

Mponeng Mine Vertical Transport

Pipe bogey foul shaft steelwork
during slinging operation

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Incident

During normal slinging operations on the Main shaft East Man Winder on Tuesday 7 March 2006 at approximately 11:00 am a bogey carrying four 250mm chilled water pipes became lodged on the shaft steelworks between the underlay and overlay compartments. During an insito investigation following the incident it was observed that the overlay conveyance was sitting on top of the fouled bogey and that an amount of winder rope had coiled on top of the conveyance forming a cork screw. It was further observed that at least one of the chilled water pipes was hanging outside the bogey.



Sequence of events

- The incident took place during normal slinging operations
- The 7th bogey loaded with four 250 mm lagged chilled water pipes was pulled into the shaft
- The bogey was steadied and the cage was rung away
- Engineering Assistant working on another conveyance heard a noise in the shaft
- The assistant went to tell the banksman



Sequence of events

- Before the assistant could reach the banksman the winder tripped on electronic slack rope
- The banksman immediately activated the long bell
- The engineer was notified



Sequence of events

- The West Man Wider was rigged up to do shaft examination on single in order to assess the extent of the situation.
- Upon investigation it was found that the bogey of pipes fouled the shaft steelwork
- Fortunately none of the pipes fell down the shaft and thus no major damage to the shaft



Sequence of events

- The conveyance had come to rest on top of the bogey, which caused the slack rope and the subsequent corkscrew of the rope
- **A retrieving procedure was drawn up (one plan)**
- Retrieving operations began



Sequence of events

- A complete plan was formalised before retrieval of the bogey began
- Only the prescribed plan was to be followed with only one person in charge
- Everyone involved was briefed regarding each person's roles and responsibilities
- Chilled water pipes were supported to the bogey by means of chain blocks



Sequence of events

- The bogey together with the chilled water pipes was secured to the shaft steelwork
- The conveyance was raised slowly to take up the slack in the rope
- The condition of the kink in the rope was assessed in order to establish whether it could be used to raise the conveyance and bogey



Sequence of events

- The bogey was raised to surface using the kinked rope
- 9 hours after the incident the bogey was recovered on surface
- The kinked rope was cut, a new front end made and the kinked portion was sent for destructive testing

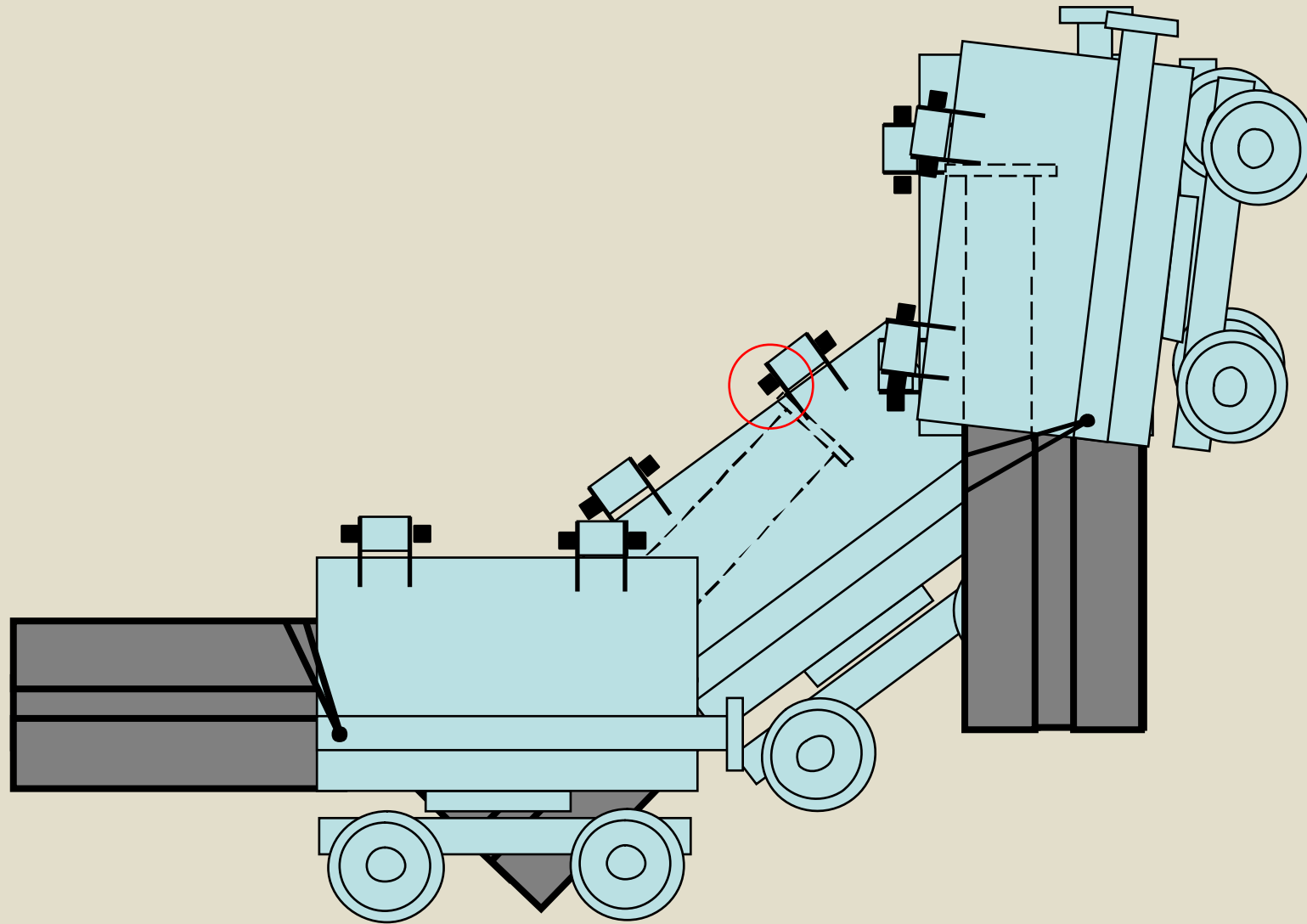


Unsafe Conditions

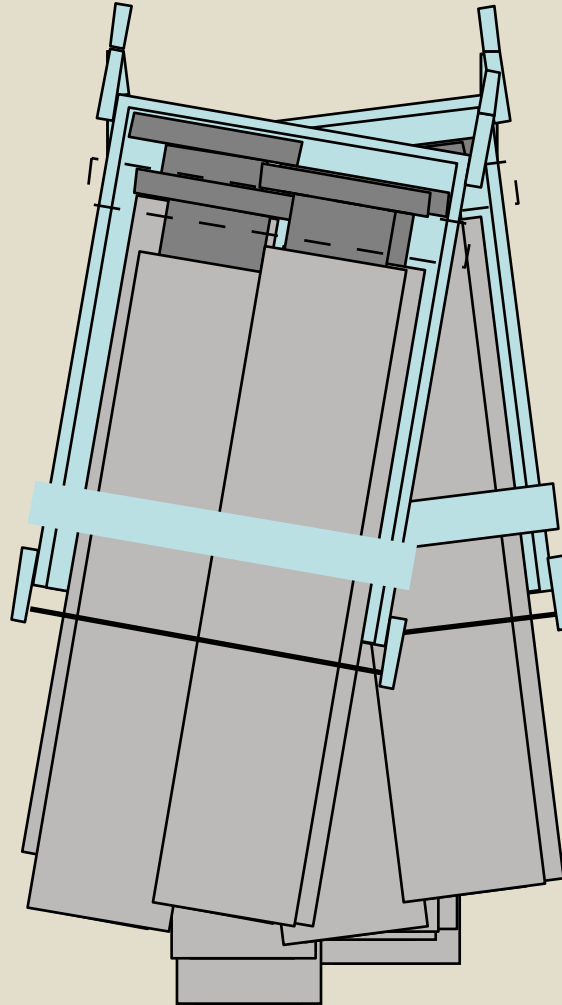
- Position of the bogey head after being stabilised in the shaft



Unsafe Conditions



Unsafe Conditions





Unsafe Acts

- Failure to notice the position of the bogey relative to the pipes
- Although not evident in this case Winding Engine Drivers occasionally introduce shock into the system while slinging



Incorrect loading of bogeys



Wrong bogey used

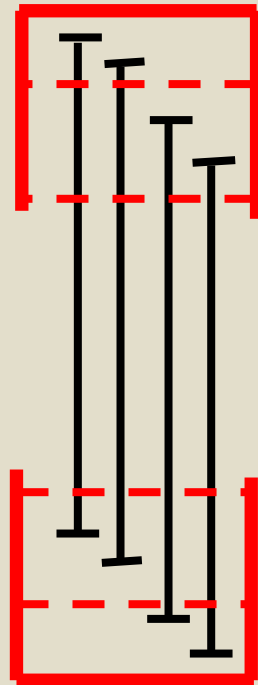


Loaded off centre

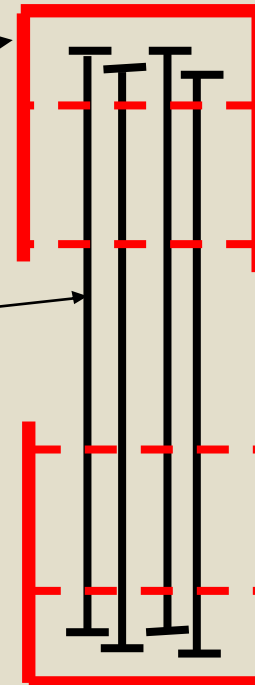


Transport sling too long

Unsymmetrically loaded bogey



Symmetrically loaded bogey



Bogey

Pipes

- The bogey will hang skew in the shaft
- Pipes can come off the bogey
- Need to use a shackle to compensate for skewness

Correct loading of a bogey



Pipes loaded to ensure symmetry

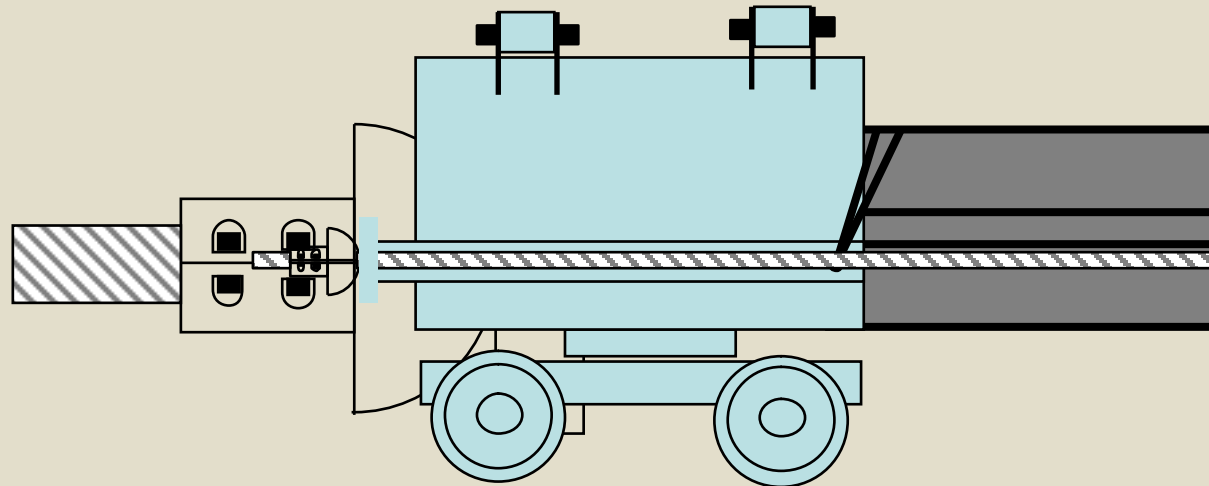
Operational Control

- Bogey modification to allow for additional lashing



Operational Control

- Design of rope stopper





System Controls

- Truck busting shop inspection
- Check bogeys for symmetry at the shaft before slinging (improperly loaded bogeys will be rejected)
 - Final Rigger inspection
 - Banksman final sign off



Other Remedial Actions

- Increased WED awareness during slinging
- ATD request to determine the behaviour of pipes during slinging
- Increased awareness of people loading bogeys

Learning Points

- Attachment point for a Sala block to be attached above person



Learning Points

- The value of electronic slack rope device.
- With proper assessment and under controlled conditions, a kinked rope can be used to lift the conveyance.

Minimum Breaking Force = 2943 kN

Test results (kinked rope) = 2629 kN





Questions