



Sibanye Stillwater RPM

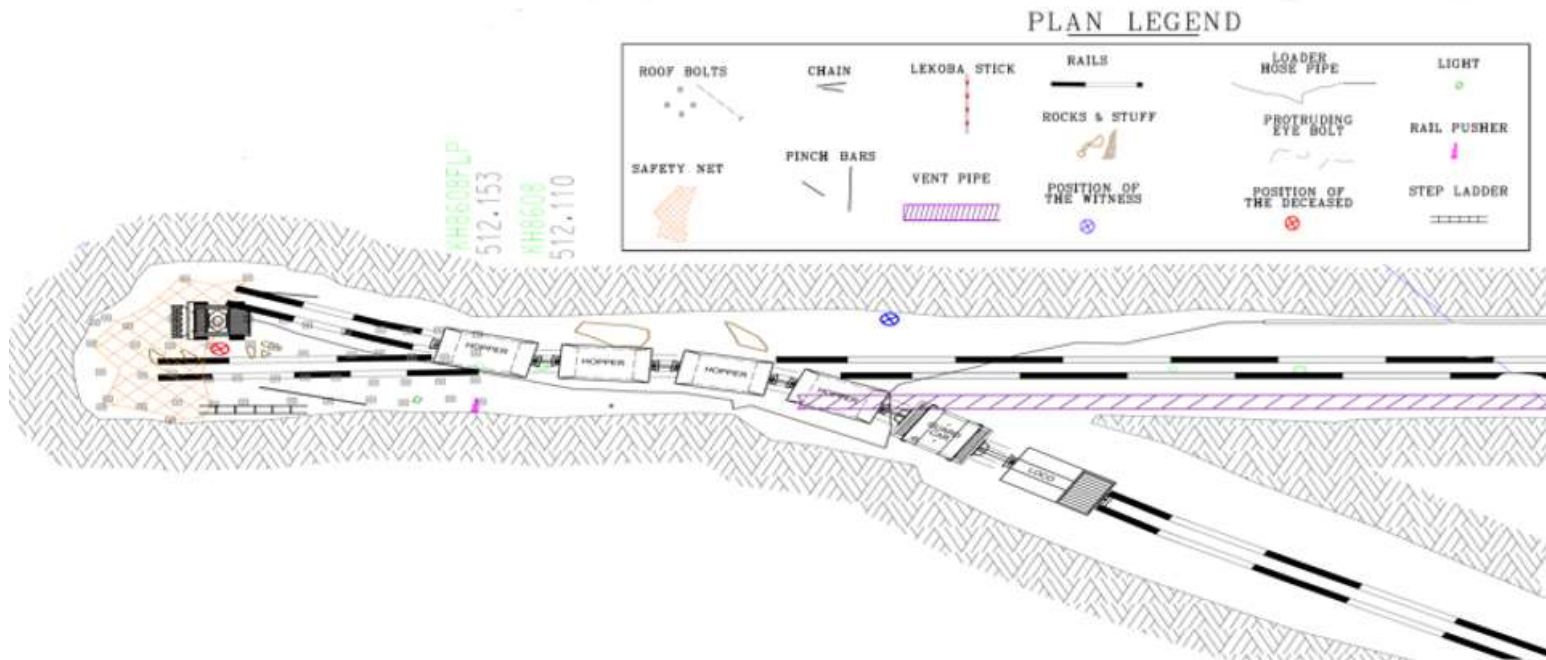
Railbound Development

Working Group

09 November 2023

Description

On the 18th July 2023, a Loader Operator was busy loading with a pneumatic mechanical Loader at 16LE23 X/CS breakaway, it would appear that the loader was driven off the front of the sliding rail and toppled-over. During this process, the extended telescopic arm pinned the Loader Operator against a rock that was lying on the footwall. The incident occurred during night shift at approximately 03:20.





we
Sibanye
Stillwater

Other Risks Associated with Pneumatic Mechanical Loading:

- Current Telescopic Arms Limitations
- Improved Design for Ends >3.5m
- Additional Designs Reviewed

Temporary Rail Best Practice:

- Jump Sets and Sliding Rails with G-Clamp
- Jump Sets and Sliding Rails with Stubs
- Stopper/Indication

New Technology:

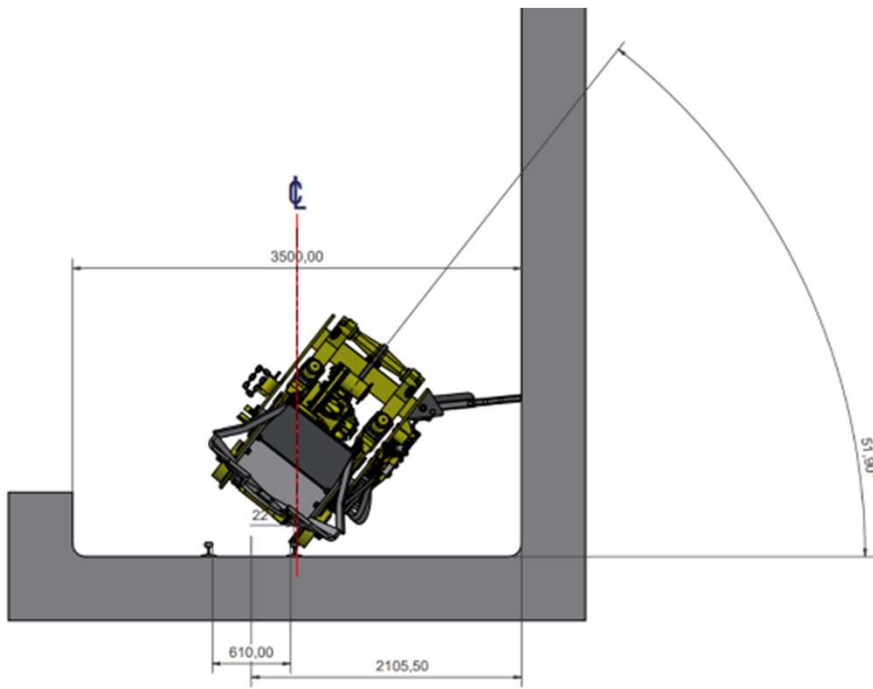
- GST SQL Mucking Loader
- Doking Continuous Loader
- Trident Electric Hydraulic Loader
- Salzgitter Electric Loader
- Bobcat Re-Design



Other Risks Associated with Pneumatic Mechanical Loading

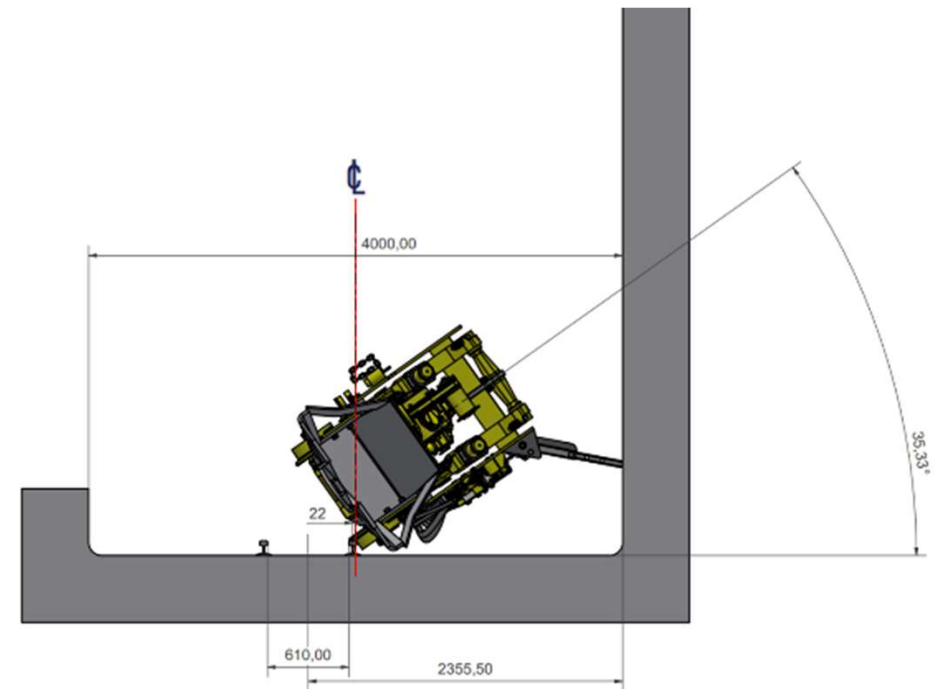


Current Telescopic Arm Limitations



Current 3.5m development standard

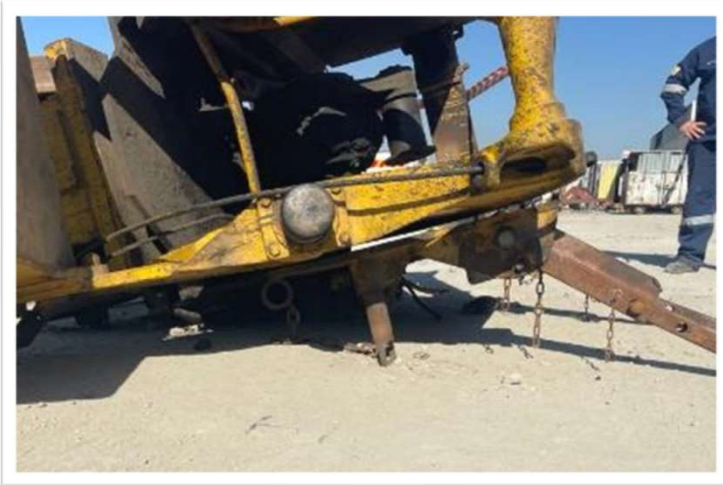
- Centre of haulage offset
- Angle of loader 51.9 degrees



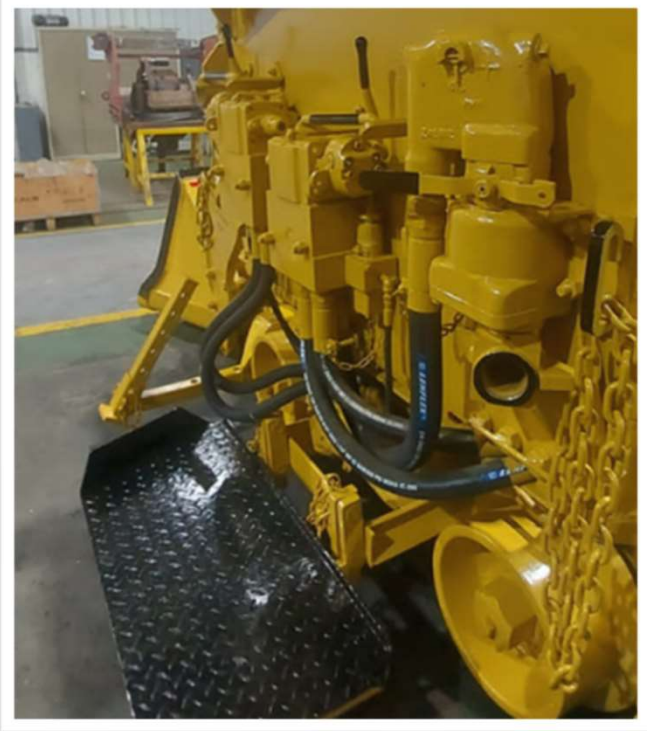
Current 4m development standard

- Centre of haulage offset
- Angle of loader 35.33 degrees

Improved Design for >3.5m



Additional Designs Reviewed





Temporary Rail Best Practice

Overview of Mock-Up



Straight G-Clamp Jump Set with Sliding Rail



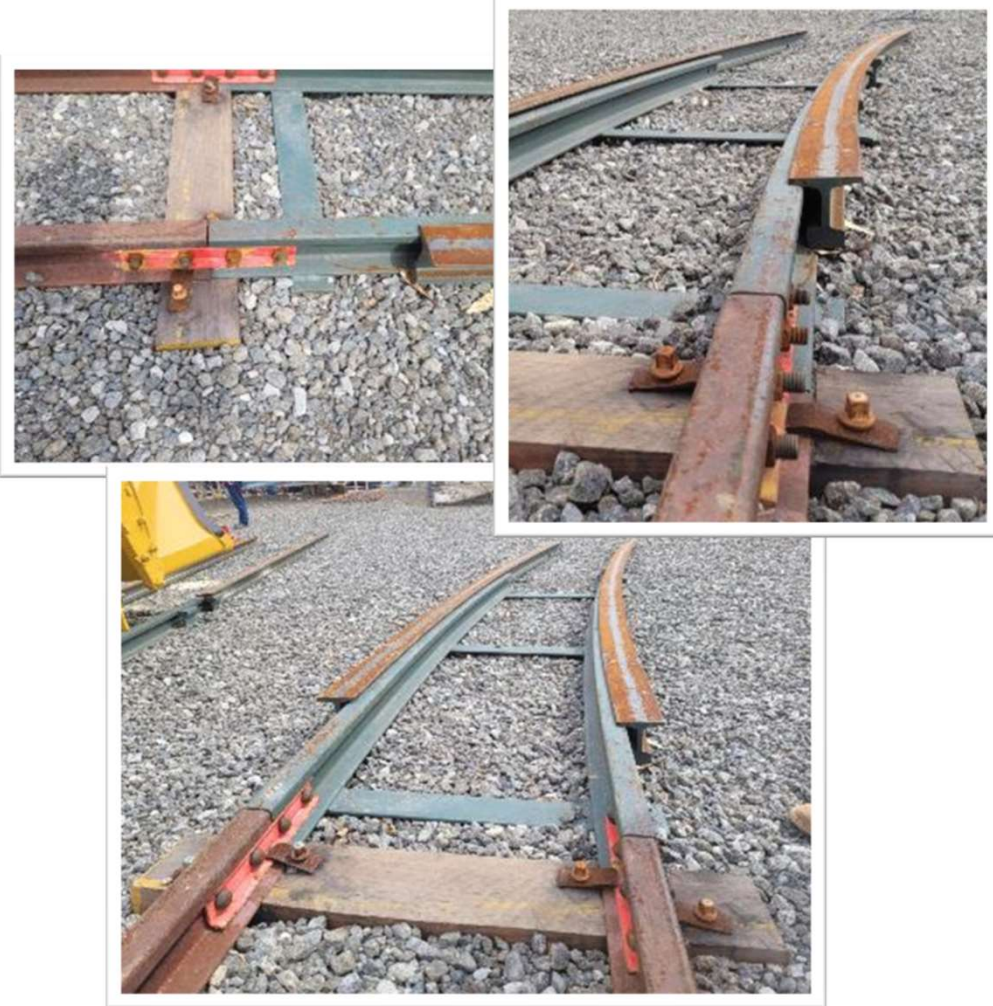
Curve G-Clamp Jump Set with Straight Sliding Rail



Straight Stub Jump Set with Sliding Rail



Curve Stub Jump Set with Sliding Rail



Stopper/Indication



Different Stoppers/Indicators Tested:

- Cut out of sliding rail
- Clamp with stopper, fitted inside of web
- Slotted stopper inside of web
- **Slotted stopper with web cut-out**



Stopper/Indication



Different Stoppers/Indicators Tested:

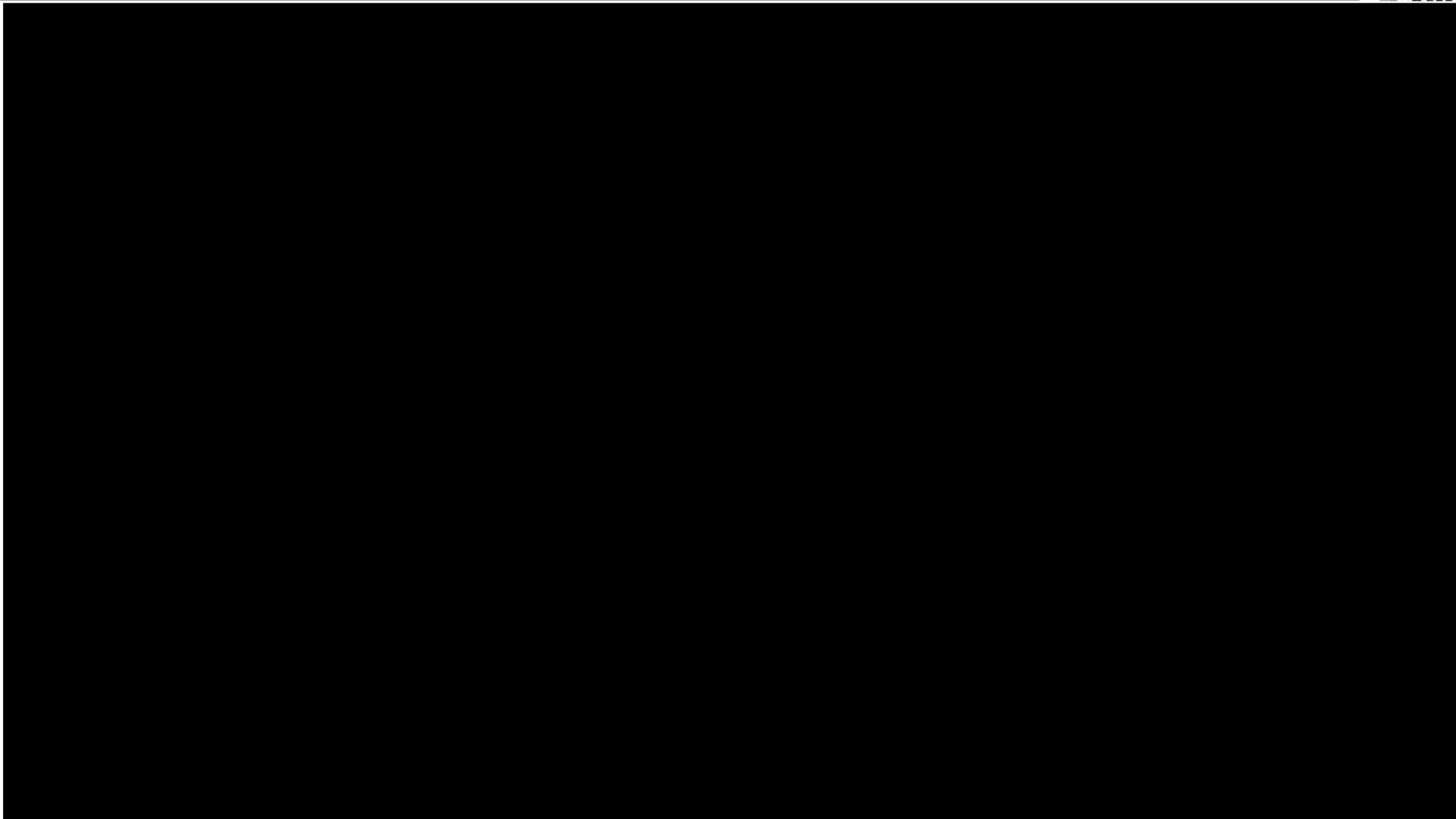
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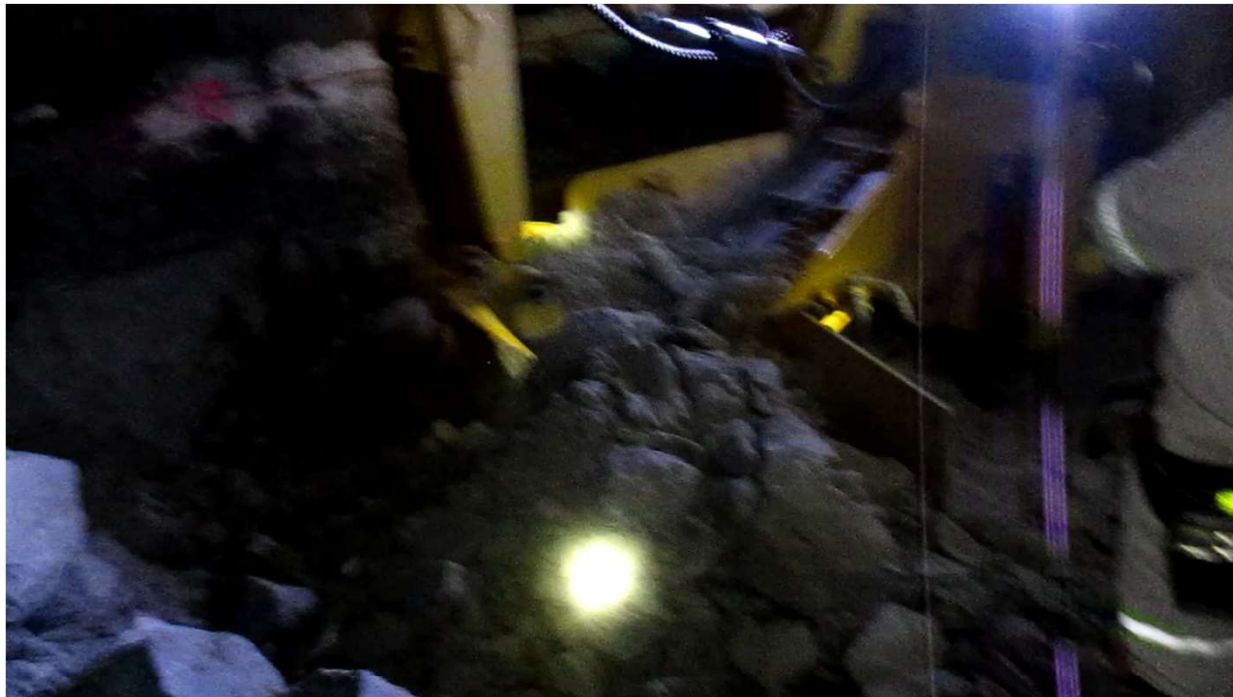


New Technology

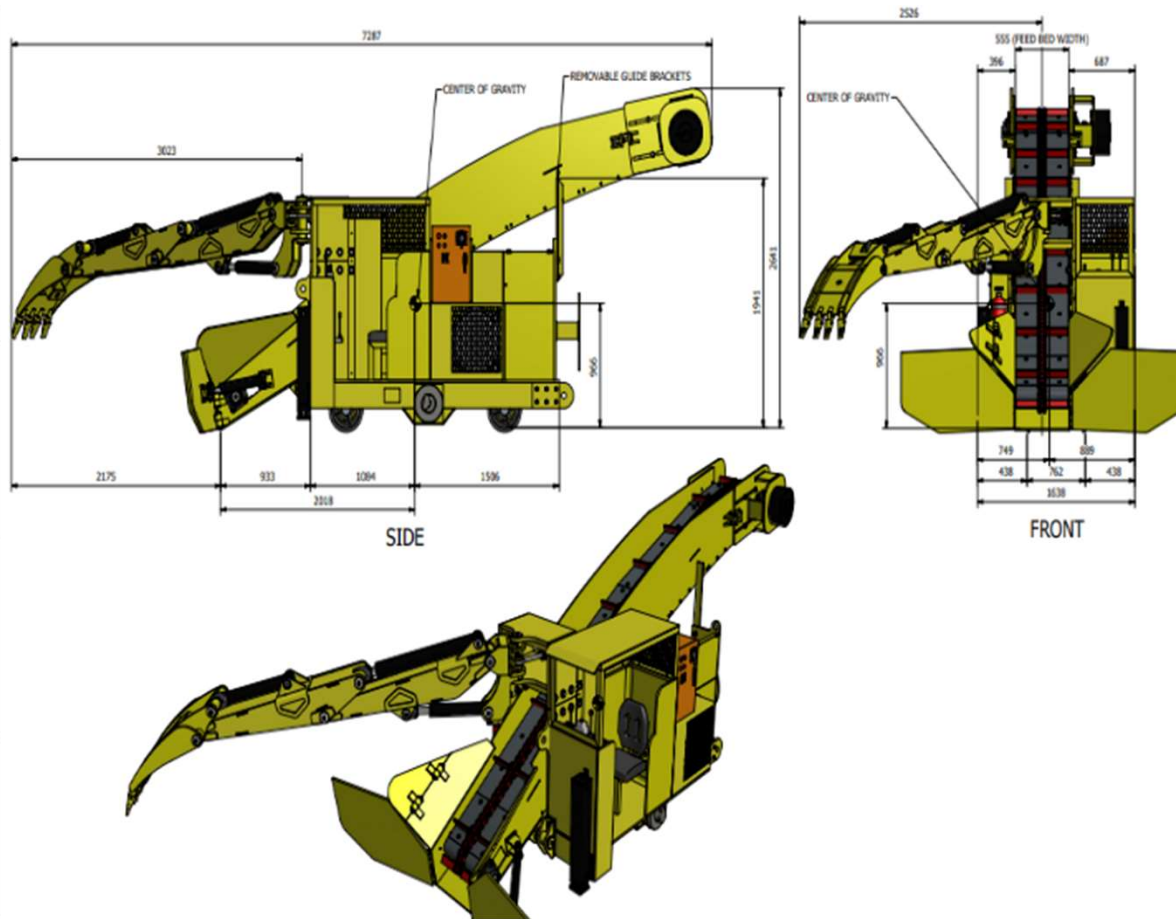
GST SQL Mucking Loader



GST SQL Mucking Loader

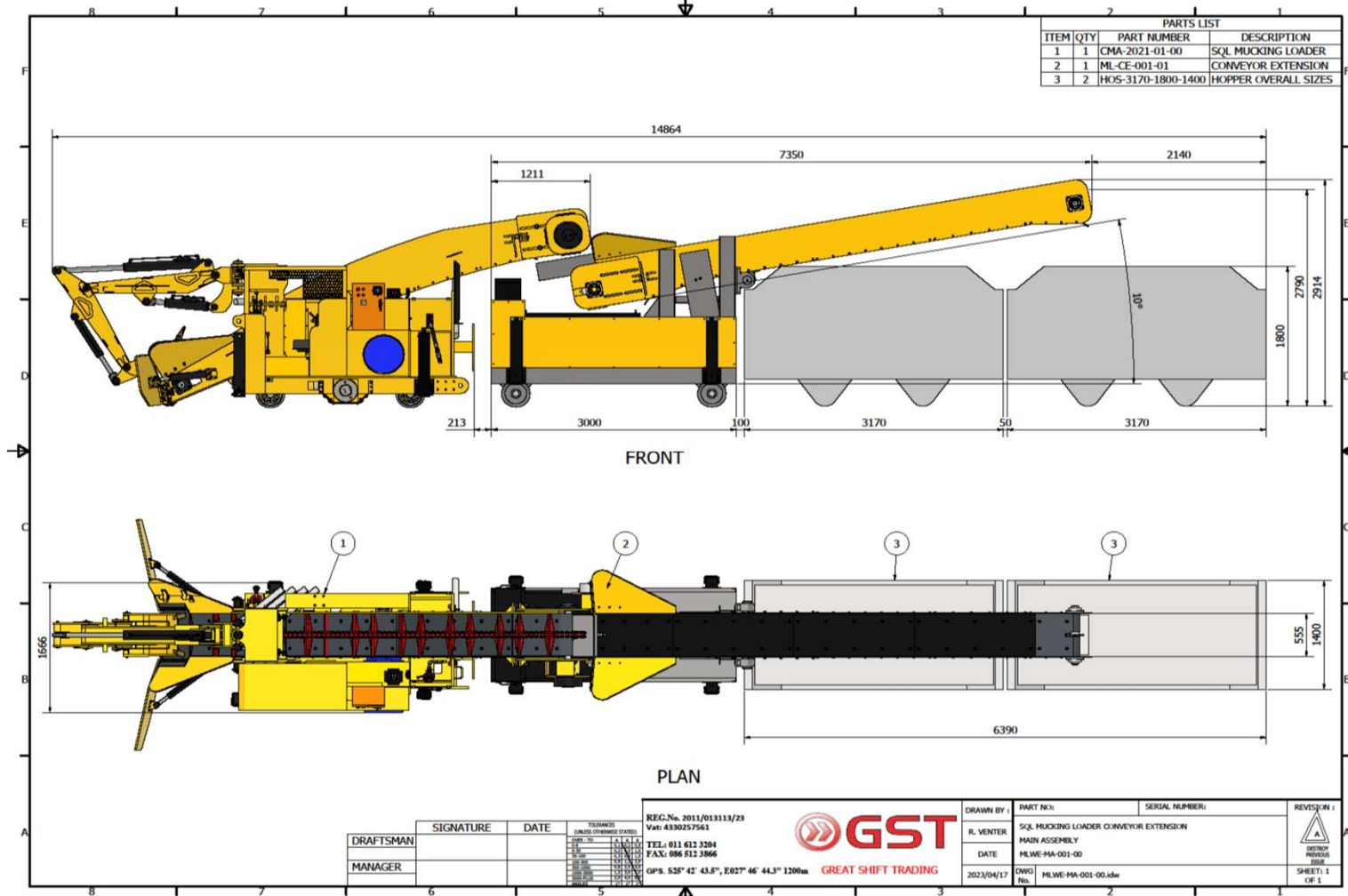


GST SQL Mucking Loader



- Weight 7968,4 kg
- Loading ability 80 m³/h
- Traveling speed 0.37 / 0.75 m / sec
- Speed of scraper chain 42 m / min
- Conveyor chain Single chain single motor
- Adaptive tunnel slope 1:100
- Min. turning radius ≥12 m
- Clearance from track ≥ 150 mm
- Steering Rail bound
- Track gauge as per mine standard
- Conveyor inner width 555 mm
- Maximum Boom angle ± 36°
- Dimension (Transportation) L 6839 mm
W 1638mm
H 1941 mm
- Dimension (Operating) L 7287 mm
W 1638 mm
H 2641 mm

GST SQL Mucking Loader – Conveyor Extension



Doking Continuous Loader



Option 1

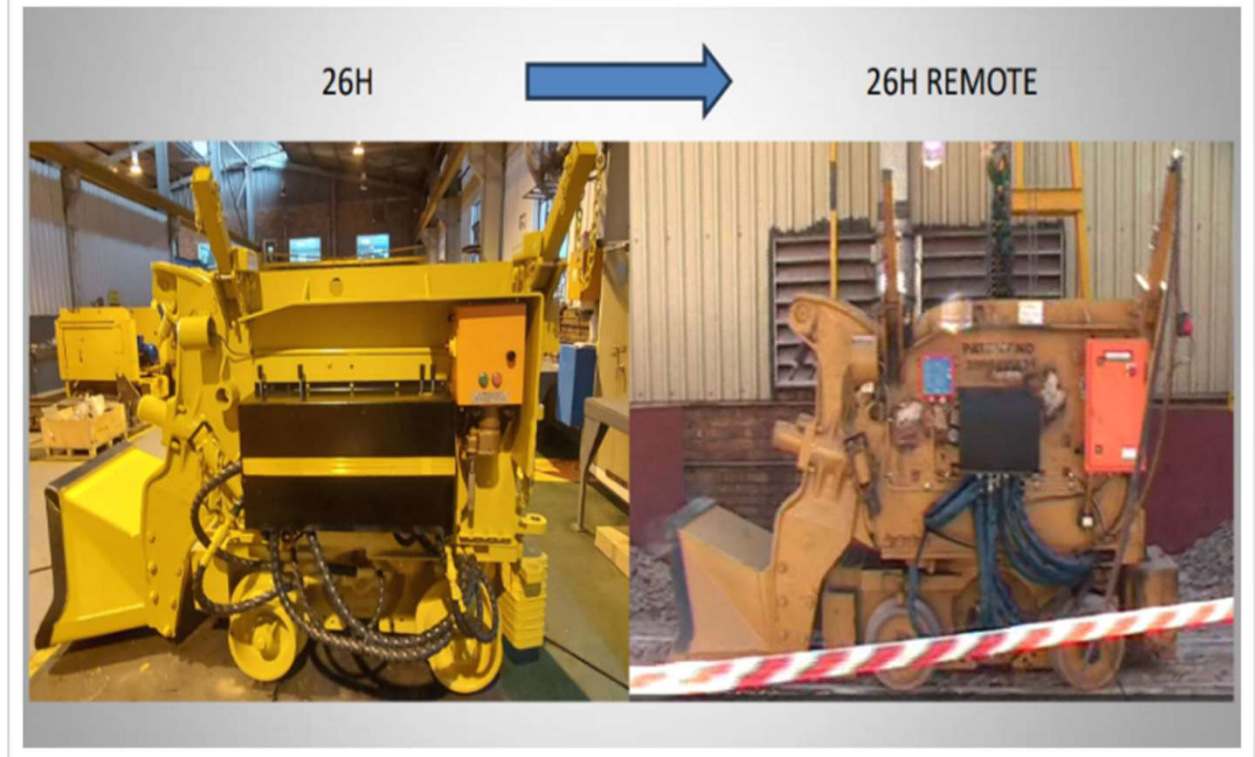
- Keep tracks as per current design
- Reduce Loader width for current U/G conditions

Option 2

- Replace tracks with wheels
- Reduce Loader width for current U/G conditions

DIMENSIONS (L x W x H) mm:	
Prime Mover with Tool	5150 x 2900 x 1800
Clearance	135 mm
Weight	9000 kg

Trident Electric Hydraulic Loader



Salzgitter Electric Loader

ALZ-30 CRAWLER ELECTRIC REMOTE-CONTROLLED LOADER



Bobcat Re-Design



Bobcat Design Considerations

- Remove wheels and fit steel railway wheels
- Drop the cab design to below 1.8m
- Split top and bottom deck and insert ring gear design
- Re-design current bucket to loader design
- Ensure top deck movement will fit in U/G dimensions

Questions?