Department of Industry
Resources Regulator
Mine Safety

MINE SAFETY INVESTIGATION UNIT

INFORMATION RELEASE

Fatality

Incident date 4 November 2016

Event Fatality in underground opal mine

Location Mulga Rush Opal Fields (near Lightning Ridge) NSW

Overview

A heavy steel material hoist bucket fell down an opal mine shaft, hitting a worker at the bottom. He suffered fatal injuries.

Photograph 1: Surface of the opal mine and shaft hoist system.

Safety Message

Any opal mine operator with the same or a similar hoisting system should contact the NSW Resources Regulator – Lightning Ridge Office on 02 6829 9200 immediately.

The mine

The underground opal mine, Mineral Claim 44507, is in the Mulga Rush Opal Fields, about 40 km southwest of Lightning Ridge, NSW.

The Mulga Rush field was found in late 1999, with more than 500 mineral claims granted in the first four months of discovery. In this field, opal is mined at depths of between three and 20 metres. The opal in the field consists of seam opal including black and light opal.

The method

The method of mining is underground mining, accessed via a vertical shaft drilled through sandstone and conglomerate beds to reach claystone, where levels are then dug horizontally through potential opal-bearing material. These levels are dug using either hand or power tools such as jackhammers or underground electric/hydraulic digging machines.

The claystone is brought to the surface using a powered material hoist or winch, where it is transferred to a truck for transport.

Photograph 2: Headframe and material hoist system at the top of the shaft.

The incident

The incident occurred about 3 pm on Friday 4 November 2016.

Two workers were mining underground in the opal mine.

A powered material hoist was being used to raise claystone to the surface.

During this process, investigators suspect that the hoist bucket completed a full raise, tip and lower cycle as per normal operation. (Note: in normal operation, the holding capacity of the hydraulic system only works in one direction and the hydraulic drive motor controls the lowering of the bucket resulting in a slow descent.)

When the bucket returned to the lower limit, investigators suspect the bucket failed to activate the lower level limit switch, which is in the sump at the bottom of the shaft and designed to stop the operation of the hoist.

The hoist continued to operate and all the steel cable unspooled from the hoist winder drum. The steel cable then wound onto the hoist's winder drum in the wrong direction and the bucket raised unintentionally to the surface.

When the bucket reached the surface the hoist hydraulic system prevented the bucket from reaching the tipping point, causing it to remain in a static suspended position above the shaft. In this position, the hoist hydraulic and electrical system continued to operate and the hydraulic drive motor prevented the bucket from falling.

While the bucket was stationary on the head frame above the shaft, one worker climbed into the sump to clear out earth and material from the base of the sump (caused by material spillage).

During the task, investigators suspect the worker bumped the lower limit switch, which deactivated the hoist's electrical and hydraulic power, causing the bucket to free-fall down the shaft at speed without hydraulic drive motor control (as the steel cable was wound onto the winder drum in the wrong direction).

The bucket collided with the worker and he suffered fatal injuries.

The second worker witnessed the incident and went to the worker's aid but found him to be unresponsive.

The second worker rang for help and emergency services were requested.

The hoist equipment

The hoist system used at the mine was an Agfab Super Hoist system.

It was manufactured by Agfab Pty Ltd, a Queensland company that went into liquidation in 2009.

The hoist system consisted of a steel headframe, electric motor, hydraulic system, electrical system including limit switches, steel guide rails, a winder drum, steel wire rope and a steel bucket.

The bucket was 72 cm wide, 1.7 metres in height and was estimated to weigh between 80 -120 kg.

Photograph 3: The shaft, guide rail system, steel cable and electrical cable (taken from the base of the shaft).

The investigation

Mine Safety inspectors and NSW Police immediately responded to the incident.

The NSW Resources Regulator's Mine Safety Investigation Unit has begun an investigation to determine the cause and circumstances of the incident. An investigation report will be prepared for the Secretary of NSW Department of Industry.

Safety observations

Workers should not undertake any task in a shaft under suspended or unsecured shaft equipment.

Material hoists may fail at any time. They are not designed to carry people or have people working directly underneath the material hoist bucket.

If work is to be undertaken in a shaft, the material hoist bucket must be secured, either at the bottom of the shaft or at the surface, with the hoist system isolated and protective guarding installed to prevent the bucket or other items from falling down the shaft.

Mine operators should ensure that material hoisting systems are functioning correctly and understand any design or functional limitations.

Mine safety management systems must set out the systems, procedures, plans and other control measures that will be used to control risks to health and safety at the mine.

The safety of people working in and around shafts and shaft hoisting operations is paramount. Never ride on a material hoist. People must only ride on purpose-built hoists designed to carry people, and that are registered and comply with MDG 42.1.

There are a number of health and safety duties set out in the *Work Health and Safety Act 2011* (NSW) and *Work Health and Safety (Mines and Petroleum Sites) Act 2013* (NSW). These duties are applicable to people who operate material hoists and person-riding hoists at opal mines.

In particular, mine operators should review:

- NSW Opal Mining Safety Guidelines (4th Edition 2010), available at the Lightning Ridge Mine Safety Office
- clause 49(5) of the Work Health and Safety (Mines and Petroleum Sites) Regulation 2014 (NSW) - Control of shaft conveyances falling down shafts
- the department's MDG 42.1 & 42.2, *Person-riding hoists (winding systems) in small gemstone mines* (2015) and *Person-riding hoists in gem mines* (2011).

About this information release

Information about the Investigation Unit and its publications can be found at: www.resourcesandenergy.nsw.gov.au/miners-and-explorers/safety-and-health/major-investigations

For information about health and safety regulation on mine sites contact a mines inspector at one of our local offices www.resourcesandenergy.nsw.gov.au/miners-and-explorers/safety-and-health/mine-safety-offices

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