures of operating the radial stacker as required by MSHA Part 46 training regulations. According to interviews, the mine operator trained Wixon to stay out of the path of moving equipment. However, Wixon was not provided training specific to the radial drive restricted access areas, which contributed to the accident. Additionally, investigators determined that Wixon's new miner training was not properly conducted because: 1) Wixon received 23½ of the required 24 hours of new mining experience, and 2) Wixon did not receive a visit and tour of the mine.

Examinations

The mine operator did not assign anyone to conduct the workplace examination for the accident area on the morning of May 2, 2023. The mine operator did not complete workplace examinations for the entirety of the commencement of Plant 280 on March 28, 2023. Granum, who was Wixon's direct supervisor, was unable to produce any workplace examinations conducted since commencement. An adequate workplace exam of the area in which the radial stacker was located by a competent person would have identified excessive chain slack, an un-level runway, and that the loose, unconsolidated material creating the runway made any

movement of the radial stacker unsafe. Investigators determined workplace examinations contributed to the accident. The mine operator performed a pre-operational inspection of the mine, including the plant's radial stacker, on the day of the accident.

ROOT CAUSE ANALYSIS

The accident investigation team conducted an analysis to identify the underlying causes of the accident. The team identified the following root causes, and the mine operator implemented the corresponding corrective actions to prevent a recurrence.

1. Root Cause: The mine operator did not provide conspicuous markings to warn against access to the radial stacker left side drive tire area adjacent to the hydraulic jacking cylinder controls.

Corrective Action: The mine operator has installed signage stating that left and right side drive tire areas adjacent to the respective drive tires prohibiting miners from accessing the stacker while in automated operation.

2. Root Cause: The mine operator did not conduct or record workplace examinations of the radial stacker.

Corrective Action: The mine operator has trained miners on how to conduct a workplace examination with the use of workplace examination forms for the mine site.

3. Root Cause: The mine operator did not provide the new miner with adequate training.

Corrective Action: The mine operator has identified the deficiencies in the Part 46 Training Plan. The mine operator has corrected the deficiencies in the Part 46 Training Plan and has retrain all mines in this revised Part 46 New Miner Training Plan.

CONCLUSION

On May 2, 2023, at approximately 12:30 p.m., Izak Wixon, a 19 year-old ground man, with approximately three months of mining experience, died when his left foot contacted the left drive tire of an automated telescopic portable radial stacker (radial stacker). Wixon became trapped and the radial stacker's tires ran over Wixon.

The accident occurred because the mine operator did not: 1) provide conspicuous markings to warn against access to the radial stacker left side drive tire area adjacent to the hydraulic jacking cylinder controls, 2) conduct or record workplace examinations in the area in which the radial stacker was located, and 3) provide the new miner with adequate training.

Approved By:

Christopher Hensler
District Manager

Date

ENFORCEMENT ACTIONS

1. A 103(k) order was issued to Bowes Construction Inc.

A fatal accident occurred on May 2, 2023, at approximately 12:30 p.m. This order is being issued under the authority of the Federal Mine Safety and Health Act of 1977, under Section 103(k) to insure the safety of all persons at the mine and requires the operator to obtain approval of an authorized representative of MSHA of any plan to recover any person in the mine or to recover the mine or affected area. This order prohibits any activity in the affected area. The operator is reminded of the obligation to preserve all evidence that would aid in investigating the cause or causes of the accident in accordance with 30 CFR 50.12.

2. A 104(a) citation was issued to Bowes Construction Inc for a violation of 30 CFR 56.11008.

On May 2, 2023, a fatal accident occurred at this mine when a ground man came into contact with the left side-drive tire, in an area of restricted clearance, of a Thor, Model 136x36 TEL800 radial stacker conveyor (Thor #2). The area was designed to be accessed to control the hydraulic jacking cylinders while the radial stacker conveyor is not in motion. While inside this area, miners are exposed to trip and fall hazards not obvious due to the slow movement of the radial stacker conveyor relative to other mobile equipment at the mine site. The radial stacker conveyor moved at approximately 0.3 miles per hour (0.43 feet per second) and was designed to move automatically. The mine operator did not conspicuously mark the left side radial axle restricted access area exposing miners to trip, fall, and crushing hazards.

3. A 104(d)(1) order was issued to Bowes Construction Inc for a violation of 30 CFR 56.18002(a).

On May 2, 2023, a fatal accident occurred at this mine when a ground man came into contact with the left side-drive tire, in an area of restricted clearance, of a Thor, Model 136x36 TEL800 radial stacker conveyor (Thor #2). The mine operator had not conducted a workplace examination since before mine commencement on March 28, 2023. An adequate workplace examination of the area in which the radial stacker was located by a competent person would have identified excessive chain slack, an un-level runway, and that the loose, unconsolidated material creating the runway made any movement of the radial stacker unsafe. The Aggregate Manager was the miner's direct supervisor and was unable to produce any workplace examinations conducted since commencement. This violation is an unwarrantable failure to comply with a mandatory standard.

4. A 104(a) citation was issued to Bowes Construction Inc for a violation of 30 CFR 46.5(a).

On May 2, 2023, a fatal accident occurred at this mine when a ground man came into contact with the left side-drive tire, in an area of restricted clearance, of a Thor, Model 136x36 TEL800 radial stacker conveyor (Thor #2). The mine operator did not adequately instruct the ground man on the safety aspects and safe work procedures of operating the radial stacker and did not provide training specific to the radial drive restricted access areas. The Federal

Mine Safety and Health Act of 1977 states that an untrained miner is a hazard to himself and to others.

APPENDIX A – Persons Participating in the Investigation

Bowes Construction Inc.

Jason Bowes	President
Kerrie Bolzer	Human Resources Generalist
Timothy Granum	Aggregate Manager
Lyle Bowes	Bulldozer Operator
Brian Mogler	Bulldozer Operator
Austin Dexter	Front-End Loader Operator
Jake Waddell	Plant Operator
Donald Bingham	Mechanic

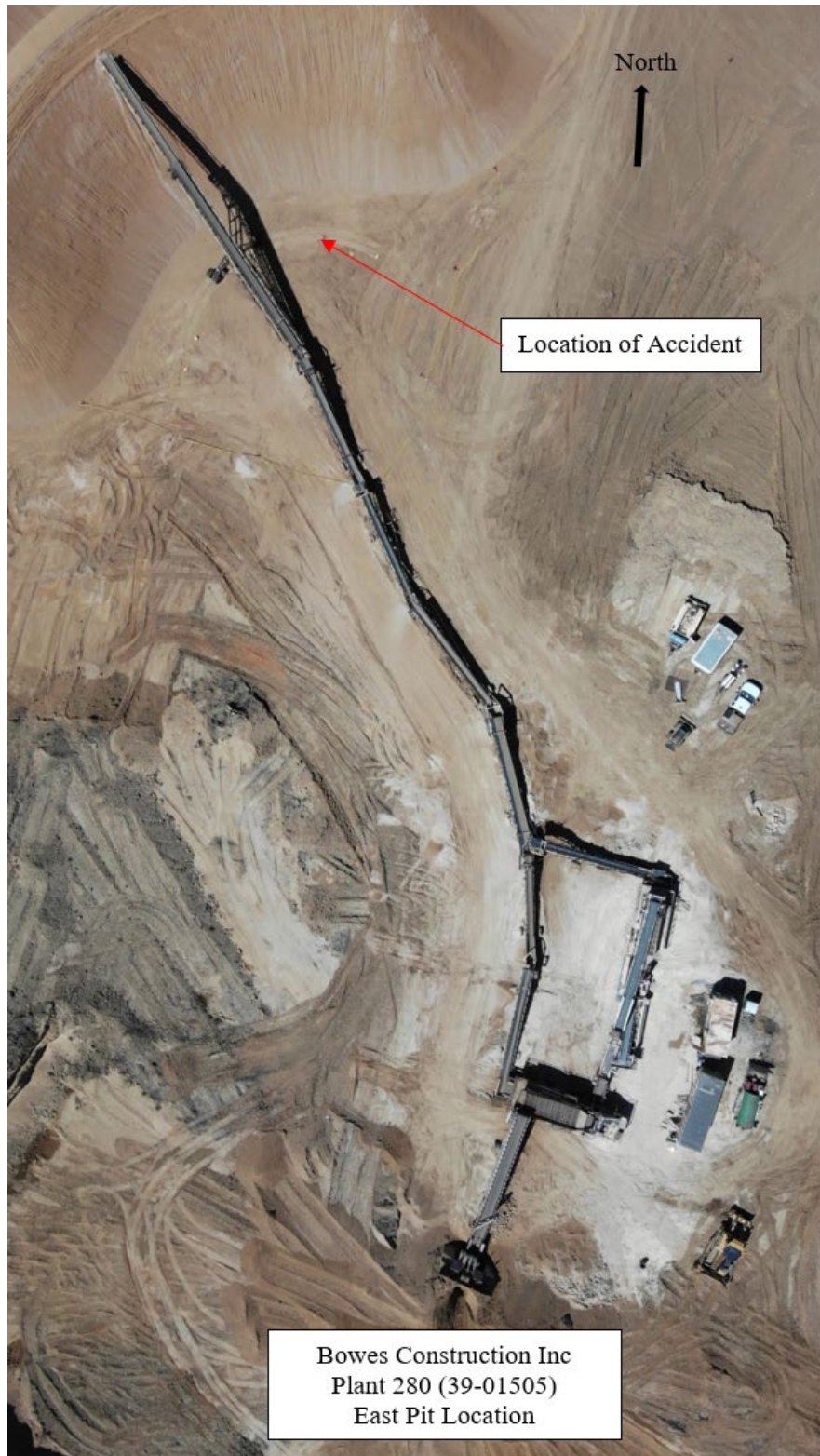
Brookings Police Department

Kevin Murfield	Sergeant-Investigator
Manuel Langstraat	Sergeant


Mine Safety and Health Administration

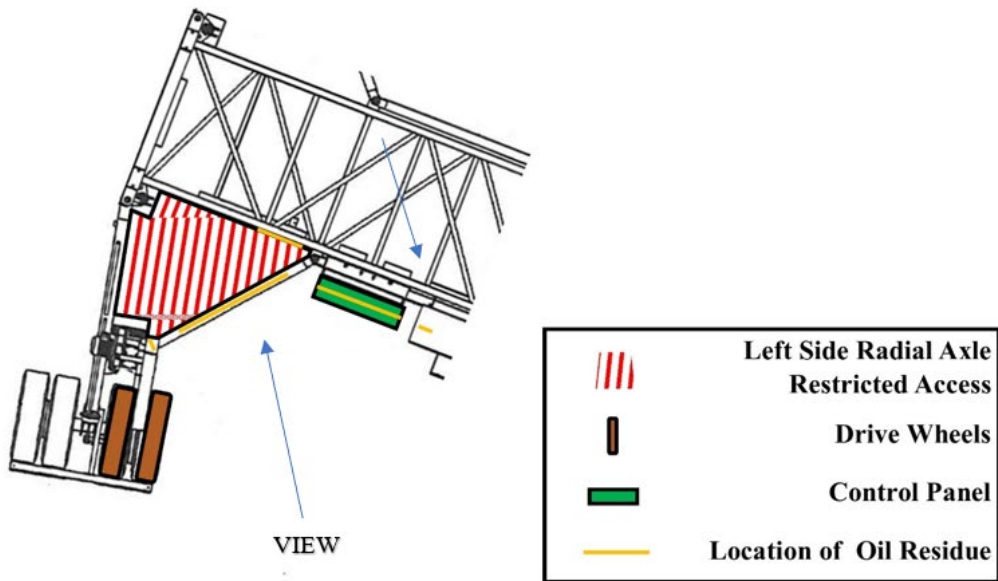
Daniel Goyen	Assistant District Manager
Elwood Burriss	Staff Assistant
Cory Niemi	Mine Safety and Health Inspector
Timothy McPherson	Mine Safety and Health Inspector

APPENDIX B – Aerial View of Plant Where the Accident Occurred

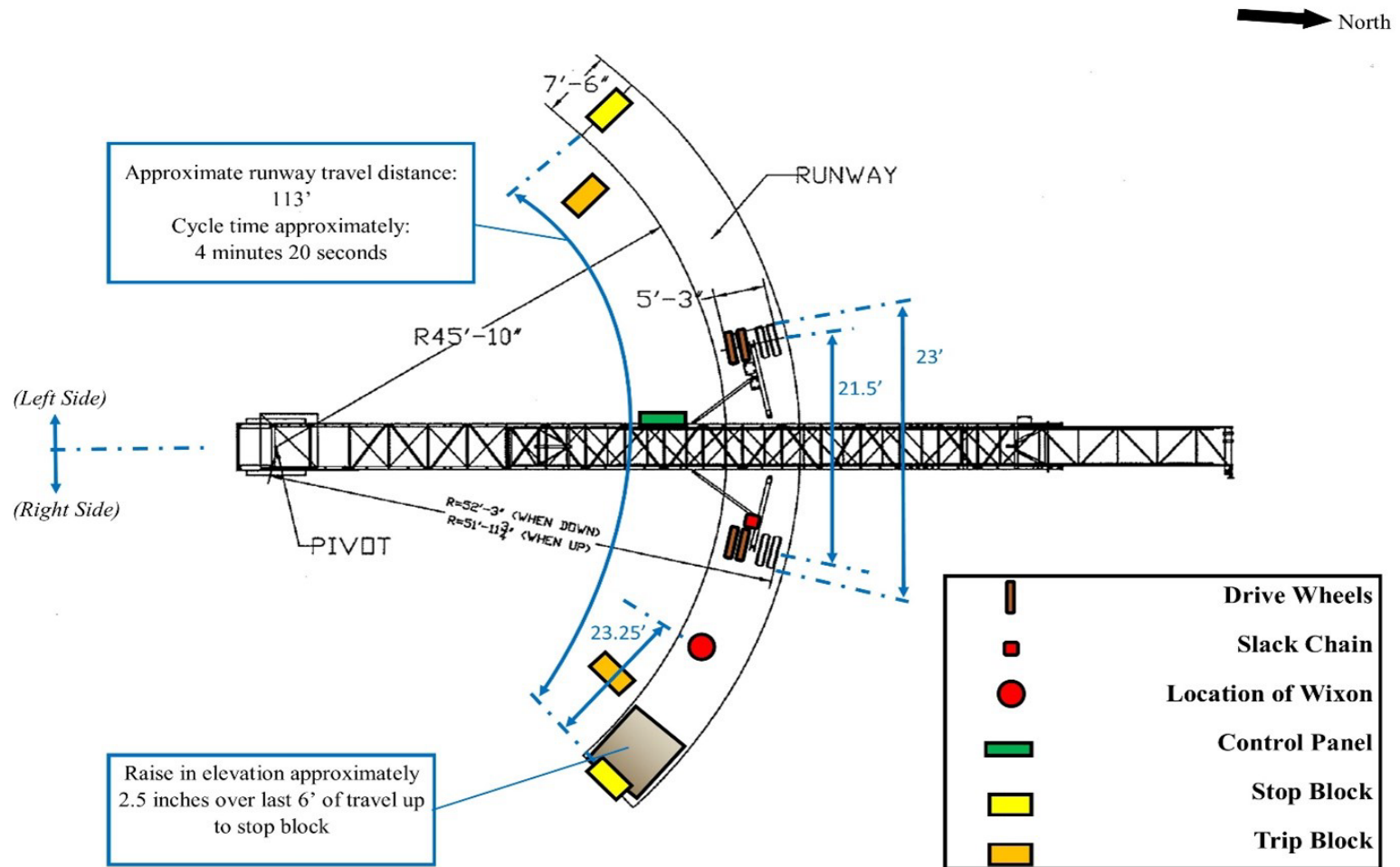


APPENDIX C – Penetrating Oil Residue Location

Location of oil residue 



APPENDIX D – Aerial Diagram Radial Stacker Accident



APPENDIX E – Examples of Excessive Right Side Drive Chain Slack

Drive chain resting without tension.



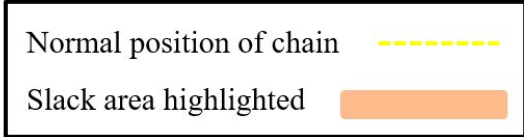
Drive chain slack approximately 14 inches.



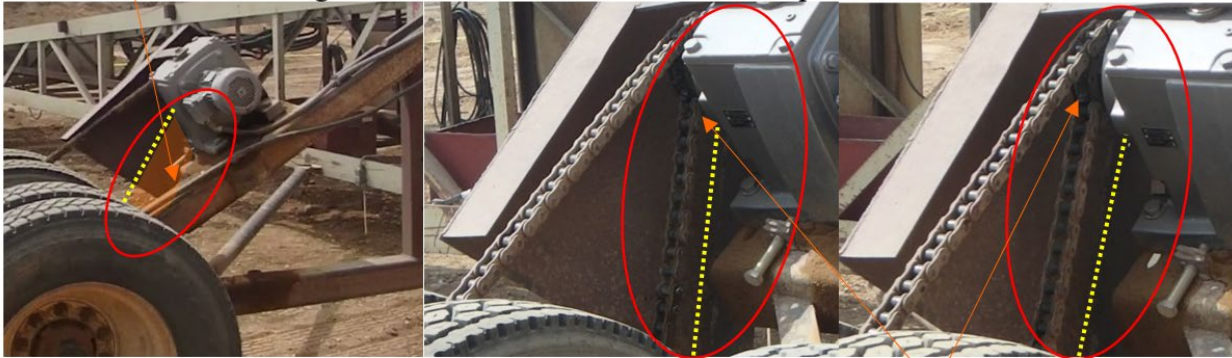
Right hand Drive Chain reaction when bottom in tension.



Loose portion
of chain



Right hand Drive Chain reaction when top in tension.



Loose portion
of chain riding
up cogs.

APPENDIX F – Uneven Ground at East End of Radial Stacker Runway Travel

Radial stacker at east end of travel in runway.



Horizontal frame of carriage at approximately 7.5% grade

