NSW GOVERNMENT

NSW Resources Regulator

FIRES ON MOBILE PLANT

October - December 2019

Mobile plant fires are inherently dangerous

Figure 1 Dangerous haul truck fire exposes operator to immediate safety risk.

Close call for haul truck driver

In the words of the operator:

I saw an orange flash from the left rear of the truck and a noise like a flat tyre. I got out of the cab on the driver's side, tried to put the boarding ladder down. It didn't move at all.

I opened driver's door, picked up the two- way, called ' I can't get out! I can't get out!'.

Smoke was coming through the door seals, thick in the cab. I started to wonder how I was going to survive. Felt around in the dark. Light in the cab wouldn't work. Felt around, pulled the pin on the fire suppression. Removed the pin. Hit the button.

I thought, 'I am stuck. I'm going to die'.

The sticker that is on the railing caught my eye. Flames were coming up the front and passenger side of the cab. I pushed the door open, moved to the emergency gate, opened latch, couldn't see to get down so felt my way with my feet.

I couldn't really see, but fire was illuminating the bottom rungs. Flame was in my face, approximately two metres away.

I walked down the ramp. I saw the push Cat coming towards me. I waved my arms and took my hat off and waved it. Emergency and ESO arrived.

Bearing fires continue to occur

Two more fires have been reported as a result of bearing failures on articulated underground trucks.

Read our Safety Bulletin – Drive shaft failures causing fires.

Air conditioner fire pollutes cabin atmosphere

After-market and original equipment manufacturer (OEM) installed air conditioning systems must integrate the system effectively into the design of the vehicle, taking into account the duties of a designer to carry out analysis, testing and examination. Air conditioning systems must be maintained and kept clean. The accumulation of dirt and dust particles in the vents, filters, coils and fins will obstruct normal air flow and may result in a malfunction or fire.

Fire suppression activation fails

Following similar concerns with the major haul truck fire in the third quarter (IncNot0035685), similar observations have been made by the operator of a dozer. In the case of fire on both the haul truck and the doze, the manual fire suppression activation actuator in the cabin was hit three times. In one case, the action did not set off the suppression system and in the other case, the operator was not confident that actuation occurred. A demonstration video also shows that a strike is able to partially activate the suppression system and a further strike was required to fully activate the system.

Fire melts shutdown floats and filter on explosion-protected engine

An underground coal diesel vehicle has continued to run without the explosion protection of the water-based exhaust flame trap. Without the cooling effect of the water barrier, elevated temperature in the exhaust melted, shutdown floats and burnt the exhaust particulate filter.

Rising trend continues

NSW mines have reported 141 fires on mobile plant during 2019. This is an increase in reporting compared to previous years. The increasing numbers include a significant rise in the occurrence of underground fires.

We have been focussed on compliance and enforcement activities relating to fires on mobile plant. We are committed to working with industry to ensure health and safety obligations are being met to reduce the number of fires on mobile plant and to prevent potentially catastrophic events.

Statistical data

Table 1 Statistical data for 2019

Mine type and primary location	2019 Q1	2019 Q2	2019 Q3	2019 Q4	Total
Underground coal - surface location	1	2			3
Underground metals - surface location	1	2	3	3	9
Mineral sands		1	2	2	5
Construction materials	2	1	2	2	7
Industrial Minerals				1	1
Surface coal	20	19	14	21	74
Surface metals		1	1	1	3
Underground coal - underground location	1		1	2	4
Underground metals - underground location	8	6	7	14	35
Total	33	32	30	46	141

Figure 2 NSW fires on mobile plant reporting – mining – trending by year

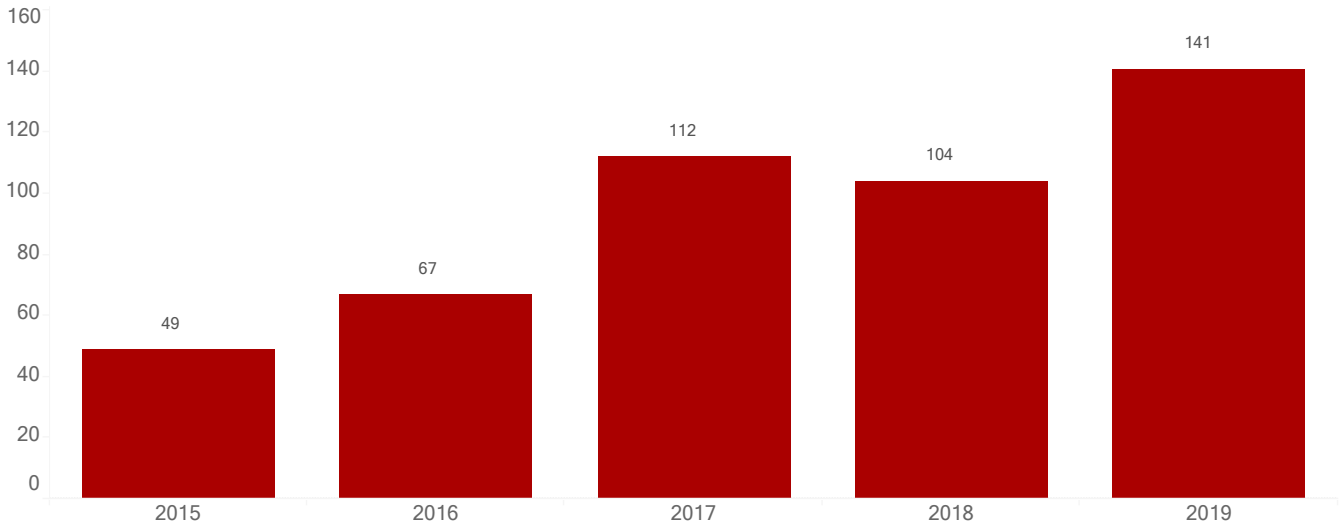


Figure 3 Fires on mobile plant - underground and surface events

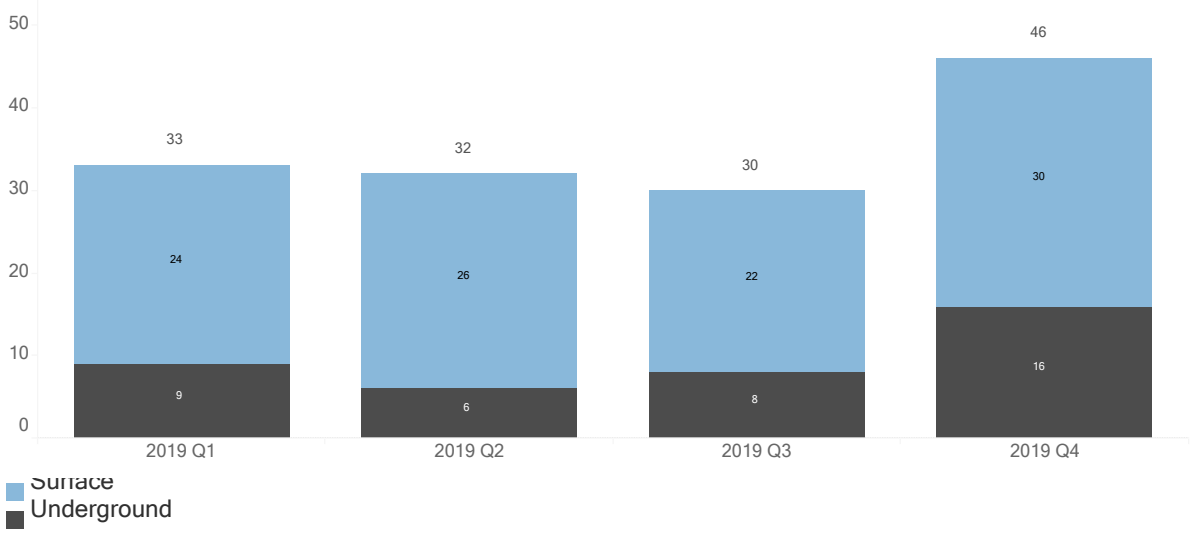


Figure 4 Fires on mobile plant - underground and surface events by month - 2019

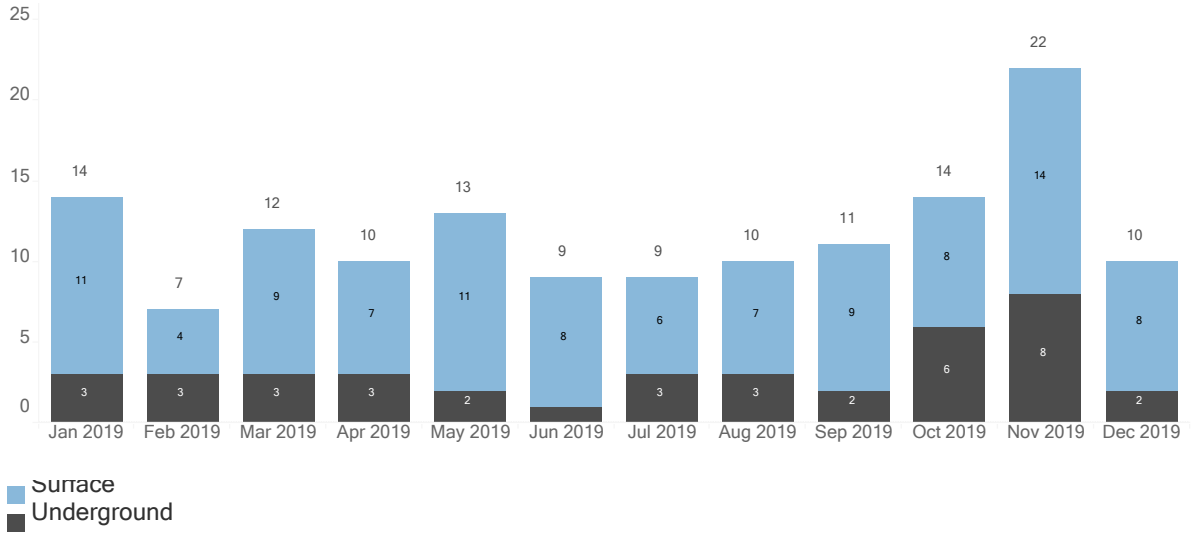


Figure 5 Fires on mobile plant - October to December 2019 events by month

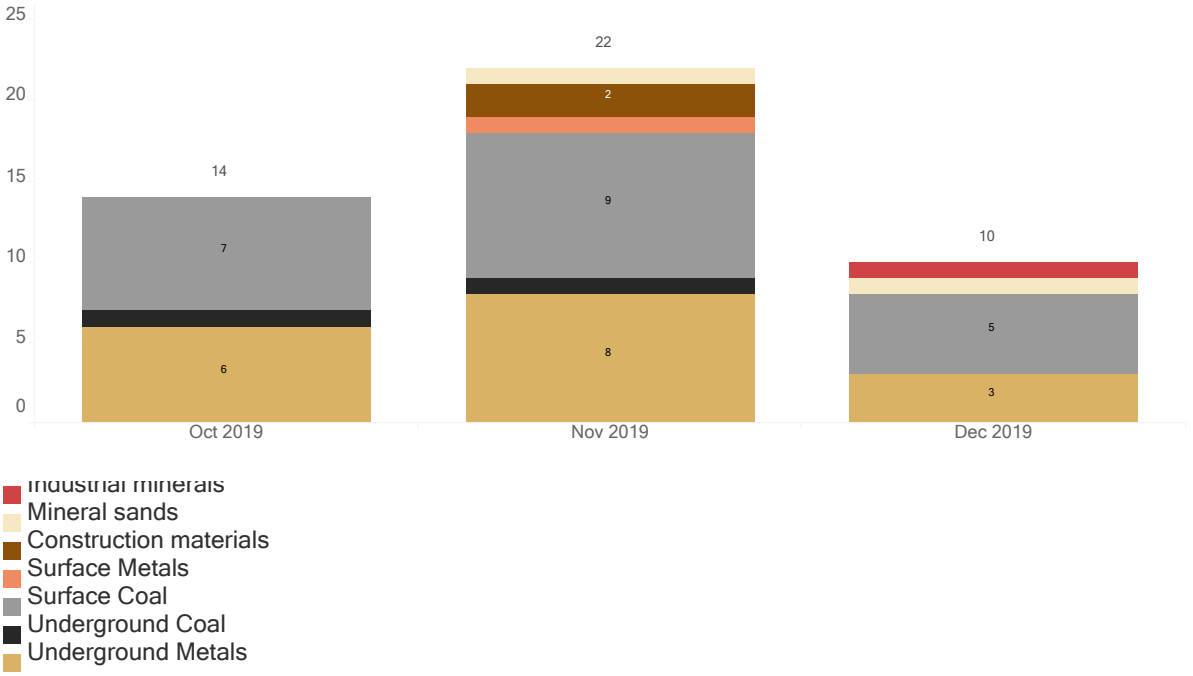


Table 2 Triage data for 2019

Triage classification	2019 Q1	2019 Q2	2019 Q3	2019 Q4	Total
Elevated	13	7	12	13	45
Standard	15	23	9	24	71
Monitoring	5	2	9	9	25
Total	33	32	30	46	141

Table 3 Response data for 2019

Response level	2019 Q1	2019 Q2	2019 Q3	2019 Q4	Total
Formal Investigation RAIU / MSO Major				1	1
On site Investigation MSO Routine	8	4	5	2	19
Directed Investigation by Mine Operator	21	27	22	34	104
Information Only No Investigation of individual Incident	4	1	3	9	17
Total	33	32	30	46	141

Figure 6 Fires on mobile plant triage and direction

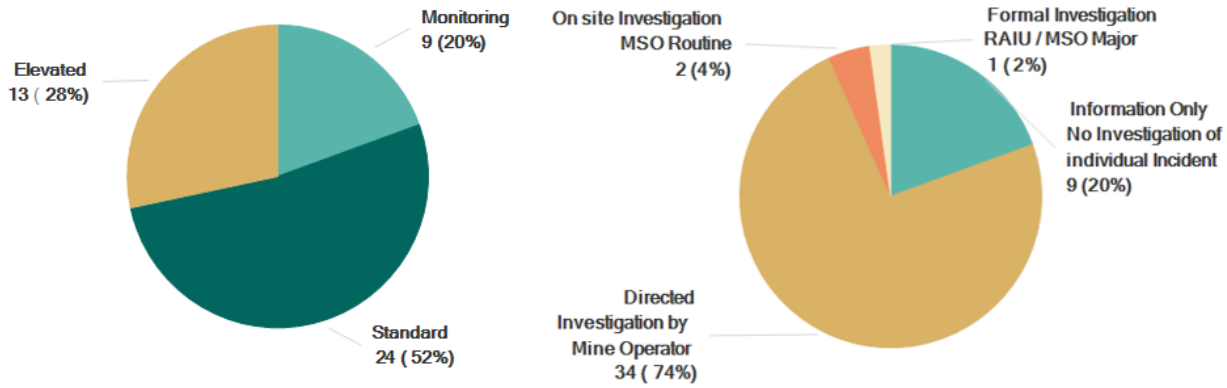


Figure 7 Heat sources for October to December 2019 as determined by ancillary reporting

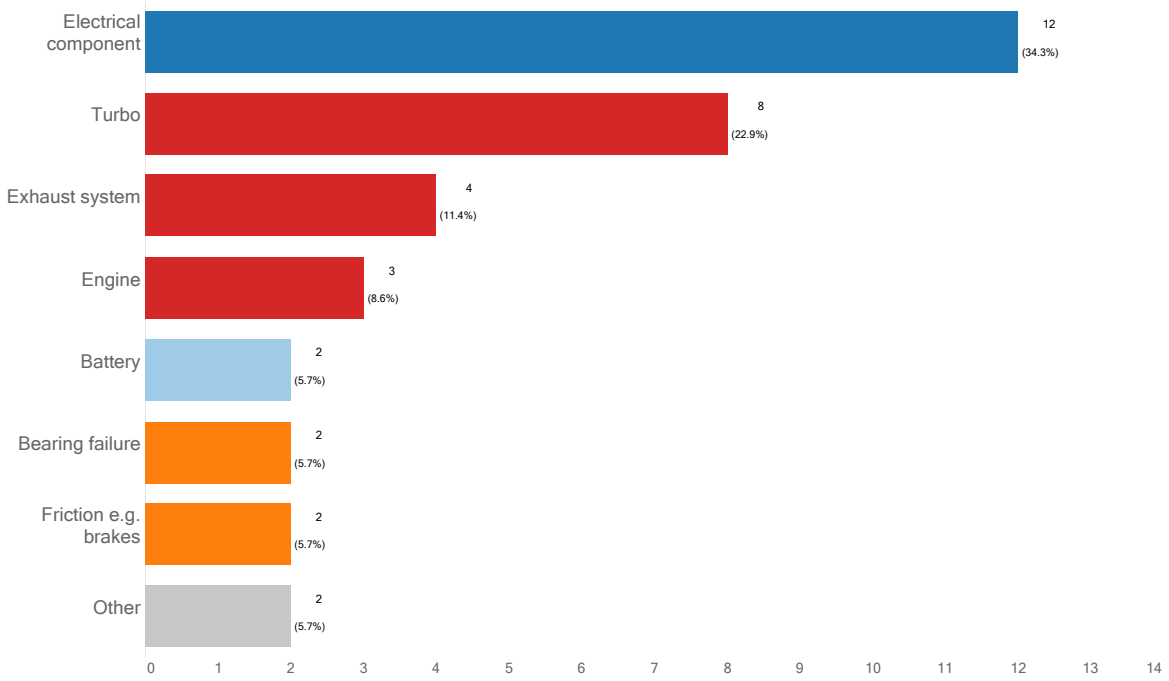


Figure 8 Fuel sources for October to December 2019 as determined by ancillary reporting

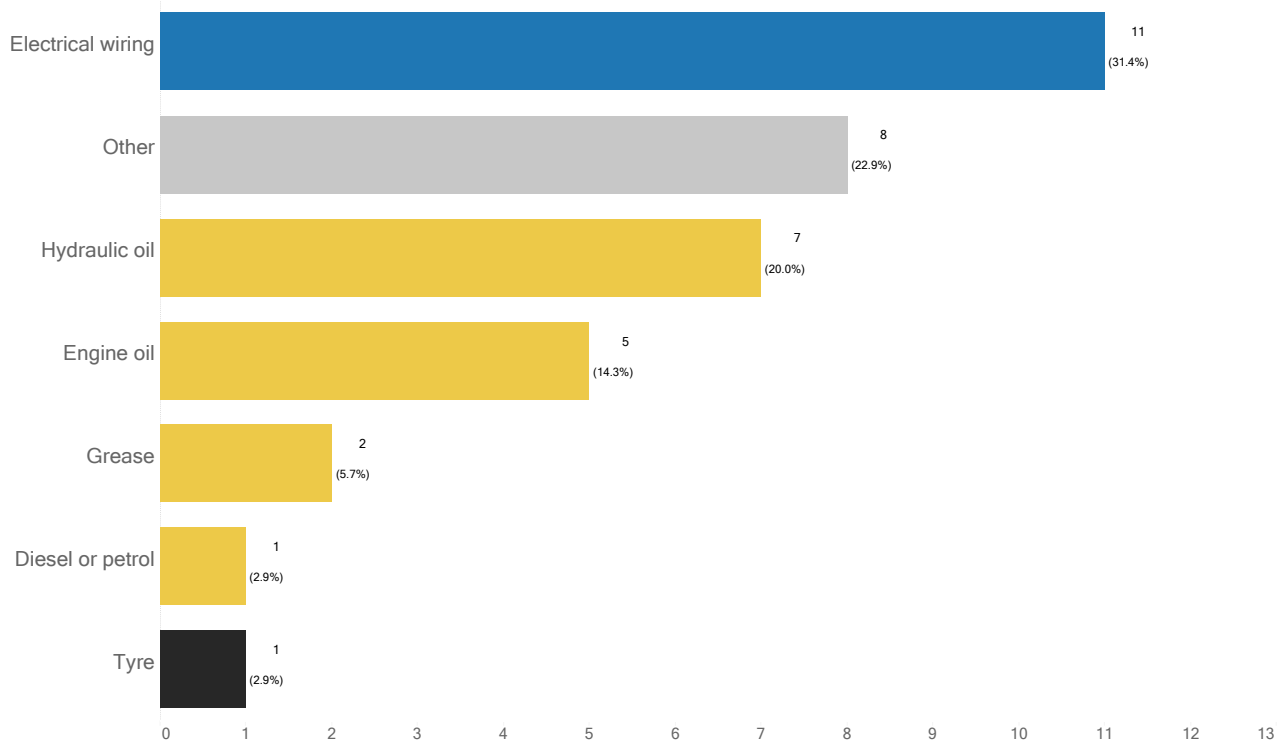
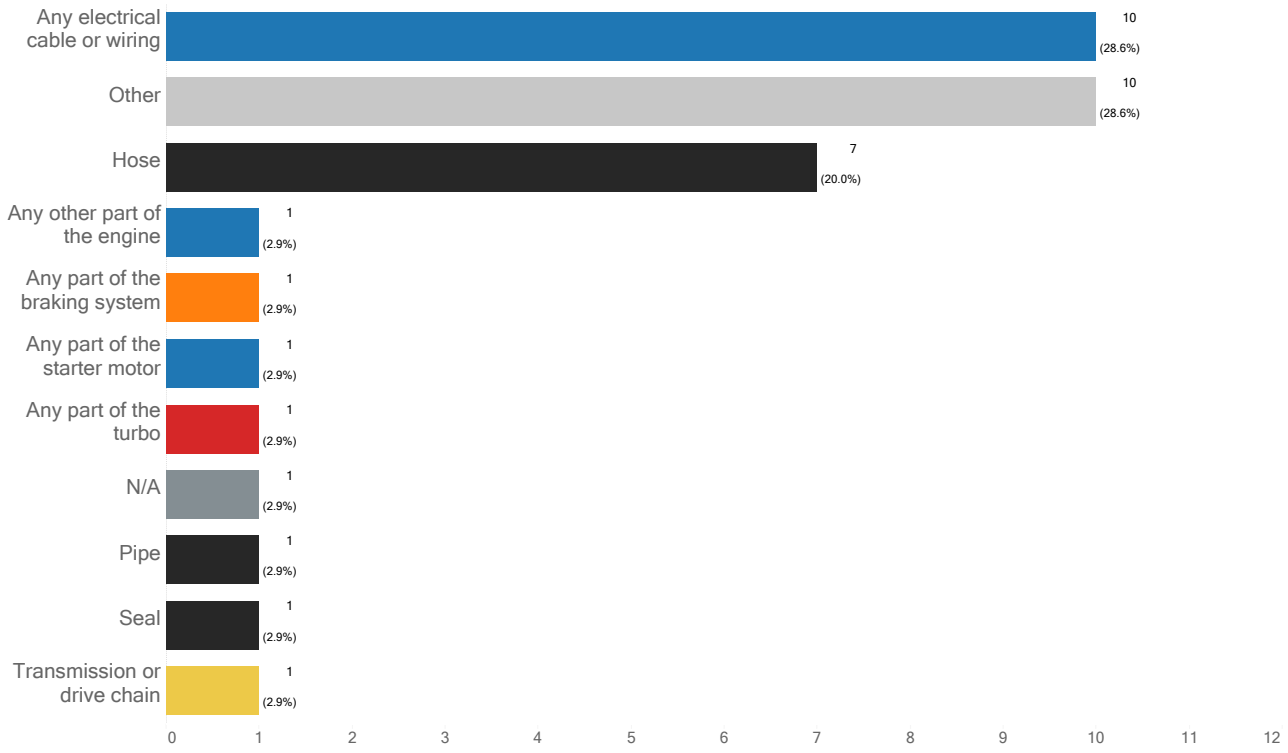


Figure 9 Failed component for October to December 2019 as reported by ancillary reporting



Safety incident log (October to December 2019)

October 2019 - Wilpinjong IncNot0035743

An operator was using an excavator when he smelled smoke in the cabin. The operator shut down the machine and went out of the cabin. He noticed the cabin air pressuriser was smoking. The circuit breaker installed was 25 amps for a circuit that runs between 1.6 - 2.2 amps.

Figure 10 Wilpinjong incident

October 2019 - Mt Arthur Coal IncNot0035751

A small hose rubbed through on the corner of a metal component where the hose was too tight. The hydraulic fluid atomised and was sucked into the engine bay where it was ignited by a hot surface. Fire suppression failed to deploy from a cabin. Deployment required hitting the actuator to puncture the canister. 'I had to hit the actuator three times but couldn't get it to work.'

Figure 11 Mt Arthur Coal incident

October 2019 - Metropolitan Colliery IncNot0035762

A dozer operator saw the battery warning light come on. The operator looked at the battery cabinet and could see sparks and flames. The non-original equipment manufacturer battery retaining bracket came into contact with the negative terminal, short circuiting to earth. This caused sparks and flames to be present.

Figure 12 Metropolitan Colliery incident

October 2019 Northparkes Mine IncNot0035753

Workers were tramming a shotcrete rig from the top of bins to fuel up. As they were tramming, the rubber delivery hose dislodged and fell in front of the exhaust discharge. The rubber delivery hose was burnt by exhaust discharge.

Figure 13 Northparkes Mine incident

October 2019 - Muswellbrook Coal IncNot0035765

A hydraulic pilot hose rubbed on the hydraulic pilot filter, creating a pinhole failure in the hose casing. Oil sprayed onto the nearby exhaust/turbo on the right side of the engine. While the turbo and hot exhaust sections were covered in heat shielding (lagging), some oil made its way between sections and ignited.

Figure 14 Muswellbrook Coal incident

October 2019 – Tarrawonga IncNot0035775

A water cart was taking water at the southern side fill point when the operator saw flames out of the window. The OEM procedure was not followed by the fitter when installing the fuel filter.

Figure 15 Tarrawonga incident

October 2019 – Liddell IncNot0035788

A fire occurred in the engine bay of a dozer that was operating on the run of mine stockpile. The apparent cause of the fire was a build-up of coal dust within the alternator housing.

Figure 16 Liddell incident

October 2019 - Cadia East IncNot0035780

A fire occurred in the underground workshop during maintenance of a Sandvik loader. A contact cleaner was used to prepare for sealing the battery isolator box. Before closing, a broken wire was identified. During the repair of the wire, a spanner and the start receptacle made contact. A small flash occurred and a small residual flame inside the box was extinguished by a single fire extinguisher.

Figure 17 Cadia incident

October 2019 – Mount Arthur Coal IncNot0035828

The secondary drive train hydraulic oil filter was not correctly tightened during a service and this allowed oil to leak into the engine bay and be ignited by hot surfaces, most likely the turbo.

Figure 18 Dozer engine bay fire

October 2019 - Tritton Copper Mine IncNot0035865

A small flame was observed due to the short circuit of a low voltage wire in a starter circuit. The machine master isolator was isolated at the time of the incident, under maintenance in the surface mobile workshop.

Figure 19 Tritton Copper Mine incident

October 2019 - Tritton Copper Mine IncNot0035876

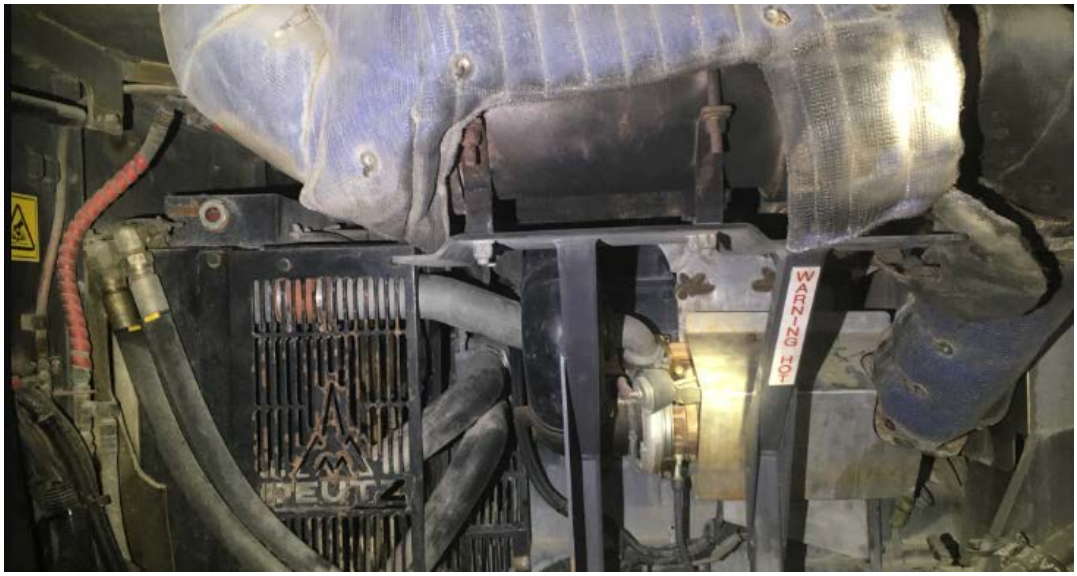
A bearing failure resulted in a fire. An investigation by a maintenance team indicated that the rear driveshaft support bearing overheated, causing the fire. The bearing was under the tub area and was not adjacent to any significant fuel source. The fire was presumed to be from grease contained in bearing.

Figure 20 and 21 Tritton Copper Mine incident

October 2019 - Cadia East IncNot0035929

An Atlas Copco E2C drill rig was tramming on the VR4 main decline when the engine stalled. When trying to restart it, flames were seen in the exhaust of the machine. Residual diesel from the fuel system failure or fuel system repairs accumulated in the exhaust system.

Figure 22 Cadia East incident



October 2019 - Werris Creek IncNot0035933

A fire occurred on a water cart. The operator saw the flames and activated the on-board fire suppression system. The fire appeared to be on a tyre, so the area was evacuated as per the mine's procedure. The cause of the fire is yet to be determined.

Figure 23 Werris Creek incident

November 2019 - Tritton Copper Mine IncNot0035968

A fire was caused by a bearing failure and subsequent grease ignition.

Figure 21 Tritton Copper Mine incident

November 2019 – Mount Thorley Warkworth IncNot0035970

The fire originated in the lower front left side of the engine compartment as a result of an atomised spray of engine oil being ignited by hot surface ignition. A trail of oil 100 metres long was observed behind the truck. The account of the operator's experience is included at the beginning of this report.

Figure 22 Mount Thorley Warkworth incident

November 2019 - Southern Operations IncNot0035973

Workers identified smoke in the interior of a parked surface light vehicle, when the passenger door was opened, flames were observed in the vicinity of the passenger side door trim and glovebox area. The fire was extinguished using a hand-held fire extinguisher. The investigation concluded that high resistance in an electrical plug generated heat, resulting in a fire.

Figure 23 Southern Operations incident

November 2019 - High Quality Sands IncNot0036010

A dredge on the river, at the southern end of the extraction area, caught on fire in the engine compartment. The dredge operator followed the fire procedure, closed all the hatches and used the fire extinguisher to put out the fire. The dredge was extensively damaged, but the operator wasn't hurt.

Figure 24 High Quality Sands incident

November 2019 - Mount Zion Quarry IncNot0036024

A severe fire came from the west of the quarry. The fire was declared a Section 44. Machines where spread throughout the quarry, in hopes that the fire would miss the machines. Machine 143 and machine 326 where about 60 metres away from each other, facing away from the direction of the fire. The operator was unsure how the machines caught alight.

Figure 25 Mount Zion Quarry incident

November 2019 - Mt Arthur South IncNot0036029

While travelling to a dump, a haul truck shut down. The operator called maintenance personnel, who inspected the truck and found the fire suppression system had been activated. The turbo oil feed lubrication line was found to be inadequately tightened. This condition allowed oil to leak and ignite on the hot turbo surface.

Figure 26 Mt Arthur South incident

November 2019 - Cowal Gold Mine IncNot0036035

A fire occurred in a service truck. The exhaust manifold failed.

Figure 30 Coal Gold Mine incident

November 2019 - Peak Gold Mine IncNot0036040

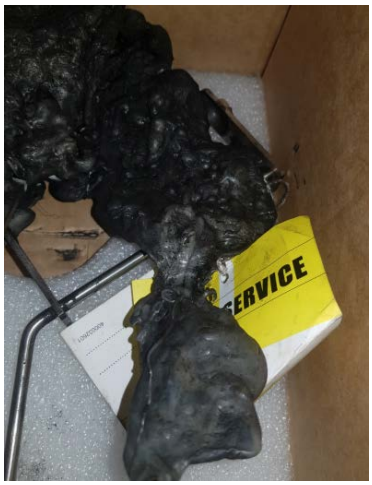
A starter motor solenoid failed to disengage on starting the engine. The heat from the continuously running starter motor and/or electrical contacts shorted out, caused heat and the insulation on nearby cables to melt and generate flames.

Figure 31 Peak Gold Mine incident

November 2019 - Tahmoor IncNot0036108

An operator found a burnt, melted diesel particulate filter in the filter housing and burnt, melted scrubber floats in the scrubber tank, with the water tank empty. The machine did not shut down when the scrubber water emptied. The machine continued to run in this state, increasing the exhaust gas temperature. The exhaust gas temperature sensors did not identify high exhaust gas temperature and did not shut down the machine, allowing the machine to sustain the elevated temperature while operating. This resulted in the disintegrated, burnt diesel particulate filter and the melted scrubber floats.

Figure 32 and 33 Tahmoor incident - melted low water shutdown floats and exhaust filter element



November 2019 – Rix's Creek IncNot0036140

A starter motor was the initiation point of a fire.

Figure 274 Rix's Creek incident

November 2019 - Werris Creek IncNot0036163

The operator of an excavator responded to a dashboard warning light for the alternator. A fitter opened the lid to the alternator and saw smoke and small flames coming from the alternator.

November 2019 - CSA Mine IncNot0036166

On an Epiroc 5020 haul truck, coolant released from a damaged hose onto a hot surface initiating a fire.

Figure 285 The CSA incident

November 2019 - Wilpinjong IncNot0036233

An operator was driving a water cart along a haul road when smoke was seen coming from under the cab. The operator and the passenger exited the cab and activated the fire suppression system.

Figure 296 The Wilpinjong incident

November 2019 - Mount Pleasant IncNot0036174

A fire occurred in a tailings dam water transfer pump. During the warm down process of shutting the pump down, the operator saw smoke coming from the turbo area of the pump. It was thought that the cause of the fire was heat damage on a hose adjacent to the turbo.

Figure 307 Mount Pleasant incident

November 2019 - Cadia East IncNot0036181

A fire occurred on a load haul dump (LHD) vehicle underground. The fire suppression system was activated. Three workers went to the refuge chamber as a precaution. The cause is yet to be determined.

Figure 31 Cadia East incident

November 2019 - Mt Arthur IncNot0036182

The active cable between the battery and the isolator was installed in contact with the mounting bracket of the isolation switch. This caused some shorting of the cables, which was the potential cause of the fire on light vehicle, as the fire appeared to have originated from the area around the battery.

Figure 32 The Mt Arthur incident

December 2019 Boggabri IncNot0036241

A bucket excavator lost power and an operator noticed a check engine light illuminated. The operator saw flames within the engine bay, so immediately activated the onboard fire suppression system. The fire was started by a fault in a wiring harness.

Figure 40 Boggabri incident

December 2019 - Ginkgo Mineral Sands IncNot0036242

The operator of a dozer noticed that the blade looked a little too shiny and suspected a fire, so went to investigate. Upon investigation, he saw a small fire at the back of the engine bay.

Figure 41 The Ginkgo Mineral Sands incident

December 2019 – Mt Arthur North IncNot36349

An incorrect rocker cover seal was installed during maintenance, which allowed engine oil to contaminate lagging near the turbocharger. The hot oil and lagging ignited with sufficient energy to deploy the fire suppression system.

Figure 42 Mt Arthur incident, punctured fire suppression canister

December 2019 – Cadia East Project IncNot0036345

A fire occurred on an underground loader when a cylinder hose failed at the front of the machine. The hose failed at the hose-end ferrule crimp.

Figure 43 Cadia East incident

December 2019 – Bengalla IncNot036348

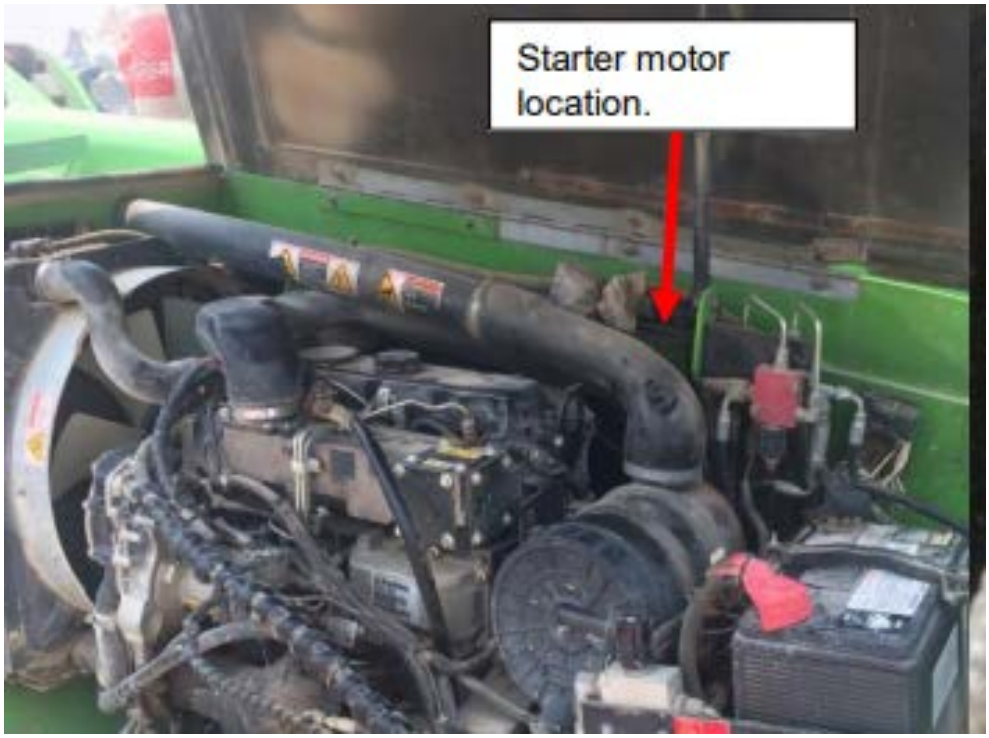
A fire occurred on a haul truck when the turbo feed line failed on the right-hand front turbo.

Figure 44 Bengalla incident

December 2019 – Northparkes IncNot0036361

While attempting to jump start a telehandler, a fitter saw smoke coming from an engine bay. On further inspection, he found a flame coming from the electrical cables near the starter motor.

Figure 45 Northparkes incident



December 2019 – Mt Arthur North IncNot0036389

A ‘P clamp’ hose support was installed but had not been properly secured to the engine. This allowed the hose to rub through allowing hydraulic oil to spray through the engine bay. Some of the oil ignited, causing a fire on the sound suppression material.

Figure 46 Mt Arthur Incident

December 2019 – CSA Mine IncNot0036385

A 5-litre lubrication oil container placed on a Jumbo compressor motor melted, allowing oil to leak onto a hot motor. The operator went to the refuge chamber and the workers in the rest of the mine were evacuated in accordance with the mine's procedure.

Figure 47 CSA mine incident

December 2019 - Mt Arthur North IncNot0036388

A haul truck grid box fire occurred. Investigation on the cause is ongoing.

Figure 48 Mt Arthur incident

December 2019 – Marulan South Limestone IncNot0036386

The fuel inlet hose from a fuel pipe (mounted to the tank) became loose, allowing fuel to leak/spray past the O-ring seal and onto the hot manifold. The estimated fuel inlet pressure was 80 PSI.

Figure 49 Marulan South incident

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