NSW GOVERNMENT

NSW Resources Regulator

INVESTIGATION REPORT

Serious injuries sustained by a worker at

Cowal Gold Mine on 29 July 2018

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Executive summary

On 29 July 2018, a 58-year-old contract worker suffered spinal injuries when he fell one metre from the platform of a scissor lift in the regeneration kiln area at Cowal Gold Mine.

The worker and a co-worker had been assigned the task of rigging an unusually shaped steel pipe, about 4.8 metres above the ground. The pipe was to be connected to existing pipework located inside and outside an existing four post structure. The task was being performed as part of construction works being undertaken at the mine by his employer, EC & M Limited.

A Genie GS1932 scissor lift was being used to assist with the task, but it was too high to fit under the angled steel bracing connecting two of the structure's upright steel supports. In order to fit the scissor lift under the bracing, the worker and his co-worker unfastened the bolts that secured the front and left side guard rails to its platform. They removed the left side guard rail, lifted the front guard rail from the tubes it was housed in and rested it on the platform.

The worker crouched down on the scissor lift's platform, which was in the stowed position. He began driving the scissor lift forward and under the angle brace using a wired control unit. As the worker did this, he lost his balance and fell forward. He fell over the front of the platform, taking the front guard rail that was resting on the platform with him. He struck his head on the concrete surface below him.

The worker was wearing a safety fall arrest harness, but it was not connected to the platform of the scissor lift. It is reasonably likely that if the worker's harness had been connected to the rear anchor point of the scissor lift, via a suitably adjusted lanyard, he would not have fallen over the front of the scissor lift. However, the harness would not necessarily have prevent a fall over the side of the scissor lift. The investigation found that had the workers walked the scissor lift under the steel support, this incident would have been prevented.

Figure 1 Direction of fall and guardrail on ground

The worker experienced pain and altered sensations in his limbs and left hip. He was assisted by other workers and members of the mine's Emergency Response Team, before being transported to hospital by ambulance.
The worker was diagnosed as having sustained severe narrowing of his spinal cord. He underwent a cervical laminectomy to relieve the compression on his spine. He experienced a series of complications secondary to the surgery which included a cardiac arrest on 8 August 2018.
The worker's condition deteriorated, and he tragically passed away on 14 September 2018.

Causal factors

The direct causes of the incident were:

- the removal of the scissor lift's guardrails
- accessing the scissor lift's platform with its guardrails removed
- operating the scissor lift with its guardrails removed.

The following factors contributed to the incident:

- failing to sufficiently define work method
- failing to conduct an updated risk assessment when a new work method was proposed
- inadequate supervision of workers
- unauthorised modification of plant
- failing to follow change management requirements.

Contents

1. Investigation overview

1.1. The Regulator

The NSW Resources Regulator investigates major workplace incidents in the NSW mining, petroleum and extractives industries. Our role is to carry out a detailed analysis of incidents and report its findings to enhance industry safety and to give effect to our *Compliance and enforcement approach.*

1.2. Legislative authority to investigate

Investigators are appointed as government officials under the *Work Health and Safety (Mines and Petroleum Sites) Act 2013* and are deemed to be inspectors for the purposes of the *Work Health and Safety Act 2011* (WHS Act). The Regulator has also delegated some additional functions to investigators, including exercising the power to obtain information and documents for the purposes of monitoring compliance with the WHS Act.

1.3. Regulator response

The incident was initially reported to the Regulator on 29 July 2018. Inspectors were not deployed to the scene at that time.
The PCBU further updated the Regulator on 16 September 2018 relating to the death of the worker, following a series of complications secondary to the surgery.
The investigation commenced on 17 September 2018. The investigation involved:

- scene assessments
- witness interviews
- obtaining information and documents from relevant parties
- engaging a specialist consultant.

On 17 December 2018, the Regulator published an Incident Information Release IIR18-14 to draw attention to the occurrence of a serious injury in the mining industry and share early learnings.

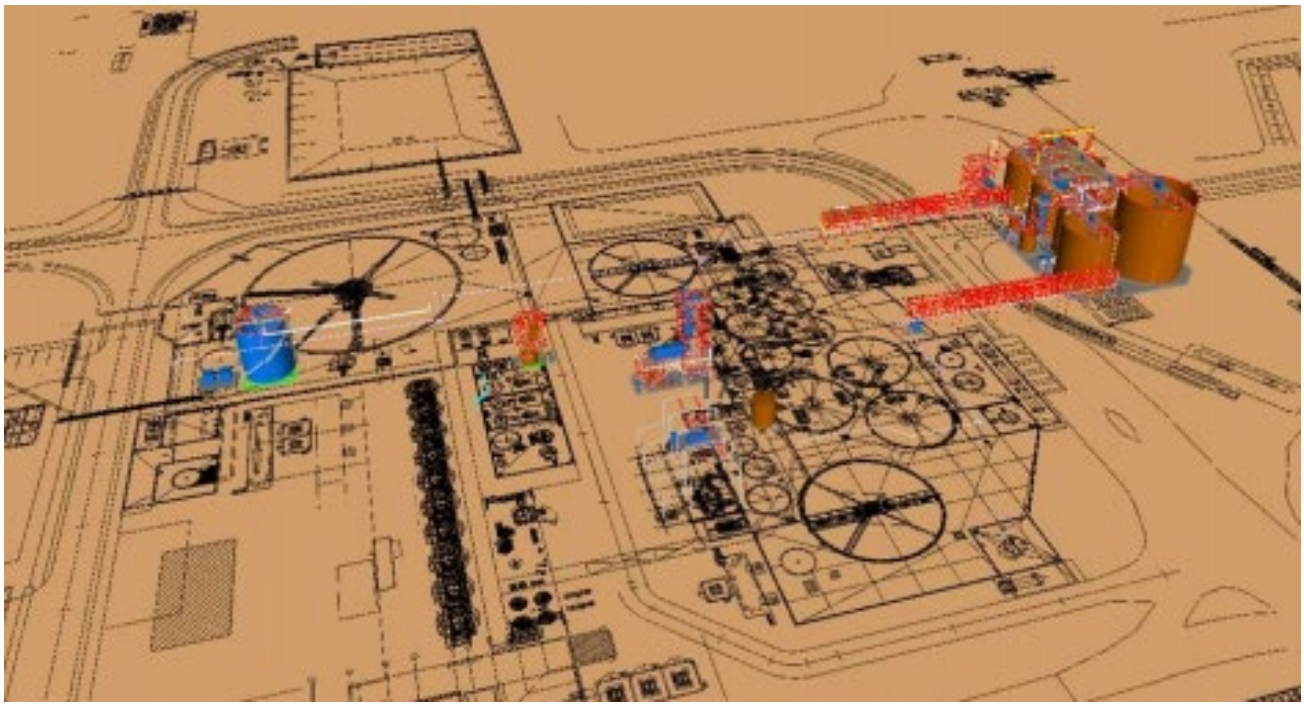
2. The incident location

2.1. The mine

Cowal Gold Mine is 40 kilometres north-east of West Wyalong. The mine is an open pit gold operation that utilises conventional drill and blast, and load and haul methodologies. The mine commenced operation in 2005.

The incident occurred at the mine's processing plant. In order to improve gold recovery, the mine operator commissioned the 'CGO Float Tail Leach Project'. The project included a new leach circuit, carbon handling, and mixing and distribution systems.

Figure 2 Cowal Processing Plant – project works overlayed in colour



3. The parties involved

3.1. The mine operator

Evolution Mining (Cowal) Pty Limited is the operator of the mine. The mine operator is a subsidiary of Evolution Mining Limited, a mid-tier producer that operates gold mines in NSW, Queensland and Western Australia. The mine operator is authorised to conduct operations at the mine under Mining Lease 1535.

3.2. The contractor

On 29 June 2017, an agreement was executed between the mine operator and Mineral Process Engineering & Construction Pty Ltd (MPEC), for MPEC to undertake the project works. MPEC is a joint venture between EC & M Limited (ECM) and CPC Project Design Pty Ltd (CPC).
ECM went into voluntary administration on 22 August 2019 and resolved to wind up the company with eventual deregistration. It previously provided construction services in the mining, oil, gas and infrastructure sectors. CPC provides engineering design and procurement services to clients in those same sectors. Under the joint venture, it was agreed that CPC would perform the design and commissioning work for the project, and that ECM would undertake all construction work.
MPEC did not employ any workers at the project. All construction workers, including the injured worker, were employed by ECM. It began deploying workers to the site in late 2017. The construction phase of the project was completed on 23 December 2018. ECM left the site at that time.

3.3. The worker

The worker was 58 years of age when he passed away. He had more than 20 years' experience as a rigger and dogman. Several of his previous supervisors described the worker as being extremely safety conscious. He held numerous qualifications, including:

- Riggers class 1; Dogman class 2; Crane chaser and hoist driver
- SafeWork NSW high risk work licence
- Elevating Work Platform Association of Australia Inc: Operator yellow card
- Working Safely at Heights competency.

4. Scissor lift involved in incident

4.1. Ownership

The mobile plant being used at the time of the incident was one of three Genie GS1932 self-propelled scissor lifts hired by ECM from Access Hire on 24 May 2018.

4.2. Manufacture and acquisition

The scissor lift was manufactured in China and imported to Australia by Terex in 2017. The scissor lift was purchased by Access Hire from Terex on 12 March 2018.

Terex provided Access Hire with an inspection certificate confirming that the scissor lift met or exceeded Australian Standards AS1418.10 and AS2550.10.

4.3. Delivery to mine

The scissor lift was delivered to ECM at the mine on 24 May 2018. Access Hire conducted a pre-delivery inspection of the scissor lift on 24 May 2018, which confirmed the following:

- no faults were identified at the time of delivery
- the operator's manual was in a protective box clipped to the scissor lift's guardrail
- safety decals were legible and in place
- nuts, bolts and other fasteners were secured.

4.4. Introduction to site

The mine operator required contractors to have all mobile plant introduced to site inspected by the mine's maintenance foreman. The scissor lift was inspected and approved for use at the mine by the mine operator on 26 May 2018. It remained on site up to and following the time of the incident.

4.5. Specifications

Table 1 The relevant specifications of the scissor lift

CRITERIA	DETAILS
Working height maximum	7.79 metres
Length (stowed position)	1.83 metres
Width	0.81 metres
Platform height maximum	5.79 metres
Platform height (stowed position)	1.00 metre
Platform length (outside)	1.63 metre
Platform width (outside)	0.74 metres
Guardrail height	1.10 metres
Toe board height	0.15 metres
Maximum platform occupancy – indoor	2 persons

Maximum platform occupancy – outdoor	1 person

4.6. Scissor lift platform

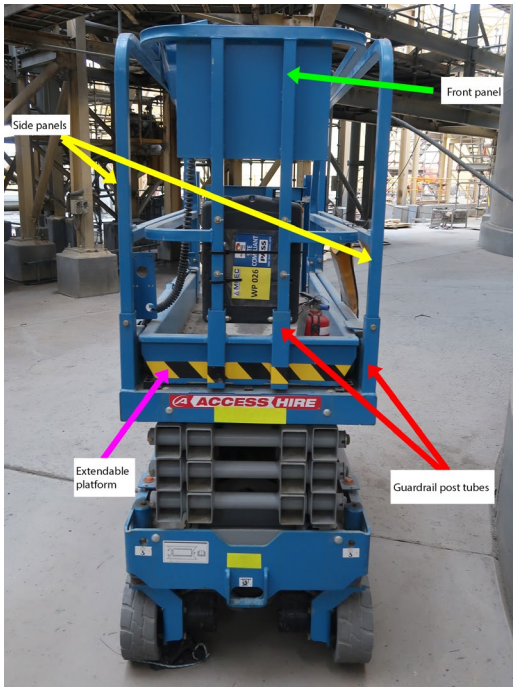
The platform of the scissor lift was fitted with an extension platform, which when extended, increased the maximum length of the platform to 2.54 metres. The platform extension was in the retracted position at the time of the incident (as shown in figure 5).

4.7. Guardrails

There was a guardrail around the perimeter of the scissor lift's platform. It consisted of four panels:

- Two straight panels along each side.
- A rear panel which included a half-height entry gate.
- A front panel fixed to the extension platform. It curved around the side of the extension panel to provide side fall protection when extended.

Figure 3 Guardrail and extending platform of scissor lift



The side panels were joined by nuts and bolts. The front panel was bolted to the extension platform. The posts of the guardrail panels were secured by bolts to metal tubes welded to the platform. The bolting system used was 3/8 by 2.75-inch bolts, washers and lock nuts. The manufacturer stated that it did not use a more permanent method to fix the guardrail in order to allow maintenance and repairs to be performed with hand tools. It stated that it did not intend for the guardrails to be removed during normal operation.

Figure 4 Bolting system used to fix guardrail panels

4.8. Fall arrest harness anchor points

The platform of the scissor lift was equipped with three anchor points where personal fall arrest harness lanyards could be attached. The two anchor points fixed to the mid-rail of the guardrail were not labelled, but the anchor point fixed to the toe board of the extension panel was.

Figure 5 Personal fall protection anchor points on scissor lift

4.9. Operator's manual and safety placards

The operator's manual of the scissor lift contained the following specific information in relation to the risk of falling from heights.

4.9.1. Use of personal fall protection

Figure 6 Excerpt from page 10 of Genie Operator's Manual

Personal Fall Protection

Personal fall protection equipment (PFPE) is not required when operating this machine. If PFPE is required by job site or employer rules, the following shall apply:

All PFPE must comply with applicable governmental regulations and must be inspected and used in accordance with the manufacturer's instructions.

4.9.2. Fall hazards

Figure 7 Excerpt from page 13 of Genie Operator's Manual

⚠ Fall Hazards

The guard rail system provides fall protection. If occupant(s) of the platform are required to wear personal fall protection equipment (PFPE) due to job site or employer rules, PFPE and its use shall be in accordance with the PFPE manufacturer's instructions and applicable governmental requirements. Use approved lanyard attachment point provided.

Do not sit, stand or climb on the platform guard rails. Maintain a firm footing on the platform floor at all times.

Do not climb down from the platform when raised.

Keep the platform floor clear of debris.

Do not enter or exit the platform unless the machine is in the stowed position.

Attach the platform entry chain or close the entry gate before operating.

Do not operate the machine unless the guard rails are properly installed and the entry is secured for operation.

The safety placard fitted to the scissor lift contained similar warnings.

4.10. Scissor lift control

The drive functions of the scissor lift were capable of being operated using a wired control unit:

- from the platform of the scissor lift
- on the ground from outside the platform of the scissor lift (often referred to as 'walking' the scissor lift).

Figure 8 Operator 'walking' a GS1932 scissor lift using wired controller

5. Safety management systems

The mine operator and contractor both worked under the 'CGO Float Tail Leach Project Health Safety and Environment Management Plan' (HSEMP). The HSEMP operated in conjunction with the operator's safety and health management plan and referenced work health and safety procedures issued by both the operator and MPEC.

The HSEMP detailed some higher-level requirements regarding working at heights and using elevated work platforms but did not have the specificity of the procedures issued by the mine operator and MPEC about these matters.

6. Working at heights procedures

At the time of the incident, there were several overlapping procedures that had been issued by the mine operator and MPEC about working at heights and the use of scissor lifts.

6.1. Mine operator

Until July 2017, the mine operator's procedure required scissor lift operators to wear a harness attached to an approved anchorage point when they were on the platform of a scissor lift. On 27 July 2017, the operator issued a sitewide change notification, which included the following:

- Safety harness/fall restraint should not be worn in a scissor lift – unless a risk assessment indicates they should be worn for risk control purposes.
- Ensure all relevant procedures and JSA (job safety analysis) are amended to reflect this change.

The operator updated its site induction document to incorporate these changes and placed the above SMWS under review. The updated SWMS for safe work at heights was published in October 2017, but due to an omission, the changes outlined in the change notification were not captured in it.

6.2. MPEC and ECM

MPEC had its own working at heights procedure, which was developed by ECM. Notwithstanding the requirements of the operator regarding working at heights, the procedure applied to work undertaken on the project. It included the following requirement in relation to the operation of scissor lifts:

- A fall arrest harness will be worn and anchored to the appropriate point within the basket.

This requirement was captured in its general and site inductions that were delivered to workers on the project. The procedure also stated:

- A SWMS, JSEA and working at heights permit are required for all activities where individuals work at heights.
- In determining control methods to be used, the hierarchy of controls shall be used to ensure risks are reduced as low as reasonably practicable.
- EWPS shall be used in accordance with the manufacturer's operation manual.
- Operators are to ensure safe working loads are not exceeded.

7. Worker's employment with ECM

ECM's process at the mine was to only employ riggers who possessed a minimum of two years' relevant experience. The worker commenced employment at the mine as an advanced rigger with ECM on 27 July 2018, after the following steps were completed:

- telephone interview
- confirmation of qualifications and experience
- referee checks
- medical clearance.

8. Worker's introduction to the mine

On 27 and 28 July 2018, the worker:

- attended pre-start and toolbox meetings
- completed inductions
- reconciled and consolidated materials in a laydown area.

8.1. Induction

The worker's induction to the mine was facilitated by MPEC's senior HSE advisor on 27 July 2018. It consisted of general and site-specific information provided by ECM and the mine operator.

As detailed above (at 6.1 and 6.2), the information contained in the mine operator's induction material differed to that of MPEC with respect to the requirement to connect a harness to an anchor point on a scissor lift.

MPEC stated that it was aware that the mine operator's induction materials contained different information to that contained in their own. MPEC had explained to the worker what the differences were and confirmed that as an MPEC worker, he would be expected to comply with MPEC's requirements.

8.2. Verification of competency

Prior to commencing employment at the mine, the worker had been assessed as competent to perform work at heights by a registered training organisation.

When a new worker started at the mine, MPEC and ECM ordinarily conducted its own verification of the worker's asserted competencies (VOC) for certain tasks.
MPEC had scheduled the worker's competency assessment to take place on the day of the incident. The assigned assessor was unwell that day, and the assessment was rescheduled to 30 July 2018 (the day after the incident).
The co-worker had completed a VOC at the time of the incident.

8.3. Information about VOC requirements

The induction given to workers did not make any specific reference to MPEC's VOC requirements, but did outline that:

- Only licenced and competent operators can operate mobile and fixed plant and vehicles.
- Operators of plant and equipment must be trained, competent and approved.

MPEC asserts that 'competent' in the above context included the completion of an onsite VOC. It was unable to be determined what the worker's understanding of the requirement was.

8.4. Toolbox talk 28 July 2018

On the afternoon prior to the incident, the worker and co-worker attended a toolbox talk provided by MPEC about its change management procedure. The procedure required workers proposing to make mechanical, procedural, technical, organisational or environmental changes, to complete a change management form and undertake a risk assessment.
The person with authority to approve changes varied depending upon the level of risk associated with the proposed change. Under the procedure, changes that were determined by risk assessment to be low risk could be approved by a supervisor.
The documented toolbox talk did not provide specific information about what was considered a low-risk change. It did however identify that the change management procedure applied to plant modifications.

8.5. MPEC work teams

MPEC established several work teams at the mine, based on function. They included pipefitting and rigging crews. Each team had a leading hand and supervisor. The workers from the rigging crew, who were involved in the incident, had little or no previous experience working with each other.

9. The task

9.1. Overview

On Monday 23 July 2018 or Tuesday 24 July 2018, the leading hand rigger was informed by a member of the pipefitting team that a section of pipe would need to be fitted later in the week in the regeneration/kiln area. The length of pipe required to be fitted was specially constructed to join two pieces of existing pipework. The existing pipes were located at differing heights (4.00 metres and 5.22 metres above ground). As such, the new length of pipe had 90-degree bends (i.e. upward and downward) at each end. The new length of pipe was required to be fitted about 4.8 metres above the ground, near and within various pipework, tanks and structures.

9.2. Location

The pipe was required to be installed across a structure consisting of four braced columns, spaced 3.0 metres apart. The scaffolding shown on the right side of Figure 9 had already been installed to provide access to various levels, but not specifically for this task.

Figure 9 Required location of pipe within structure

10. Pre-incident activities

10.1. Shift start

On 29 July 2018, the worker and co-worker began work at 6.30 am and participated in the pre-start meeting.

10.2. Task allocated

Following the pre-start meeting, the worker and co-worker were tasked to rig the pipe into place by the leading hand rigger. The rigger provided some information about the pipe guides and supports in the area where the pipe needed to be fitted. He advised the co-worker that there was a crane available to assist in the lifting of the pipe, if required. The leading hand rigger left the workers to develop a work plan for the rigging of the pipe.
The leading hand rigger was involved in other work taking place about 20 metres away from the incident area. His view of the work area was blocked by a switch room.

10.3. Work method

10.3.1. Work plan

The worker and co-worker discussed the task and decided on the following method:

- a scissor lift would be obtained
- the scissor lift would be used to fix a chain block to the existing steel structure
- one of the workers would operate the chain block from the raised platform of the scissor lift in order to lift the pipe.

They advised the leading hand rigger of their plan, which he approved.
About 7.30 am, they asked the leading hand rigger to provide them with a scissor lift to undertake the task. The leading hand rigger agreed to their request and advised them that he would arrange for a scissor lift to be provided.
The work plan involved one worker operating from the platform of the scissor lift, and a spotter and another worker being positioned on the ground. It had not been determined who would fill these roles at the time of the incident.

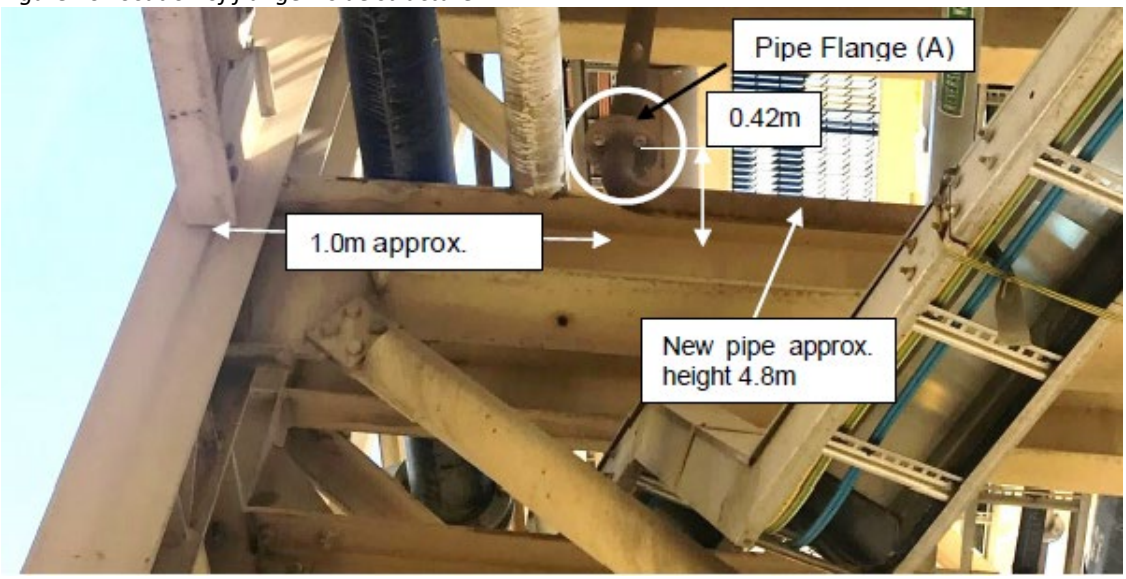
10.3.2. Use of scissor lift

During the discussions between the workers and leading hand rigger about the use of the scissor lift, there was no consideration of where the scissor lift would be placed during the lifting operation. The leading hand rigger believed that the workers would position the scissor lift on the outside of the four-post structure, adjacent to an existing pipe rack.

Although the type of structure where the work was taking place was quite common across the plant, the workers had not previously been required to place a scissor lift inside one. They initially considered using the scissor lift from outside the structure but determined that it would not be practical.

It is extremely unlikely that the tasks of rigging and fitting the pipe could have been completed with the scissor lift positioned outside the structure. One of the pipe flanges was located about one metre inside the structure, making it almost impossible to position and connect it from the outside. Also, the existing pipework inside the structure would have blocked access from the outside.

Figure 10 Location of flange inside structure



10.4. Leading hand visit

At about 9.30 am, the leading hand rigger visited the work area where the workers were setting up. He reviewed the relevant JSA's with the workers.

The work crew took a designated break between 10 am and 10.30 am.

11. Risk assessments

Several risk assessments were conducted in consideration of the work being undertaken in the area. None of the risk assessments referred to the risks associated with the operation of the scissor lift with its guardrails removed. The controls identified in the JSA's included:

- wear correct harness
- inspection of harness/lanyard
- 100% hook-up (i.e. of harness and lanyard)
- current inspection tags
- use of spotter – 'spotter to be VOC'd'
- remain in basket at all times
- barricade
- signage
- prestart checks on EWP/lift.

12. Provision of scissor lift

About 11.00 am, the leading hand rigger arranged for a third worker to transport a scissor lift to the work area. That worker 'walked' the scissor lift along a pathway to the work area, using its wired control unit (in the manner illustrated in Figure 8). There is no record in the scissor lift's logbook of a pre-start inspection having been completed on the day of the incident.

12.1. Harness worn by the worker

Around the time that the scissor lift was delivered to the worker, he wore a LINQ Height Safety 'Elite multi-purpose harness' that was issued by the MPEC store. It is unclear why he was issued a harness at a time when he was not permitted to undertake work at heights, as he had not completed a VOC.
The harness was attached to a single leg LINQ Height Safety 'Kernmantle Rope Lanyard'. The length of the lanyard was able to be varied by using its rope grab (refer to Figure 11). The harness and lanyard were part of the fall restraint system. When properly adjusted and connected to an approved anchor point, the system is designed to prevent a worker from falling from heights. They are different to fall arrest systems, which are designed to arrest a fall that has already occurred.

Figure 11 Fall restraint system worn by the worker (Credit: LINQ Height Safety)

12.2. Initial movement of scissor lift

The worker attached the lanyard to an anchor point on the scissor lift and climbed onto the platform, which was in the stowed position. He operated the scissor lift using its wired control unit. The worker manoeuvred it as close to concrete bunding on the southern side of the structure as possible. However, as shown in Figure 12, the scissor lift was too high to fit under the angled brace between the poles on the western side of the structure. The workers did not advise anyone of their inability to move the scissor lift inside the structure.

Figure 12 Approximate location of scissor lift when the worker attempted to move it under the brace

12.3. Decision to remove guardrails

The worker unhooked his lanyard and exited the scissor lift. He discussed alternate methods for completing the task with his co-worker. The worker suggested to the co-worker that they take the guardrails off the scissor lift and walk it into the structure from the ground using the wired control unit. It was proposed that the guardrails would be refitted prior to use, once it was inside the structure.
The workers did not conduct a risk assessment in relation to their decision to remove the scissor lift's guardrail. They also did not consult with anyone about their decision.

12.4. Removal of guardrails

The workers obtained two shifting spanners and undid the nuts of the bolts that fixed the guardrail panels. Initially the worker and co-worker were on the ground, but the worker subsequently climbed onto the platform of the scissor lift and continued removing the nuts and bolts.
Once the bolts securing the left-hand side guardrail of the scissor lift had been removed, the panel was taken out of its housing tubes and placed against the wall of a nearby tank.
When the bolts securing the front guard rail had been removed, the workers removed it from its housing tubes. The worker was on the platform of the scissor lift when this was done.
The worker was still wearing his safety harness, but he did not attach it to an anchor point on the scissor lift. He was wearing a hard hat.
The front guard rail was moved a short distance to the right; away from the lower portion of the angled bracing. It was rested on the front edge of the platform of the scissor lift and held in place only by its own weight.

Figure 13 Platform of scissor lift showing removed bolt and shifting spanners

12.5. Fall from scissor lift

The worker held the wired control unit and began driving the scissor lift forward. He was initially standing at the front of the scissor lift's platform but moved to a squatting position, most likely to attempt to fit under the angled brace.

It appears that the worker lost his balance when the scissor lift was about halfway through the angled brace. The reason for his loss of balance has not been established. Witnesses did not describe seeing any sudden or jerky movement of the scissor lift.

The worker fell forward from his crouched position, over the front of the scissor lift's platform which was one metre above the ground. He fell in a headfirst direction towards the ground. It is not clear whether he intentionally grabbed the front guard rail of the scissor lift, but as he fell, the guardrail panel fell to the ground with him.

The worker's head impacted with the ground. He sustained an abrasion on the left side of his forehead, which suggests that his hard hat may have fallen off before the impact.

The worker came to rest on his back and was on top of the left side of the front guardrail. The worker was laying on a 45-degree angle to the front of the scissor lift. His feet were the closest part of his body to the scissor lift.

Several nearby workers witnessed varying aspects of the incident.

12.6. Response

The worker was immediately assisted by several workers who were in the area. The worker was conscious but reported a loss of sensation in his arms and legs.

The workers who responded called for help and attempted to make the worker more comfortable by reassuring him and supporting his neck in a neutral position. The leading hand rigger placed an emergency call on the mine operator's radio system.

Members of the mine operator's emergency response team responded to the call within two to three minutes of the emergency call being made. They maintained the support that was provided by the co-workers.

12.7. NSW ambulance response

Ambulance were contacted and arrived a short time later. Arrangements had been made by those in attendance to ensure that the ambulance was swiftly guided to the appropriate location. The worker was transported by road ambulance to West Wyalong Hospital where he was triaged at 1.42 pm. NSW Ambulance stated that this response was in line with its transport protocols.

After being assessed at West Wyalong Hospital, he was transferred to Wagga Wagga Base Hospital.

13. Diagnosis and treatment

The worker was diagnosed as having sustained severe narrowing of the spinal cord, resulting in compression of nerve roots and softening of the spinal cord. He continued to experience a loss of sensation in his arms, hips and legs. He required specialist spinal investigation and management and was transferred by air ambulance to St George Hospital, Kogarah on 30 July 2018.

The worker underwent a cervical laminectomy (spinal decompression surgery) on 31 July 2018. He experienced numbness and ongoing pain in the week following this surgery. The worker described feeling a burning pain in his neck. He underwent physiotherapy and pain management.

On 8 August 2018, the worker suffered a cardiac arrest. It is understood that the likely cause of the cardiac arrest was a pulmonary embolism (blood clot in lungs) which was secondary to his spinal surgery. The worker responded poorly after his cardiac arrest. He underwent several different procedures over the following weeks, but his condition did not improve.

The worker's condition continued to deteriorate, and he passed away on 14 September 2018.

A post-mortem determined that the worker died from complications of cervical laminectomy following a fall.

14. Report to Coroner

The death of the worker was reported to the Coroner as he died in circumstances where death was not the reasonably expected outcome of a health-related procedure performed upon him.

The inquest into the death of the worker is before the Coroners Court of New South Wales.

15. ICAM

In the days following the incident, the mine operator conducted an investigation using the Incident Cause Analysis Method (ICAM). The investigation was facilitated by the mine operator's safety and training superintendent. The primary method of inquiry was a roundtable meeting involving workers and managers involved in the incident from MPEC and the mine operator. The worker participated in part of the meeting by phone from his hospital bed.

A draft report was prepared, but it was not distributed to the meeting participants upon legal advice received by the mine operator. As a result of this, the accuracy of the information detailed in the report cannot be confirmed. The report was not finalised and remained in draft form.

15.1. ICAM findings

The following findings were recorded in the draft ICAM report:

- All persons participating in the investigation agreed that it was not uncommon for guard rails to be removed from scissor lifts in order to place them into position. However, it was not considered common to have staff operate the scissor lift from the working platform with the guard rails removed.
- Persons who were eyewitnesses to the incident stated (during the investigation) that they did not think the injured party was conducting the work practice in an acceptable manner, but did not intervein as the task was “only going to take a minute or so”.
- The method of PFPE (personal fall protection equipment) used in these types of scissor lifts needs to be reviewed, where anchor points specify fall restraint; fall restraint devices should be used.
- There is no interlock fitted to these types of scissor lifts where the machine is de-energized if guardrails are removed.

15.2. Regulator analysis of ICAM findings

Inquiries were undertaken to determine the source and accuracy of the above findings, specifically that it was not an uncommon practice for the guardrails of scissor lifts on the project to be removed. This involved obtaining information from the ICAM facilitator and other people in the ICAM investigation. No detailed notes were taken of the investigation which was conducted in “workshop” mode.
A significant amount of evidence was obtained which cast doubt on the finding that it was not uncommon for guardrails to be removed from scissor lifts on the project. It appears that there was some confusion because a previous subcontractor on the project used scissor lifts that had folding guardrails.

16. Post-incident actions

MPEC’s actions after the incident were to:

- amend its working at heights procedure to state that modification to plant equipment must be risk assessed and approved by management
- send an action alert to all its sites about the incident and the actions taken to prevent recurrence
- conduct verification of competency refreshers for all MPEC and ECM personnel

- issue toolbox talks to all MPEC and ECM sites about refocusing on safety essentials
- develop rules that focused on the lessons learned from the incident investigation findings.

17. Nature of task

The task of rigging the pipe was not a particularly complex task for riggers with the involved worker's experience. It was common for workers on the project to use scissor lifts when joining pipes.
The four-post structure, with angled bracing where the pipe was to be rigged, was also quite common in the project area.

17.1. Time pressures

The investigation did not locate evidence that indicated that the worker and his co-worker were under pressure to complete the task quickly. They were allowed enough time to complete the task.

17.2. Failure to clearly define work method

At the time the scissor lift was provided to the workers, there had not been any specific discussions between the workers and their leading hand about:

- where the scissor lift would be positioned
- where the block would be installed
- who would operate the scissor lift
- who would act as the spotter
- how many workers were required to be on the platform of the scissor lift during the completion of the task.

Beyond quite generalised JSAs covering various tasks over a seven-day period, MPEC had no procedure in place to ensure that sufficiently detailed work plans were established and approved by its supervisors. If the workers and their supervisor had more clearly defined where and how the scissor lift was to be used in the performance of the task, it would have become evident that:

- the task could not be completed with the scissor lift positioned outside the structure
- the scissor lift could not fit inside the structure without modification.

17.3. Alternate methods of task completion

17.3.1. Scaffolding

17.3.1.1. Availability

Information was provided by several workers that requests for scaffolding were refused by MPEC. However, this conflicted with the bulk of the information obtained that suggested that scaffolding was available when required. Ultimately, the investigation was unable to resolve the conflict between the information.

17.3.1.2. Suitability of scaffolding for task

Varying opinions were provided about whether fixed scaffolding would have been suitable to perform the task. Those who believed it would have been more suitable, did so because they believed that it would have provided a stable work platform, which reduced the risk of a fall from heights. Those who believed that it was not suitable for the task, did so because the work needed to be undertaken at varying levels, and it was questionable whether there was enough room within the four-post structure to build the required platform and access the work area.
The view of a specialist consultant was that the varying height of the work area and the restricted access caused by the structure itself, meant that the use of fixed scaffolding would have been difficult.

The investigation determined that it would have been difficult to construct a scaffold within the structure that would permit access to all areas that were required to complete the task.

17.3.2. Crane

17.3.2.1. Availability of a crane

As outlined at 10.2, a crane was available to assist with the task if required.

17.3.2.2. Suitability of a crane

It is apparent that even if a crane was used to hoist the pipe into the required position, some other form of equipment would have been required so that workers could obtain the necessary height to fit the pipe and de-rig it from the crane. It would not have negated the need for workers to use a scissor lift or other similar equipment to complete the task.

17.4. Risk assessments

At least three risk assessments were undertaken prior to the work starting. Each of those risk assessments was conducted on the basis that the scissor lift was fit for the purpose of installing the pipe. Accordingly, none of the risk assessments identified the risks associated with the scissor lift's guardrails being removed by workers.

The leading hand rigger should have been consulted when it became known that the scissor lift could not be used for the task without being modified. This may have facilitated further consideration about the proposed work method and prompted updated risk assessments to be undertaken.

17.5. Change management

MPEC provided information to workers about its change management procedure and the requirement for plant modification to be carefully risk managed.

It had a change management procedure and delivered toolbox talks to workers about the procedure. At a minimum, the procedure required updated risk assessments to be completed when plant modifications were being considered. A more detailed consideration was required when more complex changes were proposed. It provided that low risk changes could be approved by supervisors.

The change management procedure was not followed on the day of the incident. The workers involved in the incident did not believe that they were substantially modifying the scissor lift, in that they were not required to break any joins.

17.6. Failure to connect harness

The worker was wearing a safety fall arrest harness, but it was not connected to the platform of the scissor lift. It is reasonably likely that had the worker's harness been connected to the rear anchor point of the scissor lift via a suitably adjusted lanyard, he would not have fallen over the front of the scissor lift. However, it would not have prevented him falling over the side of the scissor lift.

17.7. Supervision

The leading hand rigger stated that he attended the work location at around 7.00 am and 9.30 am. He was working close to the incident area, but not in direct sight of it. The workers spoke with the leading hand rigger on several occasions that morning and discussed their task with him.
The worker and his colleague were not directly supervised by the leading hand rigger or any other supervisor at any time after the scissor lift was delivered to them. Information given to the Regulator by workers, supervisors and managers on the project was that the work being undertaken at the time of the incident was not complex.
Having regard to the following factors, the workers should have been subjected to more intrusive supervision:

- the limited onsite experience of the workers
- the workers were using mobile plant that required verification of competency
- the work method was not sufficiently defined.

17.8. Worker acquiescence

Two other workers were aware that the worker was on the platform operating the scissor lift with its guardrails removed. They each stated that they had little or no opportunity to stop the worker from operating the scissor lift once he began moving it forward.
Certainly, one of these workers was working some distance away from the scissor lift and was involved in spotting another worker using a different scissor lift. His opportunity to intervene was limited.
However, the co-worker who was involved in the task was standing in close proximity to the scissor lift. He saw the worker reach toward the controller and begin operating it. He stated that the scissor lift had only moved forward a very short distance when the worker lost balance. He stated that this occurred very quickly. The investigation has been unable to determine what opportunity the co-worker had to intervene before the incident occurred.

17.9. Fitness of scissor lift for the task

17.9.1. Overall suitability

The ground where the scissor lift was being used was flat and solid. The scissor lift is easy to manoeuvre in tight spaces and provided the operator with access at varying heights inside and outside the structure.

If the scissor lift was used in accordance with the lift operator's manual and appropriate risk management controls were implemented, the scissor lift was suitable for the task assigned to the workers.

17.9.2. Suitability of Genie GS1932 for project site

ECM and MPEC both stated that its assessments regarding the safety and suitability of the scissor lift for use on the project consisted of:

- hiring the scissor lift from a reputable provider who provided relevant service and inspection records for the equipment, to assure ECM that it was safe for introduction to suite and suitable for the tasks for which it would be used
- providing the equipment to Evolution for inspection.

These assessments were largely restricted to the mechanical and engineering integrity of the scissor lift. The only scissor lifts that MPEC had on the project, at the time of the incident, were Genie GS1932 models. A more comprehensive assessment about how the scissor lifts would be used on site may have identified that a shorter EWP may have been effective to access certain structures.

17.9.3. Should a different scissor lift have been used?

17.9.3.1. Scissor lift with folding guardrails

MPEC did not use scissor lifts with fold down guardrails on the project. It is noted that scissor lifts fitted with fold down guardrails only provide a modest reduction of around 250 millimetres in overall height (2.00 metres down to 1.75 metres). This would not have provided enough clearance to fit under the angled bracing. It would have been necessary to use a different model for a scissor lift to fit under the angled bracing.
The following advice was given by a specialist consultant about the use of a scissor lift with folding guardrails to undertake the task:

- A more suitable MEWP (e.g. one with folding guardrails and a lower stowed height) could have been used that would have mitigated the risk to some degree, however, the system of work would still have required strict adherence to procedural controls.

17.9.3.2. Smaller scissor lift

Smaller scissor lift models are available that would have fitted under the angled bracing where the incident occurred, and still would have provided the necessary working height to install the pipe. For example, the Genie GS1330 scissor lift provides AS1418.10 compliance, a stowed platform height of 1.68 metres (rails folded) and a maximum working height of 5.9 metres (the pipe was required to be installed at a maximum height of approximately 5.2 metres).
The use of a smaller scissor lift with folding guardrails may have reduced the risk of workers travelling on the platform without guardrails in position, but would not have eliminated it.

17.10. Assessment of relevant design standards

17.10.1. Identification of relevant standard

The scissor lift was certified as meeting Australian/New Zealand Standard 1418.10:2011 Cranes, hoists and winches – Part 10: Mobile elevating platforms (the Standard).

17.10.2. Sufficiency of current standards

17.10.2.1. Guardrails

The Standard requires guardrail systems to be 'securely fastened' to the work platform. The Standard does not define what is meant by this term, but guidance is provided in Australian New Zealand Standard 4024.1601: 2014 – Safety of Machinery - Design of controls, interlocks and guarding which:

- Provides that a fixed guard may be used where "the foreseeable frequency of access [to the hazard area] is low, its replacement is easy and its removal and replacement are carried out under a safe system of work."
- Defines a fixed guard as "a guard affixed in such a manner (e.g. by screws, nuts, welding) that it can only be opened or removed by the use of tools or destruction of the affixing means."
- Defines a tool as an "implement such as a key or wrench designed to operate a fastener. An improvised implement such as coin or nailfile cannot be considered to be a tool."

The nut and bolt system used to secure the guardrail met the above requirements. Given that the height of the scissor lift's platform was one metre, it was possible to remove the bolts and guardrails from the ground. The fastening system used to secure the guardrail to the platform of the scissor lift was suitable, having regard to the considerations of:

- sufficiently securing the guardrail to the platform (in terms of AS1418.10.2011)

- providing a method of removing the guardrail for maintenance and repair
- allowing operators to walk scissor lifts under low clearances.

17.10.2.2. Interlock devices

AS1418.10.2011 requires scissor lifts to have various safety functions, some of which include interlocks which prevent the scissor lifts from being operated or travelling under certain conditions. There is presently no requirement in the standard for scissor lifts to be fitted with a device that prevents movement when its guardrails have been removed. Consideration was given during the investigation regarding the efficacy of this type of design.
A specialist consultant's advice was obtained on this issue. He determined that it was not practicable to install such a device on the plant for the following reasons:

- It would prevent operators from being able to remove the guardrails and move the scissor lift beneath low clearances (i.e. from the ground).
- Multiple interlock devices would be necessary; one for each guardrail panel.
- The interlock device on the front of the extending platform would require a flexible connection to the main deck.
- The installation of an engineering control, such as an interlock, would not eliminate the risk of falling from the platform with the guardrails removed.

18. Causes of incident

18.1. Direct causes

The direct causes of the incident were:

- the removal of the scissor lift's guardrail
- accessing the scissor lift's platform with its guardrail removed
- operating the scissor lift with its guardrail removed.

The investigation found that had the workers walked the scissor lift under the steel support, this incident would have been prevented.

18.2. Other contributing factors

The following factors contributed to the incident occurring:

- Failing to sufficiently define work method
- Failing to conduct an updated risk assessment when a new work method was proposed
- Inadequate supervision of workers
- Unauthorised modification of plant
- Failing to follow change management requirements.

19. Recommendations

It is recommended that mine operators and contractors:

- review their procurement processes to ensure that mobile plant is fit for purpose, having regard to the environment where it will be used
- ensure their procedures regarding the use of mobile plant incorporate adequate risk management practices
- review staff allocation practices to ensure that work groups have sufficient levels of site experience
- develop procedures to define how common tasks are to be performed, including identifying how and when elevated work platforms are used
- train workers about managing risks associated with plant modification
- educate workers about the degree of harm which can occur as a result of falls from short distances (heights).