NSW GOVERNMENT

NSW Resources Regulator

Quarterly safety report

April to June 2021

ABOUT THIS REPORT

This quarterly health and safety performance report has been prepared by the NSW Resources Regulator for mine and petroleum site operators in NSW. It contains industry and sector specific information, in addition to information regarding hazards. Wherever possible, trends and patterns have been identified.

The report references sector information about the number of 'active' mines. Active mines have the status: open, intermittent, mines under care and maintenance, open tourist mines, planned and small-scale titles that are current or pending.

The report also contains information on matters of concern to the Resources Regulator including controls and actions that may be implemented to prevent or reduce the likelihood of future safety incidents.

Operators should use the sector specific information, emerging issues and good practice examples presented in this report to assist them in improving safety management systems and undertaking risk assessments at their sites. This report refers to the date the incident was notified rather than the date the incident took place.

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NSW GOVERNMENT

Contents

Executive Summary

This report is prepared to assist mine and petroleum site operators meet their obligations under relevant work health and safety legislation, including the *Work Health and Safety (Mines and Petroleum Sites) Act 2013*. It is also a way in which the NSW Resources Regulator monitors progress in implementing our risk-based compliance and enforcement strategy.

As a high-hazard regulator, we focus on compliance with legislative requirements associated with principal and other high-risk hazards, including mechanical and electrical energy and explosives. This report highlights dangerous and high potential incidents, in addition to incidents where a serious injury occurred. 'Roads or other vehicle operating areas' and 'fires or explosion' are principal hazard classifications that feature regularly in incident notifications to the Regulator.

As well as providing an overview of incidents across the mining industry, this report looks at the safety performance and regulatory activities of six sectors: coal, large (non-coal) mines and quarries, small mines and quarries (including gemstones), opal mines, petroleum and geothermal sites, and exploration sites.

This report also provides information on significant mining events in Australia and globally, summarises safety incident notifications, compliance activities and outcomes for the quarter of April to June 2021 (FY2021 Qtr4). For selected measures, data is analysed over a 15-month period from April 2020 to June 2021.

There was one mining-related fatality in NSW during the quarter.

In this quarter, total incident notifications received by principal hazard were down from 186 to 166. This figure has now fallen below the quarterly average (183) for the previous four quarters.

Air quality, dust or other airborne contaminants was the only principal hazard that saw a significant[1] rise in notifications, compared to the previous quarter. All other principal hazards saw a decrease in notifications.

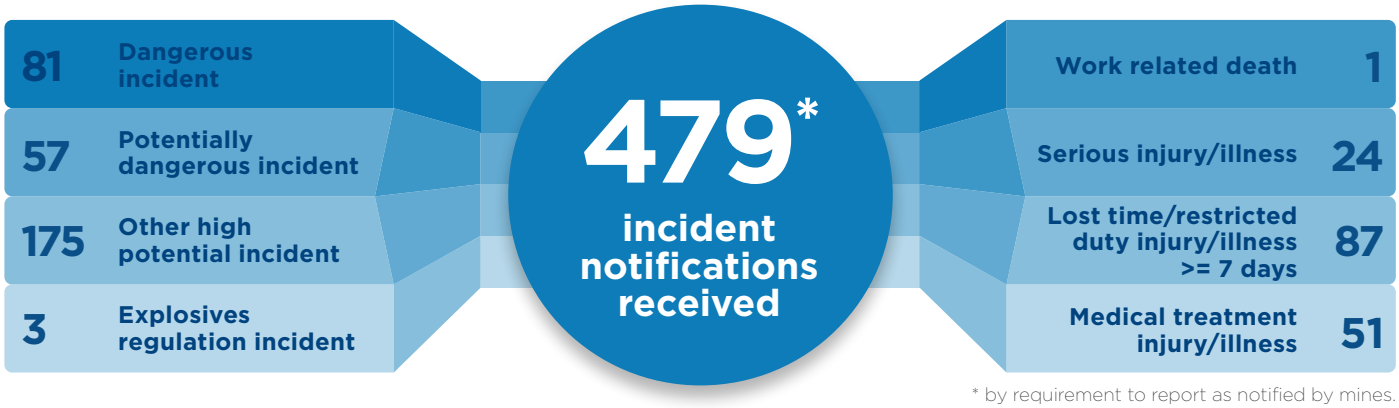
Incident notifications received by principal control plans rose slightly for both explosives control plans (from 18 up to 19) and mechanical engineering control plans (from 42 up to 45). The remaining control plan notifications were steady or saw slight falls compared to the previous quarter's notifications.

[1] The principal mining hazard subsidence, rose from one notification to two notifications, this quarter.

Quarterly snapshot

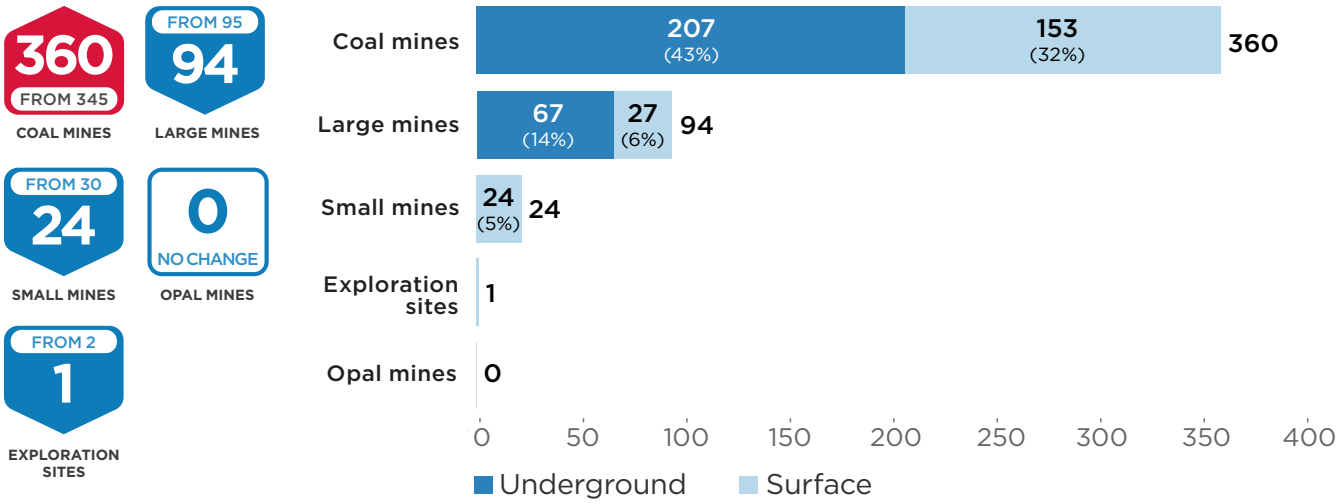
NSW Resources Regulator

The quarterly safety performance snapshot show key measures and assist industry in the development and promotion of safe work practices on mining operations.

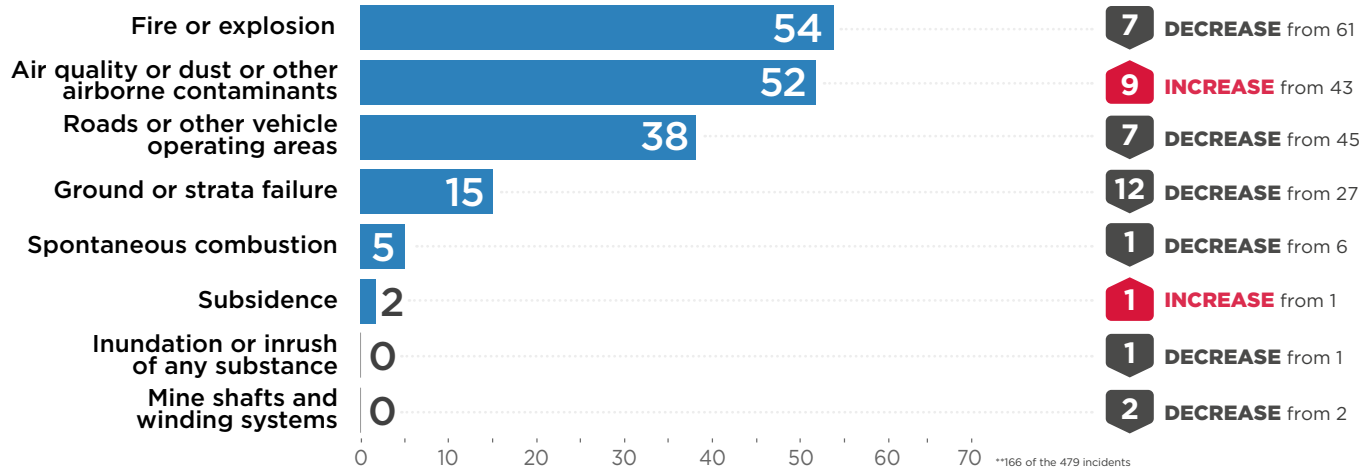


* by requirement to report as notified by mines.
The actual number of incidents, injuries and illnesses recorded may differ from original incident notifications following assessment of the notified event.

Incident notifications received by sector and operation type



Incident notifications classified by principal hazard**



**166 of the 479 incidents

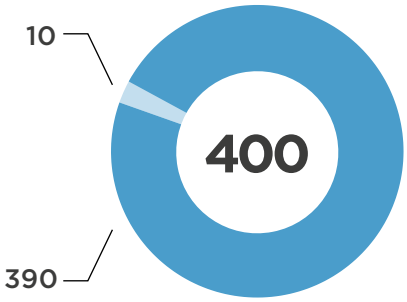
Quarterly snapshot

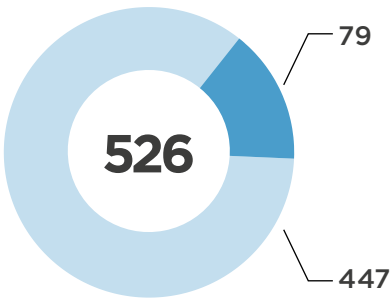
NSW Resources Regulator

926
Assessments commenced

Proactive

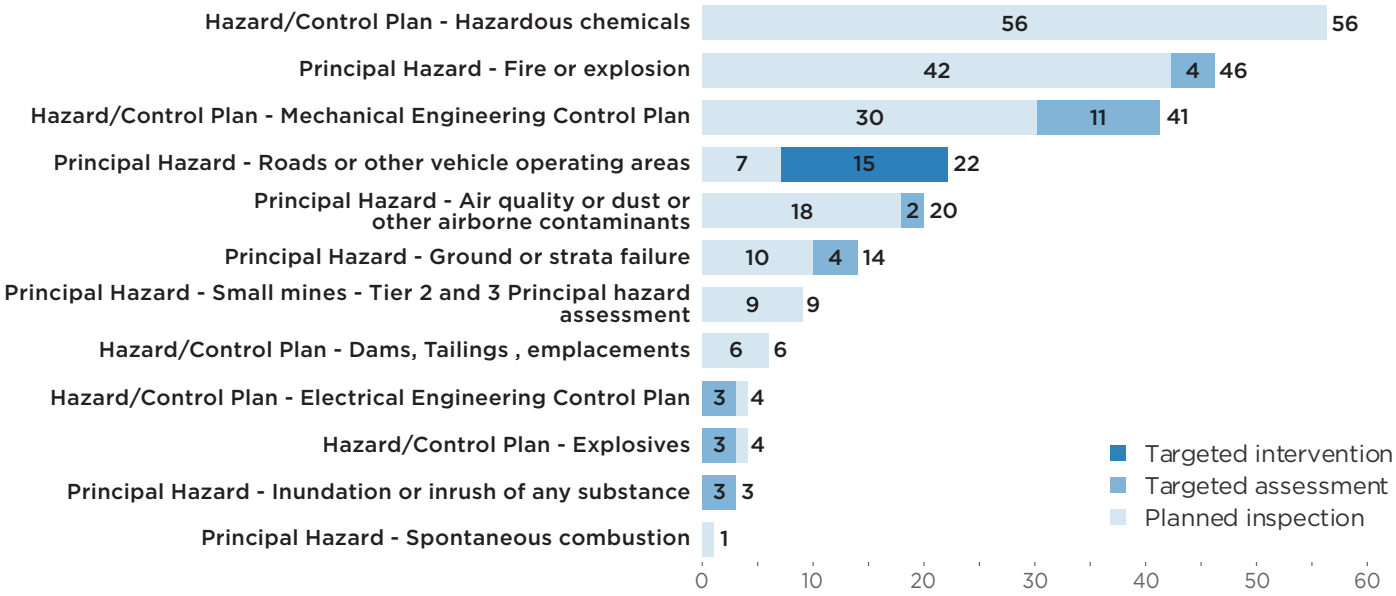
Reactive





372	FROM 133 127	FROM 210 187	77	70	2	91
FROM 297	LARGE MINES	SMALL MINES	FROM 60	FROM 26	FROM 0	FROM 88
COAL MINES			PETROLEUM AND GEOTHERMAL SITES	OPAL MINES	EXPLORATION SITES	NON-MINES

Programmed site assessments conducted



496 notices issued

280 WHSA s191 improvement notices

3 WHSA s198 non-disturbance notice

172 WHS(MPS)A s23 notices of concerns

41 WHSA s195 prohibition notices

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SUBSCRIBE TO OUR YOUTUBE CHANNEL

VISIT OUR WEBSITE FOR MORE INFO

National and international significant events

The NSW Resources Regulator is committed to sharing safety information about significant mining-related events and fatalities to increase industry awareness.

The following list includes safety alerts (including fatalities) and bulletins that occurred between **April to June 2021**.

The incidents selected, were based on their relevance to equipment and processes commonly used across the NSW mining industry.

Fatal injuries

Australia

NEW SOUTH WALES

There was one fatality reported this quarter.

A worker suffered fatal injuries when he was struck by a light vehicle. The worker was kneeling to retrieve items, which had been earlier dropped on the ground, when the driver of the light vehicle performed a left-hand U-turn. The driver did not see the worker and the front passenger side of the vehicle struck the worker. First aid was administered by other workers and later by NSW Ambulance, however, attempts to resuscitate the worker were unsuccessful.

A formal investigation has been launched by the NSW Resources Regulator's Major Safety Investigations unit and inquiries are continuing. For more information refer to the investigation information release 21-07.

OTHER STATES

Queensland

There were no mine or quarry related fatalities reported this quarter.

Western Australia

There was one fatality reported this quarter.

A worker at an Eastern Goldfields mine died after becoming unconscious in an underground gold mine. The cause of death is yet to be determined and an investigation is in progress.

Refer to the fatality summary.

Victoria

There were no mine or quarry related fatalities reported this quarter.

International

UNITED STATES OF AMERICA

There were ten mining or quarry related fatalities (nine separate incidents), published by United States of America's Mine Safety and Health Administration (MSHA), during the quarter:

- A 28-year-old haul truck driver with less than a year's mining experience, stopped his haul truck in front of his personal vehicle to get his lunch. While standing and eating his lunch, the haul truck rolled forward, pinning the miner between the haul truck and his personal truck. For more information refer to the fatality alert.
- A 53-year-old miner with over six years mining experience, was fatally injured when leaving the mine site in his personal pick-up truck. The manual swing barrier gate was partially closed. A gate pole entered the truck's windshield as the pickup truck approached, striking the driver and causing fatal injuries. For more information refer to the fatality alert.
- A 32-year-old continuous mining machine operator with 11 years mining experience, was fatally injured when a piece of rock fell from the roof and struck him. At the time of the incident, the worker was working under unsupported roof. For more information refer to the fatality alert.
- A telehandler was towing a trailer, with a diesel pump onboard, up an inclined underground roadway when the tow hitch suddenly broke. The trailer rolled down the roadway, striking and fatally injuring a 35-year-old, contract labourer. For more information refer to the fatality alert.
- A 26-year-old section foreman with five years of mining experience, was pinned against a continuous mining machine by a piece of rib. The piece fell while he was installing a rib bolt with the machine mounted rib drill. For more information refer to the fatality alert.
- A 42-year-old section foreman was fatally injured when he was hit by a shuttle car. The victim was struck when he walked into the path of a loaded shuttle car that was traveling to the dump point. For more information refer to the fatality alert.
- A 55-year-old miner with over six year's mining experience, entered the top of a primary feed hopper to break up and remove a large rock. Raw material that remained on the sides of the hopper sloughed off engulfing the worker. For more information refer to the fatality alert.
- Two miners were fatally injured when a locomotive collided with the personnel carrier in which they were riding. For more information refer to the fatality alert.

Other serious injuries

- **(NEW SOUTH WALES)** A worker sustained critical injuries after inadvertently driving his Caterpillar R2900 LHD off the edge of a stope and falling 20 metres to the level below. The dirt bund was completely knocked over by the LHD in the incident. For more information refer to the safety alert 21-04.
- **(NEW ZEALAND)** A mobile plant operator and a fellow worker were in the process of starting the plant when a small oil leak was noticed in a hydraulic hose, near the cabin. During the process of fault finding one of the workers suffered an impact injury on his left thumb pad, from a spurt of hydraulic oil. For more information refer to the safety alert.
- **(NEW SOUTH WALES)** A worker sustained a laceration to his foot when a grinder he was using fell and cut through his boot. The worker was deburring a pipe when the die grinder caught the internal edge of the pipe causing it to 'chatter' in a circular motion. The worker lost his grip on the grinder, causing it to fall on his foot. The grinder was still operating at the time of the incident. For more information refer to the weekly incident summary.
- **(NEW SOUTH WALES)** A mine worker, sitting in the front passenger's seat of an underground mine transport vehicle, sustained a serious laceration and crush injury to his upper left arm. The incident occurred when the transport vehicle drove into a cut-through and collided with a piece of equipment stowed there. The worker sustained extensive injuries to his arm. For more information refer to the weekly incident summary, investigation information release 21-08 and safety alert 21-05.
- **(NEW ZEALAND)** A contractor was using a winch truck and two snatch blocks to lift an 18-metre section of casing from a trench, when one of the components catastrophically failed, injuring the winch operator. For more information refer to the safety alert.
- **(NEW SOUTH WALES)** A mine worker at an underground colliery, was struck by a recoiling six metre polyethylene pipe. The pipe, which was protruding from a flatbed trailer, became stuck on the gas range while workers were attempting to shunt the trailer to a new location. The worker, who was spotting for the driver of the mine vehicle (shunting the trailer), sustained serious injuries and required hospital treatment. For more information refer to the investigation information release 21-09.
- **(QUEENSLAND)** While working on a dragline shutdown and performing spray painting activities under a Confined Space Entry Permit, a coal mine worker became unresponsive and was rescued from inside the revolving frame of a dragline. A second worker also had to be rescued after re-entering the confined space to assist with the first rescue. For more information refer to the safety alert #393.

- **(NEW ZEALAND)** Light from the sunrise impaired an excavator driver's vision while he was loading another vehicle. As he was slewing, the bucket contacted the tray of a waiting dump truck. The contact caused the truck driver to hit his head on the side of the cab, requiring him to go to hospital. For more information refer to the safety alert.
- **(NEW SOUTH WALES)** A worker sustained a broken tibia when his leg was trapped between two steel beams. The worker was helping position a beam that was being moved by a load haul dump. He placed his leg between a beam on the ground and the one attached to the load haul dump which slipped sideways, crushing his leg. Refer to the weekly incident summary.
- **(NEW SOUTH WALES)** A worker received crush injuries to two fingers when their hand was caught in a pinch point while operating a roof bolting rig. The worker was wearing gloves when her fingers became caught between the feed carriage end plate and the carriage retainers. The gloves had to be cut to free the worker's fingers. The worker sustained degloving of the end of her left ring finger and the tip of her little finger. A polyurethane flap had been fitted to prevent access to the pinch point, but this proved to be an inadequate risk control. Refer to the weekly incident summary.

Safety alerts, bulletins and other dangerous or high potential incidents

- **(WESTERN AUSTRALIA)** Two operators were exposed to potentially serious injury when the two autonomous haul trucks they were attempting to board unexpectedly drove forward. For more information refer to the significant incident report #286.
- **(NEW SOUTH WALES)** A dangerous incident occurred at an open-cut coal mine as a dozer passed through the off-side swing radius of a large excavator as it was slewing. The rear counterweight passed over the dozer blade and struck the cabin structure of the dozer, partially crushing it. The dozer operator was not injured. For more information refer to the investigation information release 21-10.
- **(QUEENSLAND)** A coal mine worker was deflating an ultra-class rear dump truck tyre using a super large bore IN-80 inflator adaptor tool, often referred to as a deflator tool. The stem of the tool ejected and struck the safety glasses being worn by the worker. The worker was startled by the impact and stumbled backwards off a step ladder, falling onto the workshop floor. For more information refer to the safety alert #389.
- **(NEW SOUTH WALES)** A worker was knocked from a ladder, falling onto a mobile work bench below. The ladder was knocked when a radiator noise attenuator assembly fell over. The attenuator was being prepared to be reinstalled on a Komatsu 930e haul truck. For more information refer to the safety alert 21-06.
- **(QUEENSLAND)** The operation of several large excavator emergency access and egress systems were recently tested by the Queensland mines inspectorate, in conjunction with mine operators. Testing was carried out on a number of surface coal mines and on a variety of brands which included Caterpillar, Hitachi, Komatsu and Liebherr. A range of issues were found, some of which apply to the lowering or lifting of retractable access ladders in non-emergency mode. For more information refer to the safety bulletin #194.
- **(NEW SOUTH WALES)** A person was inside an exclusion zone when a blast was initiated at a quarry. The person did not suffer any physical injury, but experienced trauma because of the exposure to the blast and flyrock. For more information refer to the investigation information release 21-06.
- **(NEW ZEALAND)** A front end loader was being used to conduct lifting operations when the end of the link arm broke off and projected itself approximately nine metres. For more information refer to the safety alert.

- **(WESTERN AUSTRALIA)** Over the past three years several vehicles on mining operations were reported as being struck by lightning, with some experiencing tyre pyrolysis following the event. Pyrolysis may result in tyres exploding unexpectedly, and this poses a risk of serious or fatal injury to workers due to the sudden release of energy. This type of catastrophic failure may occur after a delay of several hours. For more information refer to the mines safety bulletin No. 183.
- **(NEW SOUTH WALES)** Several incidents have recently been reported to the Regulator where mine operators sustained damage to equipment and infrastructure and exposed their workers to significant health and safety risks due to flyrock caused by blasting activities. The severity of the outcomes of these incidents has ranged from a near miss to minor injuries to personnel involved, as well as damage to equipment and buildings. The potential outcome of these incidents could have been severe and/or fatal injuries. For more information refer to the safety alert 21-02.
- **(QUEENSLAND)** Major structural failure of the boom point sheaves on a dragline allowed the sheave assembly to fall from the boom point and land in the pit. For more information refer to the safety alert #391.
- **(NEW SOUTH WALES)** The Regulator has recently received two notifications of incidents involving explosion protected diesel engine systems (ExDES) failing to shut down upon initiation. In each case, the engines continued to run after the engine off switch was actuated. In response, the operators used various means to stop the engine, including isolating the main air supply, draining water from the exhaust conditioner, using the throttle pedal back-heel and activating the emergency stop strangler valve. For more information refer to the safety bulletin 21-03.
- **(NEW SOUTH WALES)** The Regulator has recently received two notifications where tracked utility type vehicles have lost motion control and rolled uncontrolled down a gradient. For more information refer to the safety bulletin 21-04.
- **(QUEENSLAND)** A rear dump was being loaded by a rope shovel when a basalt rock approximately 400mm in diameter has fallen on the offside and rolled beneath the truck unnoticed. Once loaded the truck has driven forward over the rock causing that tyre to immediately fail. This sudden eruption caused numerous pieces of basalt rock shrapnel to eject from the floor, with one rock weighing 950 grams striking a manned dozer parked 40.5 metres away. For more information refer to the safety alert #392.

Notifiable incidents relating to hazards

The Work Health and Safety (Mine and Petroleum Sites) Regulation 2014 (the regulation) identifies principal hazards and principal control plans for special consideration.

Principal hazards have a reasonable potential to result in multiple deaths in a single incident or a series of recurring incidents.

Principal control plans cover risks to health and safety from hazards, work processes and plant that may result in incidents that are high potential, frequently occurring or of a certain complexity

SUMMARY OF INCIDENTS

The following table shows the number of incident notifications received for the past five quarters as classified against a principal hazard or principal control plan.

Overall, there were 479 incident notifications received in the current quarter. Of these, 35% (166) related to principal hazards, 26% (125) related to principal control plans and the remainder related to other incidents.

TABLE 1. INCIDENT NOTIFICATIONS CLASSIFIED BY PRINCIPAL HAZARD/PRINCIPAL CONTROL PLAN APRIL 2020 TO JUNE 2021

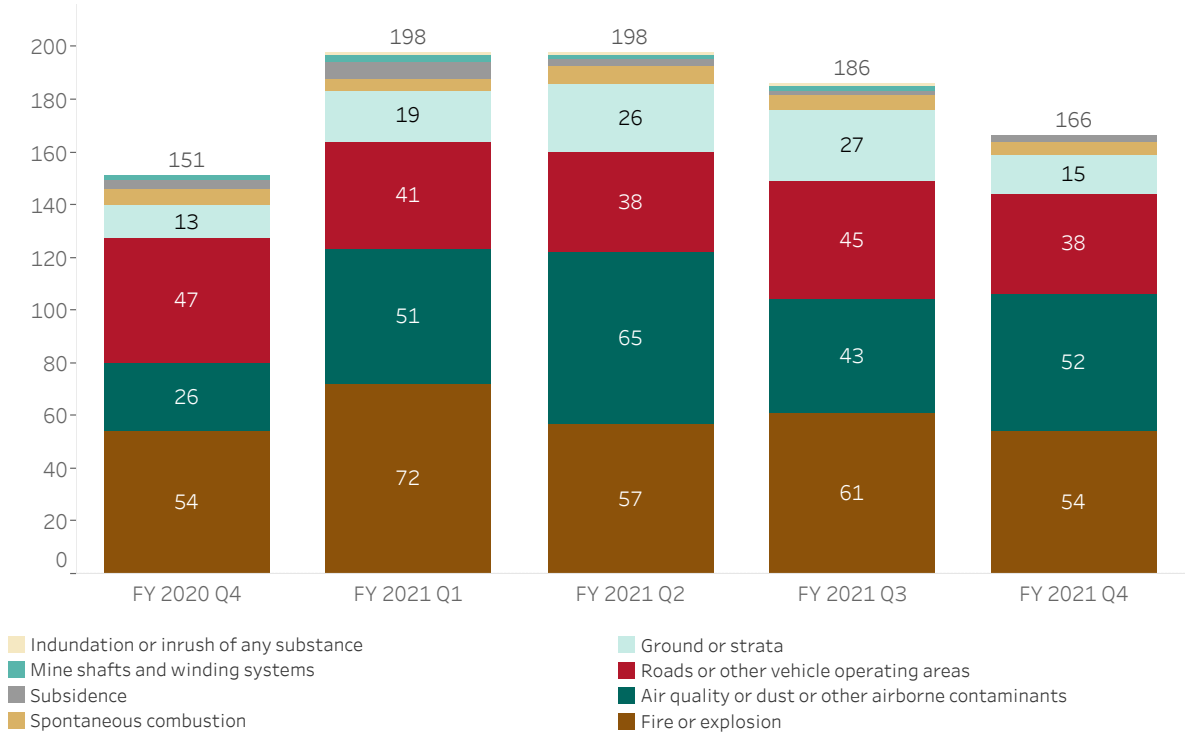
INCIDENT CLASSIFICATION BY PRINCIPAL HAZARD OR PRINCIPAL CONTROL PLAN		FY 2020 Q4	FY 2021 Q1	FY 2021 Q2	FY 2021 Q3	FY 2021 Q4
Principal hazard	Air quality or dust or other airborne contaminants	26	51	65	43	52
	Fire or explosion	54	72	57	61	54
	Ground or strata failure	13	19	26	27	15
	Inundation or inrush of any substance		1	1	1	
	Mine shafts and winding systems	2	3	2	2	
	Roads or other vehicle operating areas	47	41	38	45	38
	Spontaneous combustion	6	5	7	6	5
	Subsidence	3	6	2	1	2
	Total	151	198	198	186	166
Principal control plan	Electrical Engineering Control Plan	23	27	16	23	23
	Electrical and/or Mechanical Engineering Control Plan	51	56	43	38	37
	Explosives Control Plan	24	23	28	18	19
	Mechanical Engineering Control Plan	53	62	39	42	45
	Ventilation Control Plan	2	5	5	5	1
	Total	153	173	131	126	125
Other	No related principal mining hazard or principal control plan	176	220	190	160	188
GRAND TOTAL		**480**	**591**	**519**	**472**	**479**

Principal mining hazards

- GROUND OR STRATA FAILURE
- INUNDATION OR INRUSH OF ANY SUBSTANCE
- MINE SHAFTS AND WINDING SYSTEMS
- ROADS OR OTHER VEHICLE OPERATING AREAS
- AIRBORNE DUST AND OTHER AIRBORNE CONTAMINANTS
- FIRE OR EXPLOSION
- GAS OUTBURSTS
- SPONTANEOUS COMBUSTION
- SUBSIDENCE
- (HAZARDS IDENTIFIED BY THE MINE OPERATOR) PROHIBITED ITEMS OR SUBSTANCES

The chart below presents a further breakdown of numbers of incidents notifications received by quarter related to principal hazards as defined in clause 5 of the Regulation.

FIGURE 1. INCIDENT NOTIFICATIONS RECEIVED BY PRINCIPAL HAZARD APRIL 2020 TO JUNE 2021

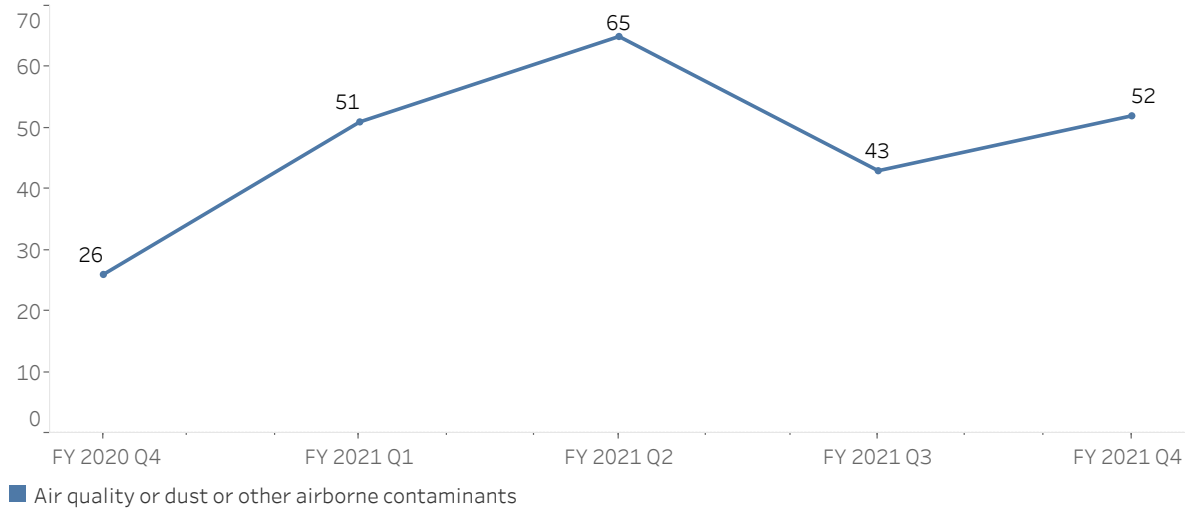


Air quality, dust or other airborne contaminants

52
FROM 43

Airborne contaminants comprise a large and varied range of substances and forms. Coal and silica particles, along with methane and carbon monoxide, are regularly present in mining as dusts, fumes and vapours. These contaminants have exposure standards and can affect workers rapidly (CO or CO_2) or over several years (coal/silica dust).

FIGURE 2. INCIDENT NOTIFICATIONS RELATED TO THE PRINCIPAL HAZARD AIR QUALITY, DUST OR OTHER AIRBORNE CONTAMINANTS APRIL 2020 TO JUNE 2021



HIGH POTENTIAL INCIDENT – RESULTS HIGHLIGHT THE NEED FOR GREATER AWARENESS

As part of routine person dust monitoring, a worker performing maintenance work between the workshop and the pit, returned a silica dust concentration exceeding the adjusted occupational exposure limit (OEL) by 164%. The worker was notified of the exceedance and an investigation commenced.

When the worker was interviewed in relation to the exceedance, it was identified that the dust monitor had been removed from his body and placed in the back seat of a vehicle and that this occurred every time the vehicle was used and during crib times.

During these periods, the monitor was exposed to surface dust from the seat and possibly other areas in the rear of the vehicle such at the foot well. As the monitor continued to sample air throughout the shift, it is likely that it may have 'vacuumed' dust off these surfaces rather than measuring air in the 'breathing zone of the worker. This contaminated result was considered void and the worker was scheduled for retesting.

Recommendations to industry

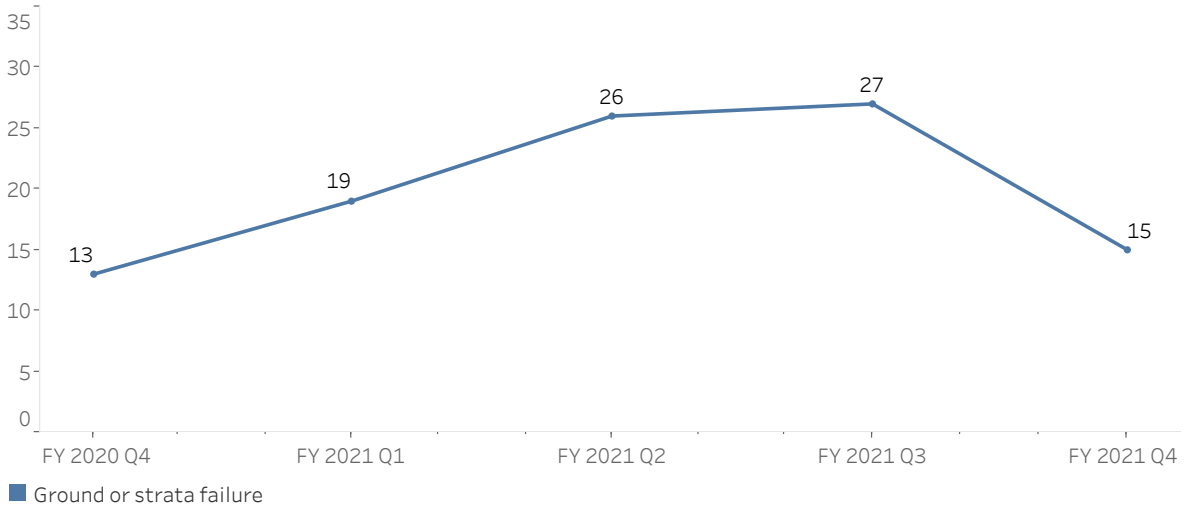
The importance of accurate dust monitoring results is crucial in identifying and reducing worker exposure to harmful and deadly airborne contaminants. Mine operators should ensure that all workers are clear on their responsibilities whilst being monitored. This includes not tampering (e.g. blocking intakes or removing devices) with monitors unless authorised to do so.

Retesting in cases where samples are contaminated or voided, is time consuming and costly. Failure to identify exposures to workers in hazardous atmospheres is potentially costlier still.

Ground or strata failure

Ground or strata failure is an ever-present hazard in both surface and underground mining, with a significant risk posed to workers from unplanned movement of ground.

FIGURE 3. INCIDENT NOTIFICATIONS RELATED TO THE PRINCIPAL HAZARD GROUND OR STRATA FAILURE APRIL 2020 TO JUNE 2021



DANGEROUS INCIDENT – FLAKING SIGNS ALERT PRIOR TO SUDDEN GROUND FAILURE

A roof fall, approximately six metres long, measuring the full width of the drive (5.4 metres) and two metres high, occurred in the main gate of an underground coal mine directly behind the continuous miner where the area was supported. Two fitters on a continuous miner noticed some flaking in the roof and immediately went outbye just prior to the fall of ground. The ground failure was sudden.

Recommendations

Underground mines must have systems in place to ensure the correct installation of designed strata support. This includes requirements and frequency of encapsulation test, pull test, torque test on drill rigs and inspection of installation spacing. Once these requirements are determined mine operators must make compliance variations.

DANGEROUS INCIDENT – SYSTEMATIC CONTROL OF ROOF FALLS CRUCIAL

A fall of roof occurred on the inbye side of a fault plane. The continuous miner was operating inbye approximately 60 metres. Operators were able to retreat past the fallen material under supported roof. Ventilation was not disrupted.

Recommendations

Underground mines must have systems in place to ensure the correct installation of designed strata support. This includes requirements and frequency of encapsulation test, pull test, torque test on drill rigs and inspection of installation spacing. Once these requirements are determined mine operators must make compliance variations.

For more information refer to the NSW code of practice: Strata control in underground coal mines.

DANGEROUS INCIDENT – ROOF FALL BLOCKS ROAD

A roof fall occurred at an intersection in an underground coal mine. The fall was in an out-bye area of the mine and extended into the cut-through, blocking the travel road. All personnel were safely evacuated and there were no injuries.

This incident is under investigation and further information may be published in the future.

Recommendations to industry

- Underground mines should review the adequacy of their strata monitoring arrangements and associated trigger action response plans, to ensure that workers are not exposed to unacceptable risks associated with strata failure. For more information refer to the NSW code of practice: Strata control in underground coal mines

HIGH POTENTIAL INCIDENT – LARGE ROCKFALL OCCURS BETWEEN MOVING TRUCKS

During night shift at an open pit gold mine, an estimated 90 tonnes of rock fell from a height of approximately 85 metres onto the western running board. The impacted area was at the entrance (adjacent to a drilled but not an active area) of an active running board, demarked as a “no stop” single vehicle lane. This was to ensure that vehicles travelling were not directly under the highwall (15m from toe of highwall) and limit exposure time in the area. This was however, still a frequently used vehicular access lane.

The rockfall was identified post occurrence, by a truck operator following another vehicle within the circuit, with the rockfall location occurring between the two moving trucks.

It appears that the cause of the incident is likely to have been the deterioration of rock mass over a period of 15 months that was not readily identified or anticipated by the mine operator.

Recommendations

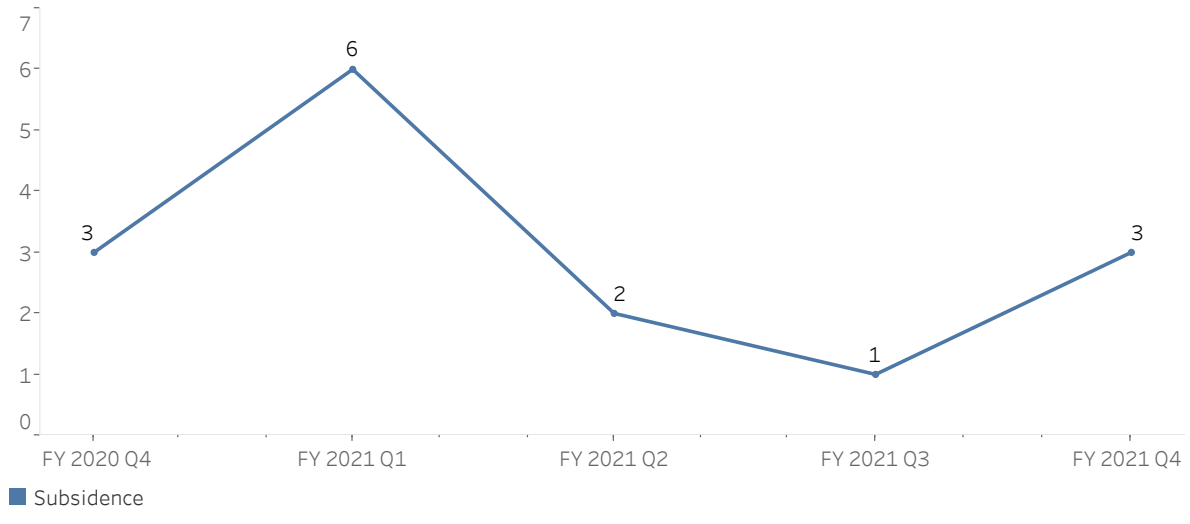
The following matters must be considered in developing the control measures to manage the risks of subsidence:

- the characteristics of all relevant surface and subsurface features
- the rate, method, layout, schedule, and sequence of mining operations.

Subsidence

Subsidence hazards are a potential in any land, below which, there has been underground mining. The potential to cause significant damage (from deformation or sinkholes) to infrastructure (roads, dwellings etc.) and injure persons nearby, makes this a principal hazard in NSW.

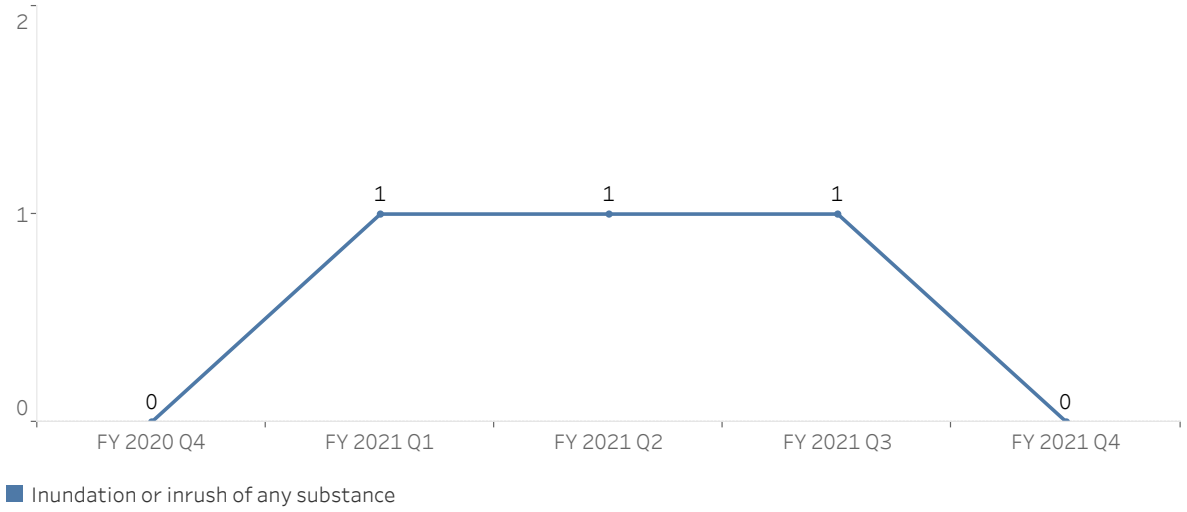
FIGURE 4. INCIDENT NOTIFICATIONS RELATED TO THE PRINCIPAL HAZARD SUBSIDENCE APRIL 2020 TO JUNE 2021



Inundation or inrush of any substance

Inundation and inrush is a low-frequency, high-consequence hazard, particularly in underground mining. Incidents often involve inrushes of water or inundation by denser materials (sand or rock). The potential to cause multiple fatalities in a single event like at Gretley Colliery in 1996, make this a principal hazard in NSW.

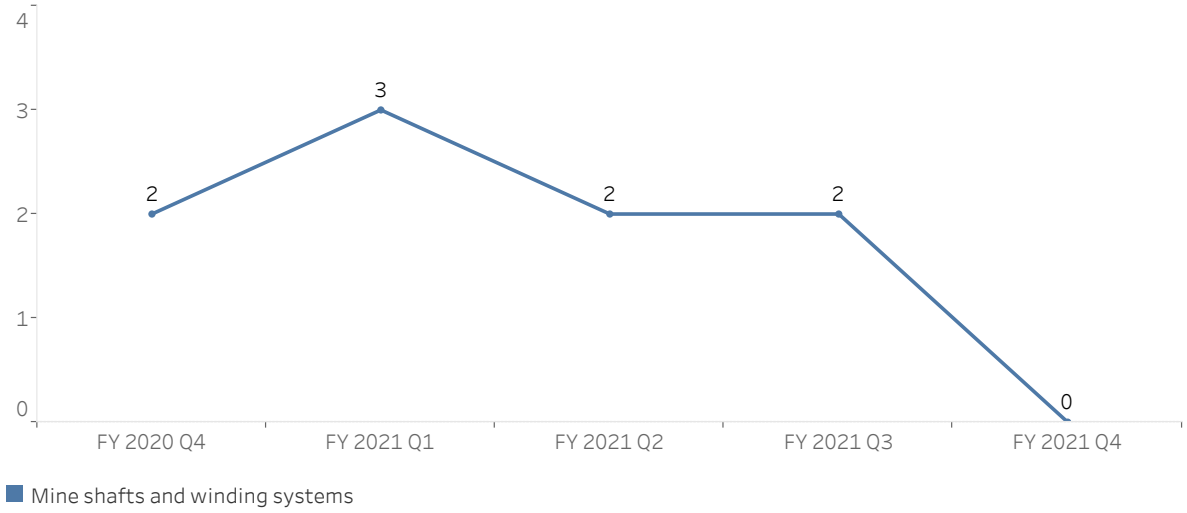
FIGURE 5. INCIDENT NOTIFICATIONS RELATED TO THE PRINCIPAL HAZARD INUNDATION OR INRUSH APRIL 2020 TO JUNE 2021



Mine shafts and winding systems

Mine shaft integrity and the operation of winding systems require specific focus. The safe movement of material and workers up/down mine shafts is hazardous and has the potential to impact on the safety of multiple workers at a mine.

FIGURE 6. INCIDENT NOTIFICATIONS RELATED TO THE PRINCIPAL HAZARD MINE SHAFTS AND WINDING SYSTEMS APRIL 2020 TO JUNE 2021



NO CHANGE
0

Gas outbursts

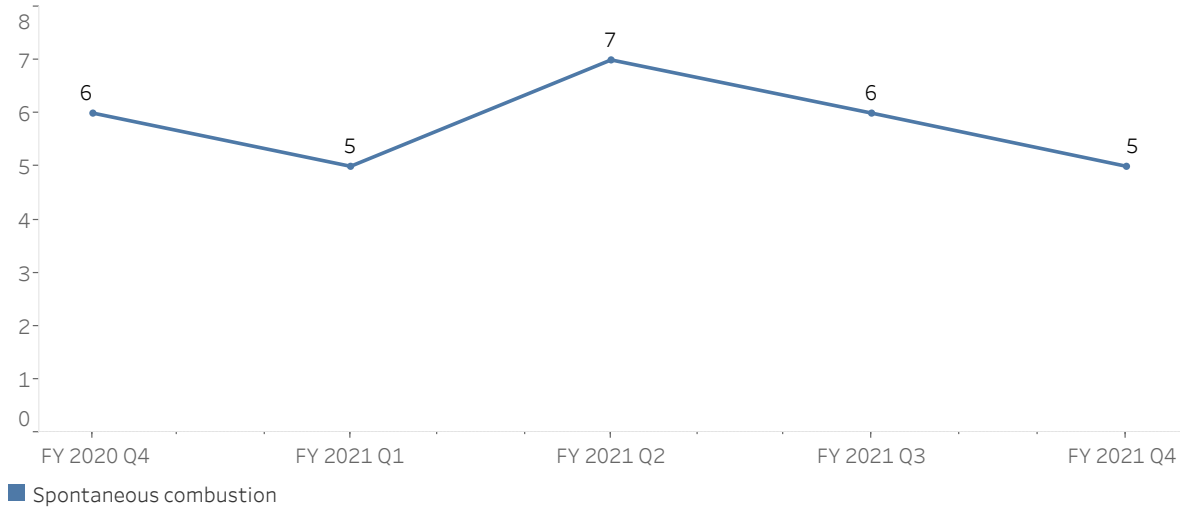
Gas outbursts are not a high frequency hazard event, but their often sudden and violent nature, has the potential to cause fatalities to workers nearby. This hazard also includes the liberation of gases that can asphyxiate, explode or cause a fire. These circumstances make this a principal hazard in NSW.

FROM 6
5

Spontaneous combustion

While spontaneous combustion (of coal) is a hazard exclusive to the coal sector, the consequences have the potential to cause multiple fatalities and devastate entire communities.

FIGURE 7. INCIDENT NOTIFICATIONS RELATED TO THE PRINCIPAL HAZARD SPONTANEOUS COMBUSTION APRIL 2020 TO JUNE 2021



HIGH POTENTIAL INCIDENT – SMALL AREA SPONTANEOUS COMBUSTION

Spontaneous combustion was discovered at a north western open-cut coal mine, in a ramp area of the main pit. This location was not an area where spontaneous combustion events had previously been detected.

The incident was likely related to a small occurrence of some carbonaceous material in amongst some waste.

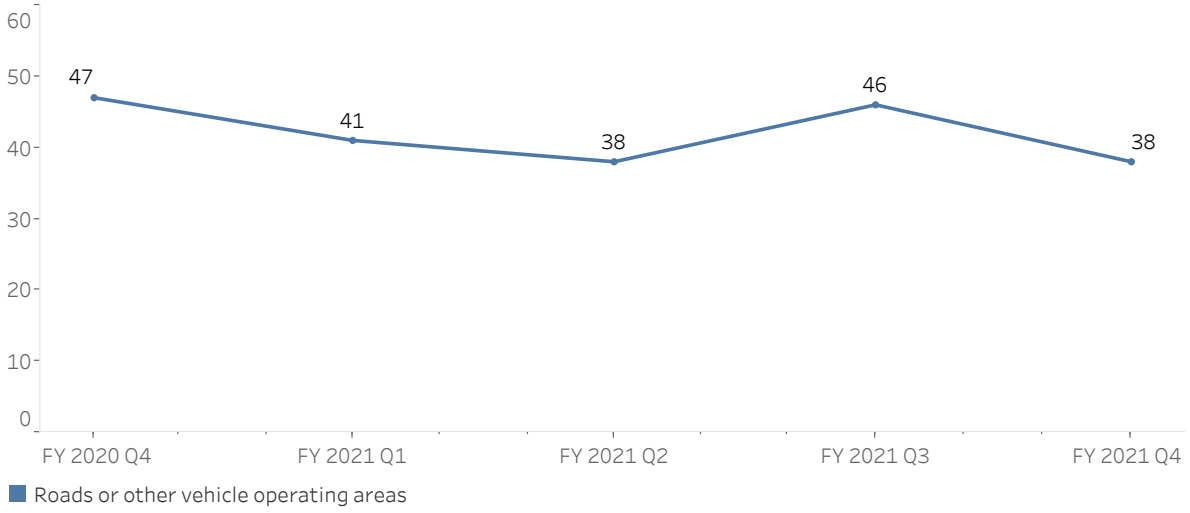
The operator managed the event as per the mines' spontaneous combustion response procedure.

FROM 46
38

Roads or other vehicle operating areas

Vehicle movements in and around mine sites, require specific design considerations and controls, to ensure that collisions and other vehicular accidents do not occur, and place workers lives at risk. The high volume of vehicular interactions on mine sites and the size of the mobile plant utilised classifies this as a principal hazard in NSW.

FIGURE 8. INCIDENT NOTIFICATIONS RELATED TO THE PRINCIPAL HAZARD ROADS OR OTHER VEHICLE OPERATING AREAS APRIL 2020 TO JUNE 2021



DANGEROUS INCIDENT – FLUID LOAD AND ROAD CONDITIONS LEAD TO OVERTURN

A service truck overturned when the operator lost control of the vehicle while descending a ramp. The road surface was wet following recent dust suppression watering. The operator was able to exit the vehicle and was uninjured. The truck had approximately 20 kilolitres of fluid on board and a capacity of 32 to 34 kilolitres.

Recommendations

When developing control measures to deal with the risks associated with articulated service trucks, plant characteristics including stopping distances, manoeuvrability, and operating speeds, both the loaded and unloaded vehicle must be considered. Movement of fluid in tanks mounted on mobile plant can significantly influence the centre of gravity and overall stability of the vehicle.

Consideration should be given to tank shape, baffle design and compartmentalisation to control fluid surge. Mine operators should provide operator training specific to wet roads and ensure drivers are made aware of dust suppression activities on roads. Operators of articulated trucks need to remain situationally aware and drive to the conditions.

DANGEROUS INCIDENT – POSITIVE COMMUNICATION FAILURE CAUSES NEAR MISS

A dozer operator communicated with a haul truck that he was about to clean up across the face behind the truck. The dozer operator completed one push and reversed back to commence a second push. The truck operator saw the dozer reversing out of the area and assumed it had finished cleaning up. The truck operator then reversed towards the face, narrowly missing the dozer cab with the dovetail of the truck. The truck operator assumed the dozer was clear without waiting for positive communication from the dozer operator.

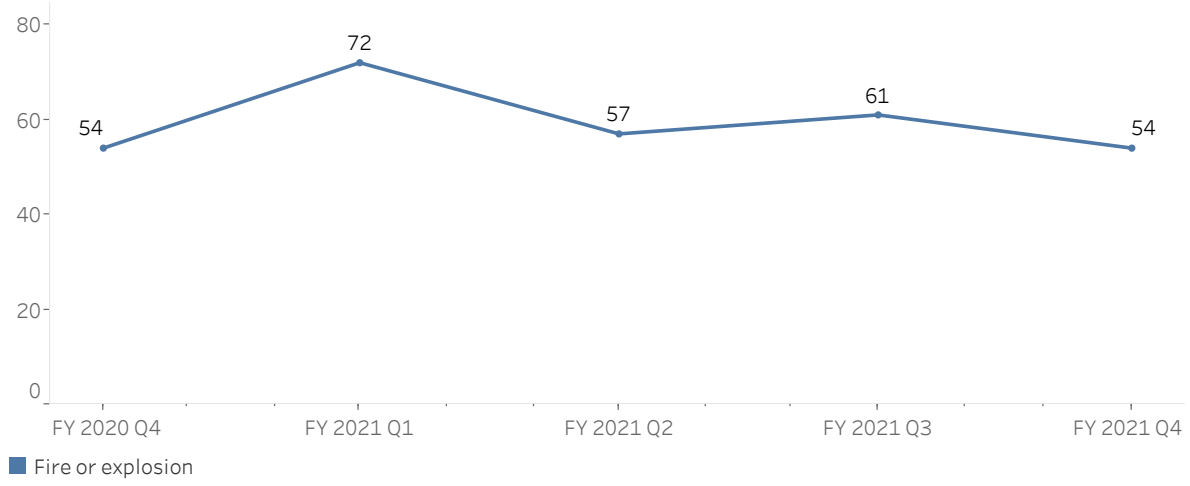
Recommendations

Operators of mobile plant must establish positive communications with other plant operators before moving into impact zones. There is no room for assumption when the consequences could be fatal. Mine operators should consider periodic refreshers in positive communications protocols for operators using mobile equipment. Refer to safety bulletin 18-06.

Fire or explosion

This principal hazard includes risk associated with all sources of flammable, combustible and explosive substances and materials in the working environment. A common source of these incidents are fires on mobile plant (at both underground and surface operations). This principal hazard is distinct from the hazards covered in the explosives control plan.

FIGURE 9. INCIDENT NOTIFICATIONS RELATED TO THE PRINCIPAL HAZARD FIRE OR EXPLOSION APRIL 2020 TO JUNE 2021



DANGEROUS INCIDENT - MANDATORY INSPECTIONS CATCH POTENTIAL FIRE SOURCE

A deputy carrying out underground conveyor belt inspections found hot embers and a small flame. Both were caused by an empty 20 litre oil drum wedged under the moving conveyor return belt.

Recommendations

Historically, fires in underground coal mines have led to significant human tragedy and loss. Any fire should be extinguished as quickly as possible. Mine operators should ensure that risk control measures to prevent the occurrence of fires, and the escalation and response to underground fires, are implemented and remain effective. Inspection regimes, housekeeping standards and emergency response procedures should be routinely examined to ensure minimum standards are met or exceeded.

DANGEROUS INCIDENT – BIT HITS UNUSED EXPLOSIVE RESIDUE, DETONATING

A jumbo operator's offsider sustained lacerations to his leg and arm when he was struck by flyrock. The operator was mechanically scaling the face with a 45-millimetre bit, when the bit entered an unidentified blast hole. The blast hole contained explosive residue which initiated the explosion. The offsider was standing towards the rear of the jumbo at the time of the incident.

Recommendations

A risk assessment should be undertaken to identify blast hole remnants prior to commencing scaling work. Mine operators should consider using a scaling bit that is larger in diameter than a blast hole bit to eliminate the risk of the drill bit entering an unidentified blast hole remnant.

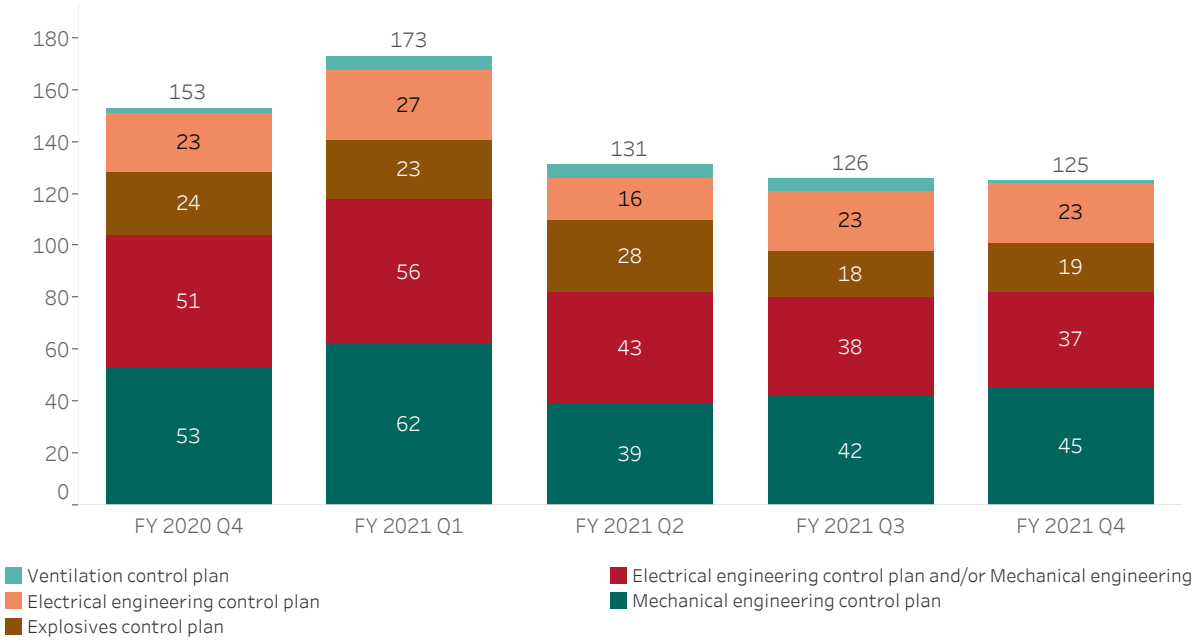
Principal control plans

The Work Health and Safety (Mines and Petroleum Sites) Regulation 2014 specifies principal control plans for managing certain risks associated with hazards at mine and petroleum sites.

There are seven principal control plans specified in the Regulation.

The figure below presents a further breakdown of numbers of incident notifications received related to principal control plans as defined in clauses 3 and 26 of the Regulation.

FIGURE 10. INCIDENT NOTIFICATIONS RECEIVED BY PRINCIPAL CONTROL PLAN APRIL 2020 TO JUNE 2021

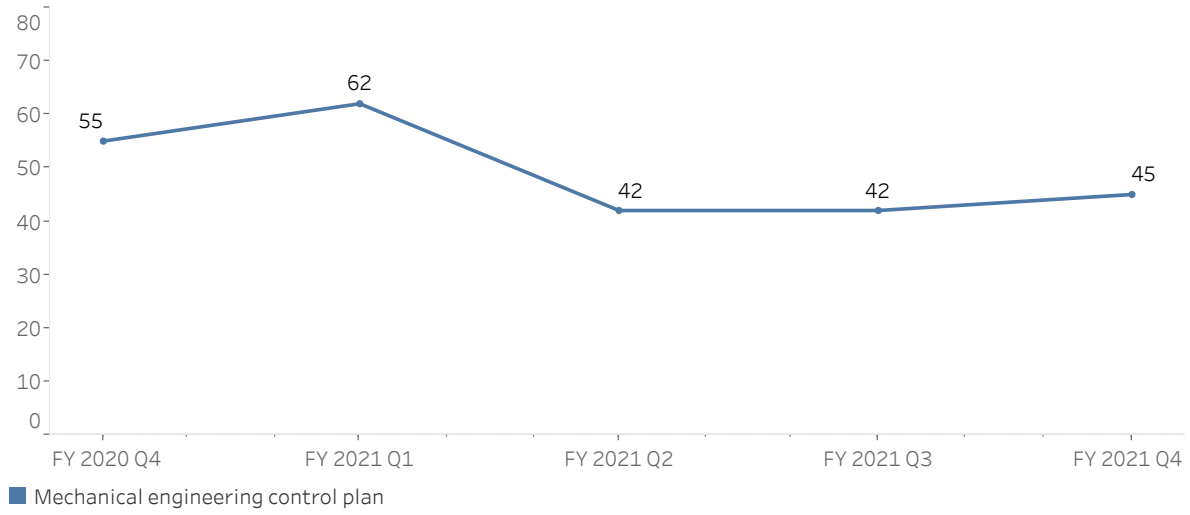


Mechanical engineering control plan

45
FROM 42

The mechanical engineering control plan covers 'lifecycle' risks associated with mechanical hazards (vehicles, plant and mechanical systems and structures), that workers may be exposed to. This includes risks associated with pressurised fluids.

FIGURE 11. INCIDENT NOTIFICATIONS RELATED TO THE MECHANICAL ENGINEERING CONTROL PLAN APRIL 2020 TO JUNE 2021



DANGEROUS INCIDENT – RELEASE OF ENERGY INJURES WORKER

A fitter received a severe laceration to his left cheek while removing a cross-member from the engine bay of a haul truck. Two fitters were removing the cross-member by jacking from below and lifting with a crane. The injured worker was reportedly moving electrical cables from the path of the cross-member when it came loose. The tension applied by the slings, combined with the pressure from the jack, allowed the cross-member to rise up quickly and strike the fitter. The incorrect procedure was being used for the task.

Recommendations

Mechanical engineering control plans must set out the control measures for risks associated with the unintended release of mechanical energy by considering safe work systems for people dealing with plant or structures. Mine operators should review how workers and supervisors are trained to recognise the potential hazards associated with all energy sources, including the load introduced by lifting equipment on plant. This is especially important when there is the potential for stored energy to be released without warning.

DANGEROUS INCIDENT – HIGH PRESSURE EJECTION NEAR MISS

During commissioning of a new water line, the end cap was being undone to remove air build up when it ejected under pressure. It travelled approximately 25 metres and hit nearby infrastructure. A worker was using a socket and ratchet on the end cap bolts and working from an elevated work platform about five metres from the ground at the time. The worker was not injured.

Recommendations

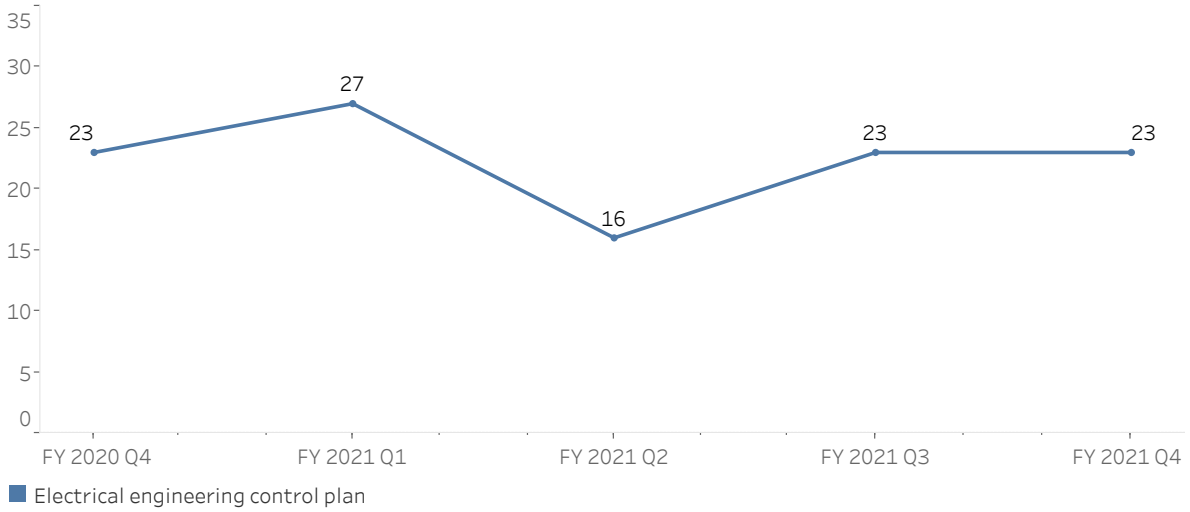
Mine operators are reminded that effective isolation and energy dissipation is a critical risk control when working on pressurised fluid systems. Loosening bolts on an end cap is not a suitable method of dissipating air pressure in a water line. Appropriately rated valves should be used. Operators must ensure that pressurised fluid lines are isolated, with pressure dissipated prior to removing end caps. Refer to Safety Alert: Fluid power isolation failures.

Electrical engineering control plan

NO CHANGE
23

The electrical engineering control plan covers 'lifecycle' risks, associated with electrical hazards (supply, vehicles, plant or infrastructure), that workers may be exposed to.

FIGURE 12. INCIDENT NOTIFICATIONS RELATED TO THE ELECTRICAL ENGINEERING CONTROL PLAN APRIL 2020 TO JUNE 2021



REPORT RELEASED FOLLOWING STATE-WIDE BLITZ ON ELECTRICAL RISKS AT LARGE QUARRIES

During March 2021, operators of large quarries were visited by teams of inspectors as part of a targeted intervention across the State, focusing on the management of electrical hazards. The intervention followed an incident investigation for a reported electric shock at a quarry. The Regulator's investigation raised significant concerns regarding the testing, inspection, and maintenance of electrical equipment at the quarries. The Targeted Intervention Program report has been finalised and is available here.

DANGEROUS INCIDENT – WORKER RECEIVES SUSPECTED ELECTRIC SHOCK

Contract workers installing a new crusher at an underground metal mine were using an induction heater (water-cooled) to preheat components prior to welding when an incident occurred. During this task, a worker has reported receiving a suspected electric shock, when he brushed against a cooling hose connector.

The worker sustained no other observed injuries and underwent an onsite ECG prior to being transported to hospital for a precautionary assessment.

A measurement taken by the mine soon after the incident, indicated approximately 280V (15kHz) at the point of contact. The incident scene was immediately isolated, and the task stopped, pending consultation with the original equipment manufacturer of the induction heater.

Recommendations

The operator of a mine or petroleum site must, in preparing an electrical engineering control plan, take the following into account when managing the risks to health and safety from electricity:

- the reliability of electrical safeguards used to protect persons from electrical or other hazards
- procedures for the use of electrical welding plant
- control measures for managing the injury to persons caused by direct or indirect contact with electricity.

DANGEROUS INCIDENT – WATER INGRESS LIKELY PRECURSOR TO INCIDENT

A worker received an electric shock while using a 240v Makita hammer drill. At the time of the incident, the worker was drilling a hole in concrete to insert steel dowels.

The work area was damp, having been flooded and then pumped out prior to commencing work. The drill was powered by a 3kva portable generator and the circuit was protected by a 30 milliamp, residual current device, or RCD. The RCD, however, did not trip.

The worker stated that he felt a tingle travel up his arm from his left hand and the shock lasted about two seconds. The worker dropped the drill and a co-worker shut off the generator.

The mines' electric shock protocol was initiated. The worker was monitored with an ECG at the mine and then driven to the hospital for observation.

The incident scene was secured and the drill, leads, power board and supply generator were isolated, subject to the outcomes of the detailed technical investigation.

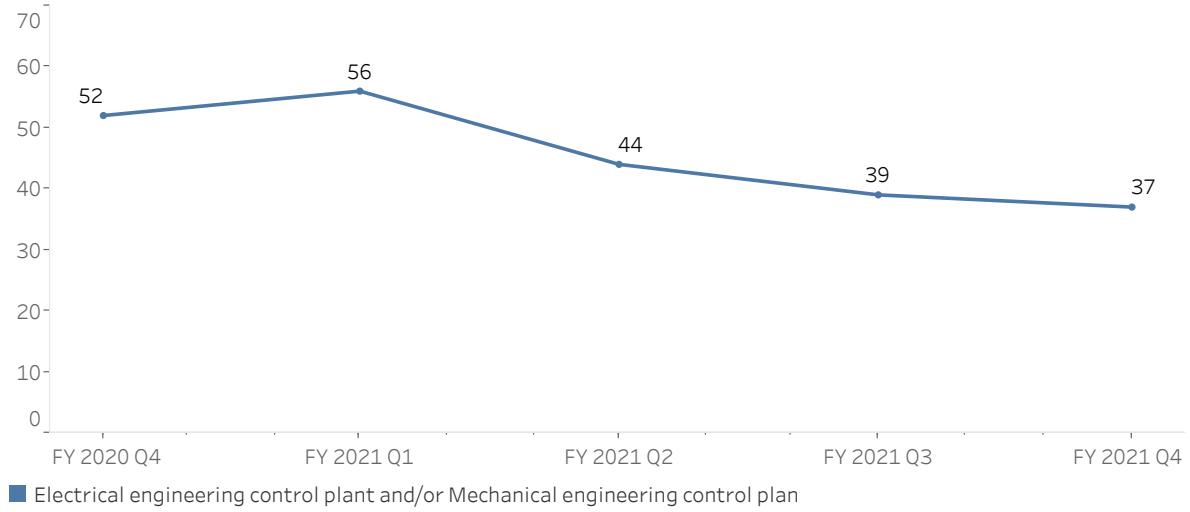
A preliminary testing of the tool identified some water ingress, which is suspected of providing a high impedance path that partially energised the outer case of the drill leading to an electric shock < 1mA.

FROM 39
37

Electrical and mechanical engineering control plans

Notified incidents may relate to both electrical and mechanical control plans.

FIGURE 13. INCIDENT NOTIFICATIONS RELATED TO THE ELECTRICAL AND/OR MECHANICAL CONTROL PLANS APRIL 2020 TO JUNE 2021



HIGH POTENTIAL INCIDENT – STRANGLER FAILS TO KILL ENGINE

During a scheduled 1000hr mechanical inspection on a load haul dump vehicle at an underground coal mine, the mechanical tradesperson was testing the function of the intake strangler valve, a valve that acts to cut the engine off in certain situations. In this instance, the valve failed to function and shut off the on the diesel engine it was fitted to.

Low water/oil pressure, leading to an engine overheating or a vehicle roll over, are two typical emergency circumstances where the proper functioning of such an engineered control could be crucial. The mines own investigation indicated that the apparent cause was a worn seal around the butterfly (valve) which enabled the engine to continue to run.

The faulty valve unit was replaced and sent to the supplier for a failure report. To further limit risks, the mine will implement inspection and testing of the valve at intervals of 250hr, going forward.

HIGH POTENTIAL INCIDENT – EXPLOSION PROTECTION COMPROMISED

While carrying out daily shutdown tests on a diesel-powered four-wheel drive utility vehicle, the vehicle failed to shut down on a low engine oil pressure shutdown test. The machine was tagged "Out of Service" and an investigation commenced into the cause.

The apparent cause seems to have been 'contaminate' (part of an O-ring or thread tape) in the adjustable orifice on the override flow control. This didn't allow the pilot pressure to dissipate from the circuit between the start override pilot valve and the override flow control. The trapped pilot pressure kept the start override pilot valve in the closed position and did not allow the safety circuit pressure to dissipate when the low engine oil shutdown test valve was activated.

Preventative actions:

- The faulty valve was replaced and sent to the original equipment manufacturer (OEM) for a failure report.
- The system was cleaned and inspected for further contaminates.
- The mine also re-tested all other shutdown control functions on the vehicle for similar issues.
- Completed shutdown tests on all explosion protected (ExDES) machines on site.
- Hire company informed of the failure and the mine's investigation findings.

Recommendations

The operator of a mine or petroleum site must, in preparing a mechanical engineering control plan, take the following into account when managing the risks to health and safety from the mechanical aspects of plant and structures:

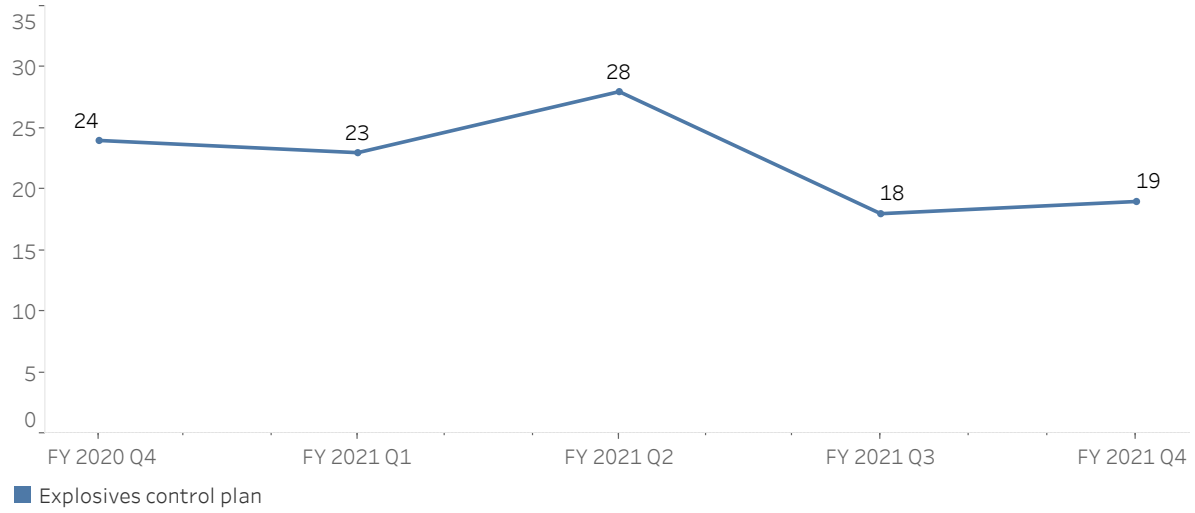
- the reliability of safeguards used to protect persons from the hazards posed by the plant or structure during each phase of its life cycle
- the inspection and testing of plant or structures including testing of any braking systems, steering systems, warning systems and other safety critical functions or components.

Explosives control plan

19
FROM 18

The explosives control plan covers risks associated with the use and management of explosives hazards, that workers may be exposed to. This includes incidents involving 'flyrock'.

FIGURE 14. INCIDENT NOTIFICATIONS RELATED TO THE EXPLOSIVES CONTROL PLAN APRIL 2020 TO JUNE 2021



SERIOUS INCIDENT – PROCEDURAL FAILURE INCREASES WORKER RISK

A drill rig trammed to a demarcated shot hole to re-drill a new hole as the original drill hole was too short. The booster and detonator were within two to three metres of the operating drill. The drill rig operator was unaware of the presence of the booster and detonator. The mine has a procedure in place for re-drilling, but it appears the rig operator proceeded without the procedure being followed.

The drill operator gained access into a loaded shot without authorisation of the nominated shotfirer and without guidance as per the sites drill procedure for re-drills. The mine had a drilling procedure in place which clearly explained the process of drilling a re-drill hole next to and or in nearby, to loaded blast holes. The worker involved in the incident had been trained in all procedures.

As part of the mine's investigation of the incident, a review of the mine's drilling procedure and associated risk assessments has commenced. Retraining on changes to the procedure are planned, pending the final investigation report and review.

HIGH POTENTIAL INCIDENT – BENCH PREPARATION ISSUES

During a designed overburden cast blast that used ammonium nitrate fuel oil in blast hole liners and was initiated with electronic detonators, the blast pattern area experienced 68.4 mm of rainfall. This resulted in significant surface water flows across the loaded blast pattern.

During hook-up activities nine loaded and stemmed holes on the face row of the blast were identified with lost downlines and could not be reprimed or recovered.

Response planning identified that the face holes would be thrown into prime spoil during the blasting process. The location of the detonator/primers would then be covered by material and remain at least eight metres below the final cast profile. At this point, the detonators would not be impacted by any machine activity post the blast process. Finally, it was decided to fire the blast, survey the surface, and commence bulk dozing activities.

Recommendations

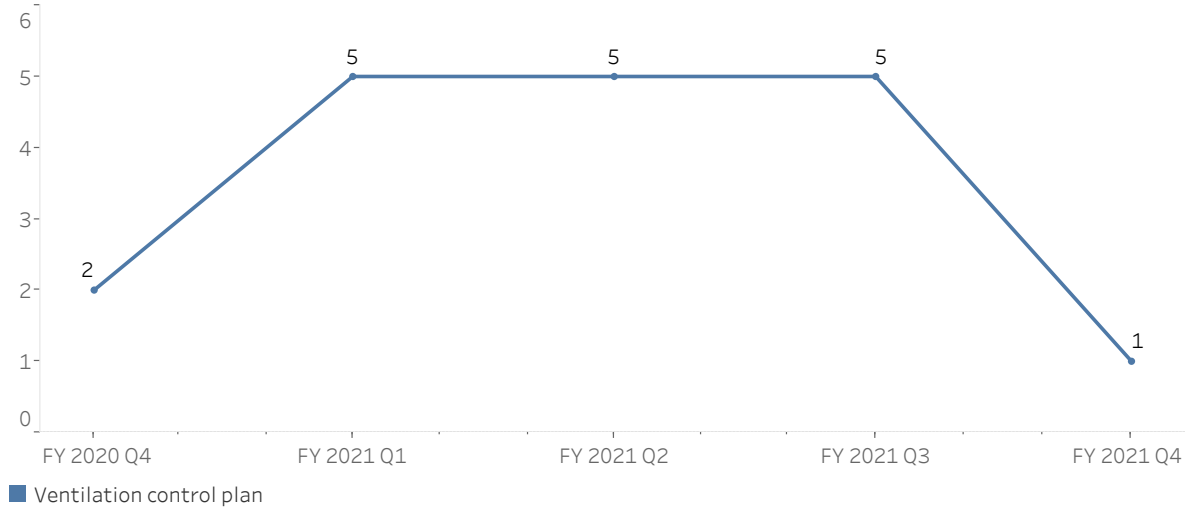
This incident highlights the importance of good bench preparation in the mitigation of explosive malfunction/misfire risks associated with blasting. Demarcation zones, a levelled blast pattern area, free of water pooling (with drainage considered) and authorised entry and “blast area” signage, are some good practice bench preparation examples.

FROM 5
1

Ventilation control plan

A ventilation control plan covers risks associated with ventilation in underground mines. This includes incidents involving failed atmospheric conditions and where trigger action response plans may have been activated.

FIGURE 15. INCIDENT NOTIFICATIONS RELATED TO VENTILATION CONTROL PLANS APRIL 2020 TO JUNE 2021



NEW TECHNICAL REFERENCE GUIDE FOR VENTILATION CONTROL PLANS, NOW AVAILABLE

In June 2021, the Regulator published a new Technical Reference Guide (TRG) to provide guidance to underground coal mines and underground metalliferous mines on developing and documenting a ventilation control plan.

Spotlight on good practice
Highwalls, benches and controls

Roads and other vehicle operating areas is a principal mining hazard that produces a consistently high number of incidents. For the last several quarters, incidents reported under this hazard average around 44 per quarter, making it the second highest reportable principal mining hazard category.

Many of the incidents reported under this hazard involve persons or vehicles falling over edges. A recent inspection at the HyTec Yarrabee Road Quarry, found the site had implemented good practice control measures when planning to conduct blasting including:

- the area was delineated by a surrounding bund to restrict access onto the bench (drilling area) to a single entry
- the edge of the highwall was protected by a bund
- the surface was well prepared and without hazards (uneven ground, pooling water)
- 'witch's hats' were deployed to restrict vehicle access onto bench through single entry
- there was a designated parking spot for the driller's light vehicle, outside of bunded area
- signage designating "blasting area ahead" posted on access roads leading to the works, as well as the shot firing area itself.

Examples of good practice

Spotlight on good practice
Broad airborne dust control strategy

Harmful airborne contaminants are generated during mining activities, posing a risk to worker health if not properly managed. However, diseases like silicosis are entirely preventable by implementing an effective control strategy. A recent initiative by an underground coal mine is aiming to do just that.

Glencore's Ulan underground coal mine has been implementing a combination of controls aimed at reducing exposures.

As a result of some higher than expected monitoring results and a goal to protect their people, they have implemented a broad ranging airborne contaminant control strategy, which includes:

- A reconfiguration of their dust suppression sprays to decrease the droplets size which they hope will improve effectiveness by increasing air spread (of the spray) and lead to better airborne particulate capture.
- Regular scheduled, compliance checks on dust controls carried out by every crew, each production shift, with a compliance inspection sheet completed by each deputy weekly.
- Trialling the use of soap 'candles' as dust suppressants. These have been added to 'problem areas' around the beam stage loader (BSL) and crusher spray circuits. Testing carried out indicates dust reduction improvements from 25% to 45% is possible.
- Automated spray activation technology at longwall transfer points. The system activates sprays based upon airborne contamination levels detected at fixed dust monitors located in specified areas.
- Use of real-time dust monitoring – pump station, BSL and Main Gate. This has been included as part of their dust monitoring trigger action response plan (TARP) and allows for improved measurement of dust levels on start-up of belt after stoppages.
- The development of a purpose-built, dust extraction device, they call "Mr Snuffleupagus" for use during the spraying of stoppings (a high dust task).
- Use of "floor steer" automation of the longwall. This not only promises to improve the efficiency of production as well reducing the time that personnel are required to spend at the face, reducing their exposure.
- A greater use of portable dust monitors.

Good practice solutions like these demonstrate that innovative thinking applied to known control technologies and implemented effectively can lead to improved WHS outcomes and ultimately help keep workers healthy and safe.

Sector profiles

NSW Resources Regulator

SECTOR REPORTING

Coal mines

Open cut, underground and coal preparation plants

Large mines

METALLIFEROUS AND QUARRIES

Quarries that produce >900,000 tonnes pa and large open cut or underground metalliferous mines

Small mines

METALLIFEROUS, QUARRIES AND OTHER GEMSTONES

Quarries and other mine types (e.g. sand, clay, lime) that produce <900,000 tonnes pa, open cut or underground metalliferous mines and gemstone mines

Petroleum and geothermal sites

Onshore petroleum and geothermal productions and exploration sites

Opal mines

Opal mines at Lightning Ridge and White Cliffs

Exploration sites

Exploration sites (excluding petroleum)

Non-mines

Includes many manufacturers (including OEMs), suppliers, designers, importers, licence holders and registration holders

Coal sector

Incident notifications

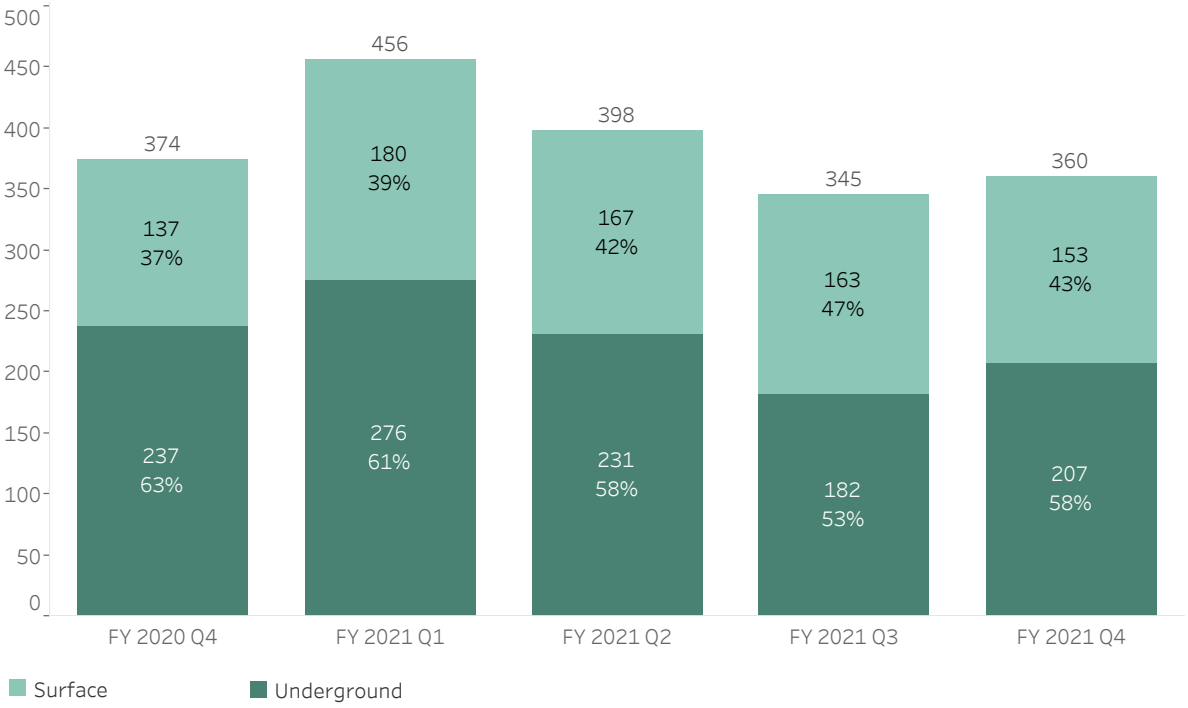
Under work health and safety legislation, mine operators must notify the regulator about the occurrence of certain types of safety incidents. Incident notification data (by active mine) provides insights into sector-specific reporting trends.

TABLE 2. COAL SECTOR INCIDENT NOTIFICATION RECEIVED RATES APRIL 2020 TO JUNE 2021

MEASURE	FY 2020 Q4	FY 2021 Q1	FY 2021 Q2	FY 2021 Q3	FY 2021 Q4
Incidents	374	456	398	345	360
Active mines	122	118	117	118	118
Incident rate per active mine	3.07	3.86	3.40	2.92	3.05
Mines that notified incidents	49	57	54	51	48
% of mines notifying an incident	40%	48%	46%	43%	41%
Incident rate per notifying mine	7.63	8.00	7.37	6.76	7.50

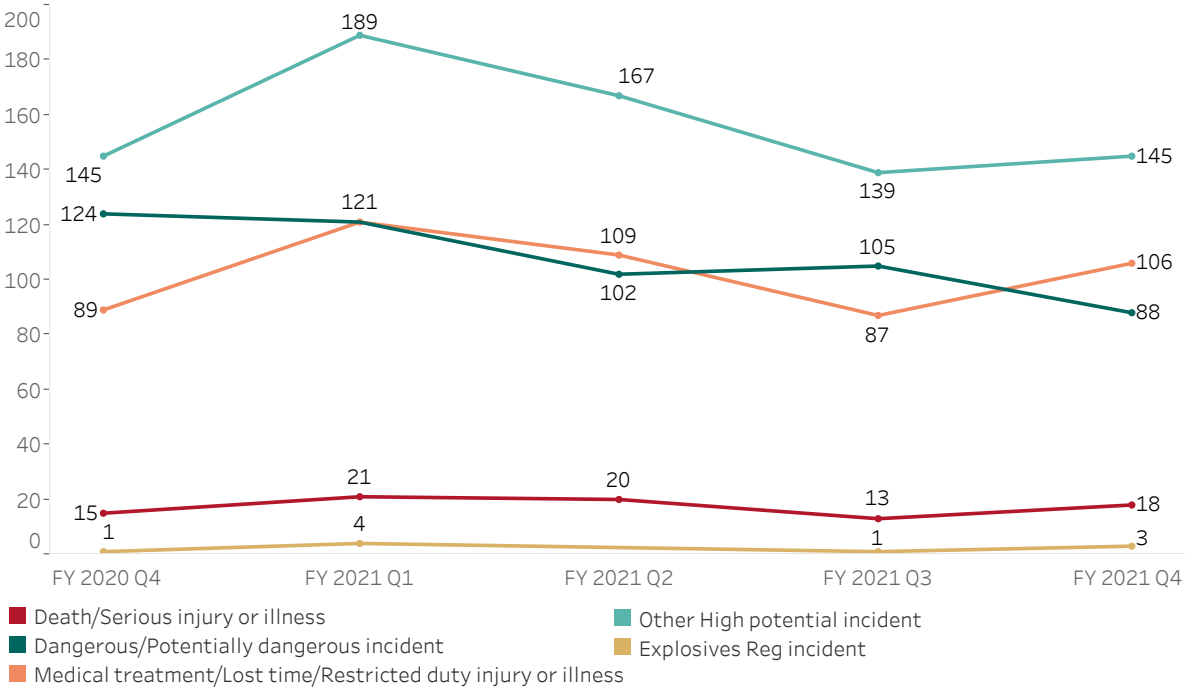
The following graph shows the proportion of safety incident notifications received from surface and underground coal operations.

FIGURE 16. COAL SECTOR INCIDENT NOTIFICATIONS BY OPERATION TYPE APRIL 2020 TO JUNE 2021



The graph below presents a breakdown of safety incidents notified to the NSW Resources Regulator by the coal sector by the requirement to report. This quarter saw an increase in notifications of death/serious injury illness and medical treatment/lost time/restricted duties injuries and illness. Decreases in notified dangerous/potentially dangerous incidents were observed this quarter.

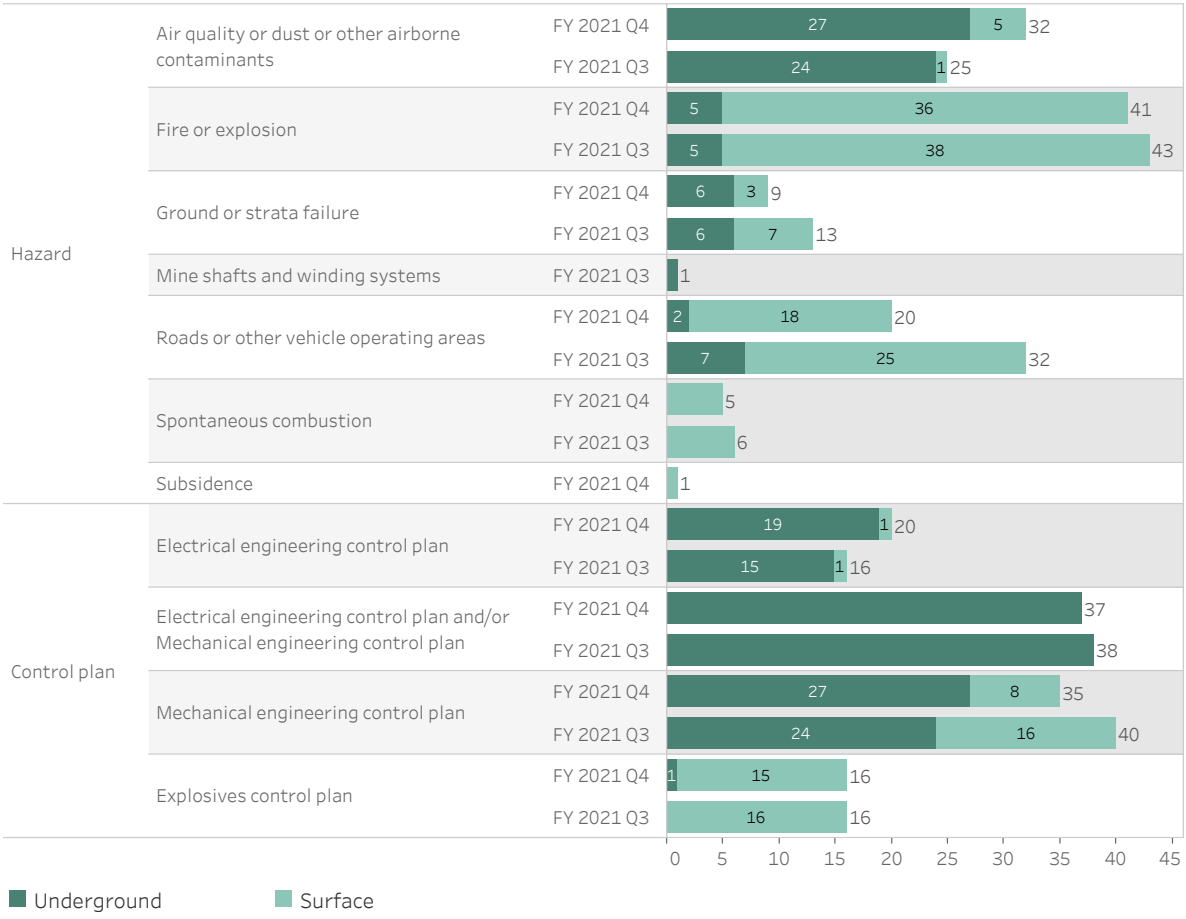
FIGURE 17. COAL SECTOR INCIDENT NOTIFICATIONS BY REQUIREMENT TO REPORT APRIL 2020 TO JUNE 2021



Incident notifications by principal hazard

The figure below shows the number of incident notifications received from the coal sector during the past two quarters, as classified against related principal hazards and principal control plans. The findings highlight hazards where mine operators need to ensure their risk management controls remain fully effective — this includes ensuring the effectiveness of electrical/mechanical engineering control plans in underground operations and controls for managing fire or explosion hazards in surface operations.

FIGURE 18. COAL MINE INCIDENTS CLASSIFIED BY PRINCIPAL HAZARD BY OPERATION TYPE JANUARY 2021 TO JUNE 2021



Large mines sector

Incident notifications

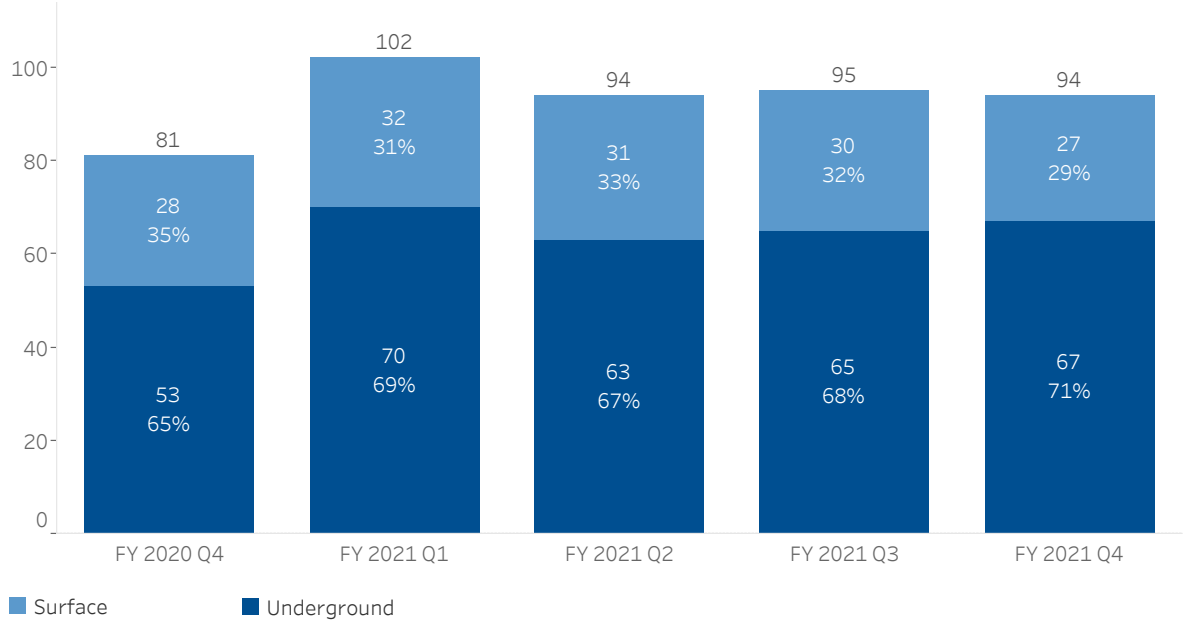
Under work health and safety legislation, mine operators must notify the regulator about the occurrence of certain types of safety incidents. Incident notification data (by active mine) provides insights into sector specific reporting trends. The increased number of active mines seen this quarter reflects changes in mine classification by the Resources Regulator where some small mines were re-classified as large mines.

TABLE 3. LARGE MINES AND QUARRIES SECTOR INCIDENT NOTIFICATIONS RECEIVED RATES APRIL 2020 TO JUNE 2021

MEASURE	FY 2020 Q4	FY 2021 Q1	FY 2021 Q2	FY 2021 Q3	FY 2021 Q4
Incidents	81	102	94	95	94
Active mines	39	40	40	44	62
Incident rate per active mine	2.08	2.55	2.35	2.16	1.52
Mines that notified incidents	26	36	24	30	28
% of mines notifying an incident	67%	90%	60%	68%	45%
Incident rate per notifying mine	3.12	2.83	3.92	3.17	3.36

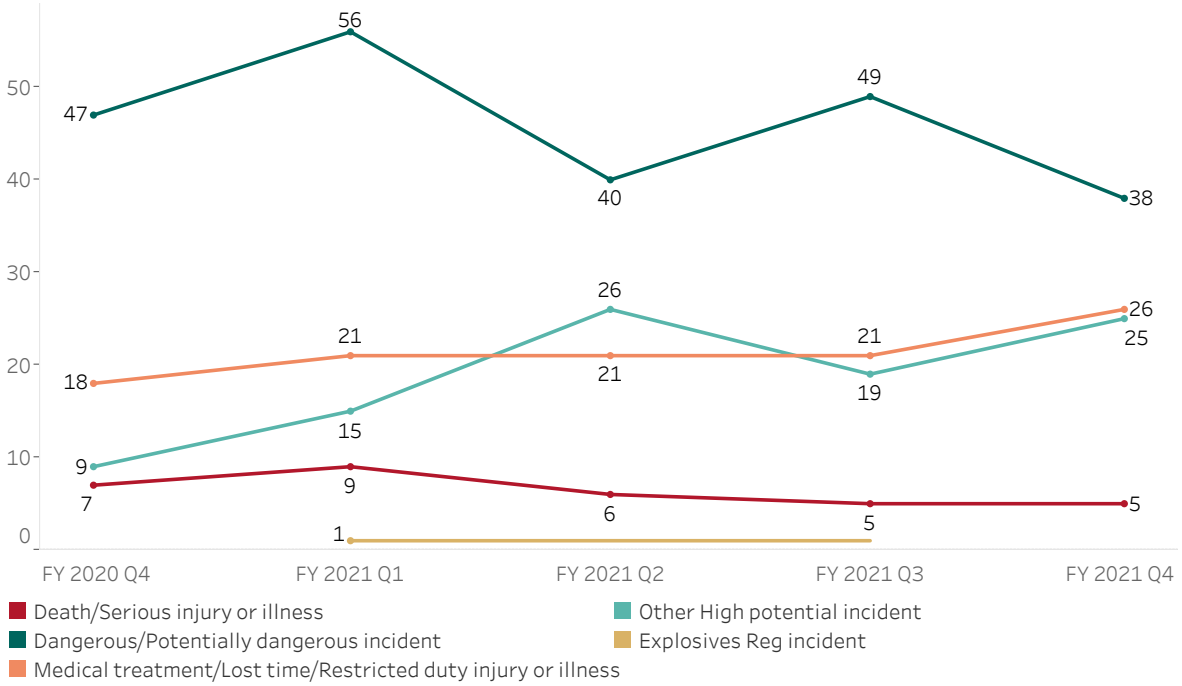
The following graph shows the proportion of safety incident notifications received from large mines and quarries by operation types. Consistently, underground large mines and quarries notify around 70% of all incidents for the sector.

FIGURE 19. LARGE MINES AND QUARRIES INCIDENT NOTIFICATIONS BY OPERATION TYPE APRIL 2020 TO JUNE 2021



The following graph presents a breakdown of safety incidents notified to the NSW Resources Regulator by the large mines and quarries sector based on the requirement to report under the safety legislation. While a decrease in 'dangerous' and 'potentially dangerous' incidents was observed this quarter, numbers of 'other high potential' incidents remained high compared to earlier quarters. Exceedances of the airborne contaminants and dust exposure standards (associated with increased monitoring by mining operators) has contributed to this ongoing increase highlighting the need for mine operators to ensure their risk management controls associated with airborne contaminants remain fully effective. More information about airborne contaminants and dust and the updated exposure standards can be found on our website.

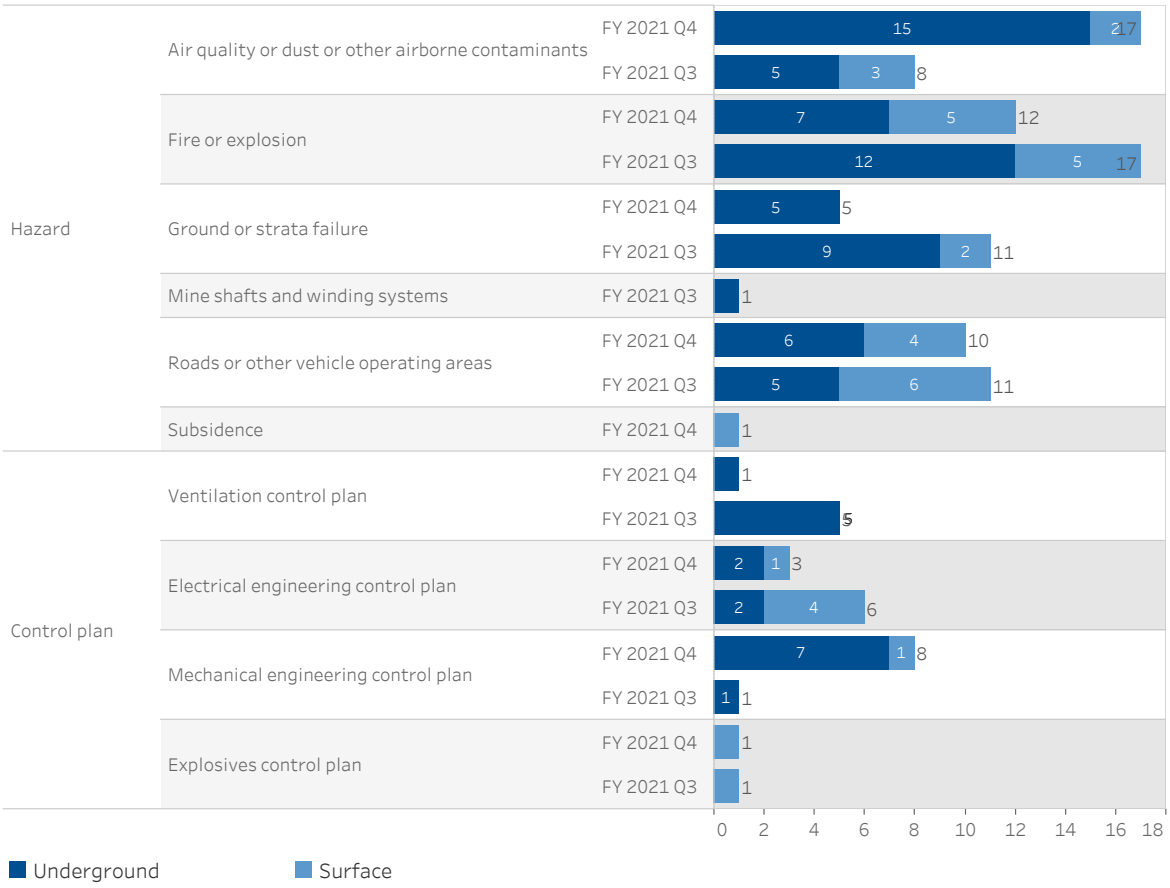
FIGURE 20. LARGE MINES AND QUARRIES INCIDENT NOTIFICATIONS BY REQUIREMENT TO REPORT APRIL 2020 TO JUNE 2021



Incident notifications by principal hazard

The figure below shows the number of incident notifications received from the large mines and quarries sector during the past two quarters as classified against related principal hazards and principal control plans. The findings highlight hazards where mine operators need to ensure their risk management controls remain fully effective. This includes controls for managing hazards associated with airborne contaminants and dust specifically those for managing atmospheric crystalline silica.

FIGURE 21. LARGE MINES AND QUARRIES INCIDENTS CLASSIFIED BY PRINCIPAL HAZARD BY OPERATION TYPE JANUARY 2021 TO JUNE 2021



Small mines sector

Incident notifications

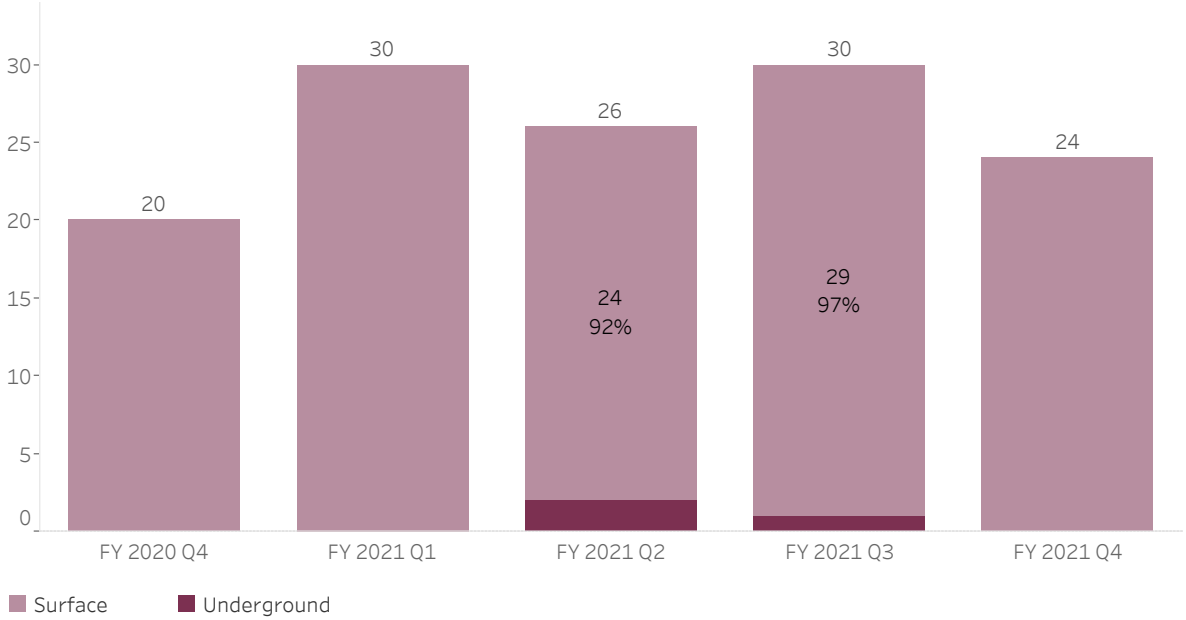
Under work health and safety legislation, mine operators must notify the regulator about the occurrence of certain types of safety incidents. Incident notification data (by active mine) provides insights into sector specific reporting trends.

TABLE 4. SMALL MINES AND QUARRIES SECTOR INCIDENT NOTIFICATIONS RECEIVED RATES APRIL 2020 TO JUNE 2021

MEASURE	FY 2020 Q4	FY 2021 Q1	FY 2021 Q2	FY 2021 Q3	FY 2021 Q4
Incidents	20	30	26	30	24
Active mines	2,671	2,658	2,654	2,624	2,588
Incident rate per active mine	0.01	0.01	0.01	0.01	0.01
Mines that notified incidents	18	26	22	27	22
% of mines notifying an incident	0.67%	0.98%	0.83%	1.03%	0.85%
Incident rate per notifying mine	1.11	1.15	1.18	1.11	1.09

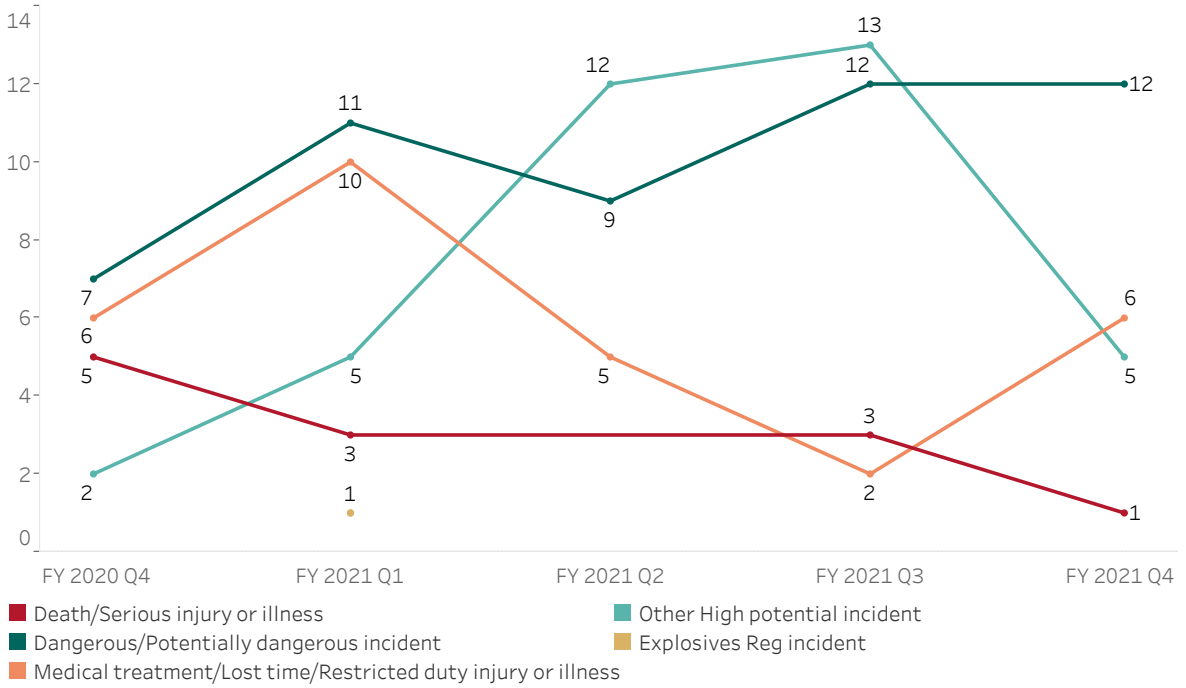
The graph below shows the proportion of safety incident notifications received from small mines and quarries.

FIGURE 22. SMALL MINES AND QUARRIES INCIDENT NOTIFICATIONS BY OPERATION TYPE APRIL 2020 TO JUNE 2021



The graph below presents a breakdown of safety incidents notified to the NSW Resources Regulator by the small mines sector by the requirement to report. This quarter saw an ongoing steady trend in the number of 'dangerous and potentially dangerous' incidents. Comparatively, the number of incidents notified by the sector is substantially lower than what is reported by the coal and large mines and quarries sector.

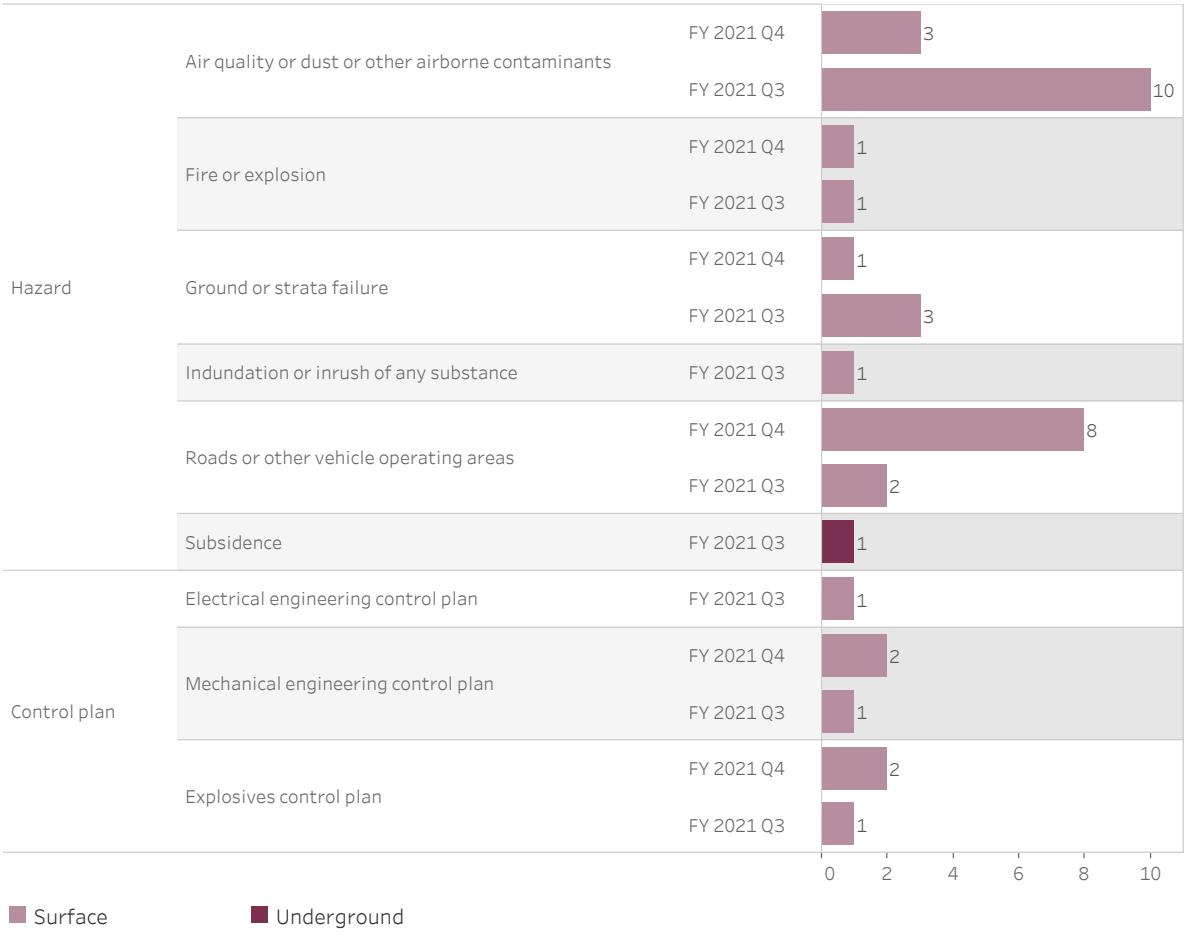
FIGURE 23. SMALL MINES AND QUARRIES INCIDENT NOTIFICATIONS RECEIVED BY REQUIREMENT TO REPORT APRIL 2020 TO JUNE 2021



Incident notifications by principal hazard

The figure below shows the number of incident notifications received from the small mines sector during the past two quarters as classified against related principal hazards and principal control plans. The findings highlight hazards where small mine operators need to ensure their risk management controls remain fully effective — this includes controls for managing hazards associated with airborne contaminants /dust and roads or other vehicle operating areas.

FIGURE 24. SMALL MINES AND QUARRIES INCIDENTS CLASSIFIED BY PRINCIPAL HAZARD BY OPERATION TYPE JANUARY 2021 TO JUNE 2021



Other mines sector profiles

Incident notifications

Under work health and safety legislation, mine operators must notify the regulator about the occurrence of certain types of safety incidents.

This section relates to petroleum and geothermal sites, opal mines and exploration sites. The tables below show the number and types of incident notifications by requirement to report and by principal hazard.

TABLE 5. PETROLEUM AND GEOTHERMAL SITES, OPAL MINES AND EXPLORATIONS SITES INCIDENT NOTIFICATIONS APRIL 2020 TO JUNE 2021

SECTOR	FY 2020 Q4	FY 2021 Q1	FY 2021 Q2	FY 2021 Q3	FY 2021 Q4
Petroleum and geothermal sites*	0	0	0	0	0
Opal mines	0	0	1	0	0
Explorations sites**	5	3	0	2	1

* includes exploration
** excludes petroleum and geothermal

TABLE 6. EXPLORATION SITES INCIDENT NOTIFICATIONS BY REQUIREMENT TO REPORT APRIL 2020 TO JUNE 2021

REQUIREMENT TO REPORT	FY 2020 Q4	FY 2021 Q1	FY 2021 Q2	FY 2021 Q3	FY 2021 Q4
Death/serious injury or illness	2	0	0	1	1
Dangerous/potentially dangerous incident	1	1	0	0	0
Medical treatment/lost time/restricted duty injury or illness	1	2	0	1	0
Other high potential incident	1	0	0	0	0
TOTAL	5	3	0	2	1

TABLE 7. EXPLORATION SITES INCIDENT NOTIFICATION BY PRINCIPAL HAZARD JANUARY 2020 TO MARCH 2021

INCIDENT CLASSIFICATION BY PRINCIPAL HAZARD OR PRINCIPAL CONTROL PLAN		FY 2020 Q4	FY 2021 Q1	FY 2021 Q2	FY 2021 Q3	FY 2021 Q4
Principal hazard	Fire or explosion	1	0	0	0	0
	Roads or other vehicle operating areas	0	1	0	0	0
	TOTAL	1	1	0	0	0
Principal control plan	Mechanical engineering control plan	1	0	0	0	0
Not applicable	Not applicable	3	2	0	2	1
TOTAL		**5**	**3**	**0**	**2**	**1**

Compliance and enforcement

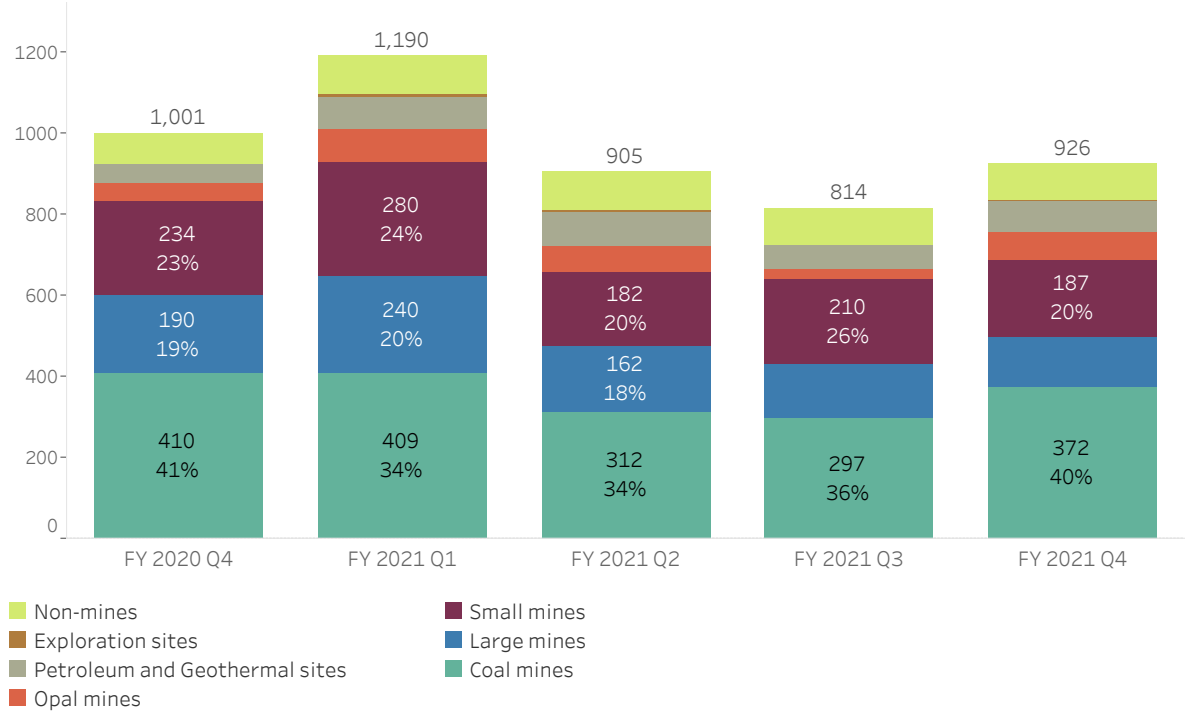
The Regulator uses a range of tools to promote and secure compliance in mines and petroleum sites in relation to work health and safety legislation. These include desktop assessments, site inspections, investigations and enforcement actions, such as issuing notices and commencing prosecutions.

Detailed information regarding compliance activities, priorities, outcomes and reports are published on our website and in our monthly business activity reports.

Safety assessments by sector

This quarter saw an increase in the number of assessments conducted in the coal sector.

FIGURE 25. SAFETY ASSESSMENTS BY SECTOR APRIL 2020 TO JUNE 2021



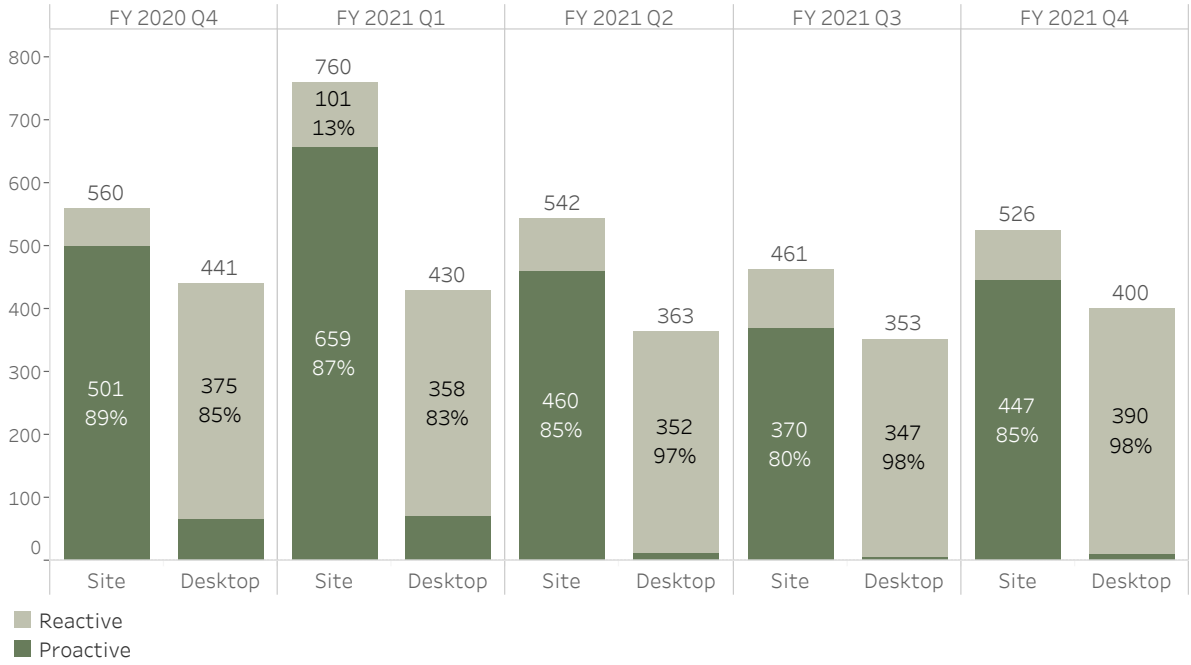
Safety assessments by category and nature

Site-based (visiting mine sites) and desktop activities are both important regulatory tools. While the main focus of our on-site compliance activity is on preventing incidents through planned risk-based proactive assessments, our desktop activities are mainly reactive.

Site-based proactive assessments focus on establishing whether critical controls have been effectively implemented. Meanwhile desktop assessment activities include reviews of control measures following an incident, review of personal dust monitoring reports submitted by coal mine operators, assessment of high-risk activity notifications, applications for exemptions from work health and safety laws, subsidence management plans and preparation for site work.

Our proactive assessments on airborne quality or dust contaminants contributed to the spike observed in proactive site assessments during FY 2021 Q1.

FIGURE 26. SAFETY ASSESSMENTS BY CATEGORY AND NATURE APRIL 2020 TO JUNE 2021

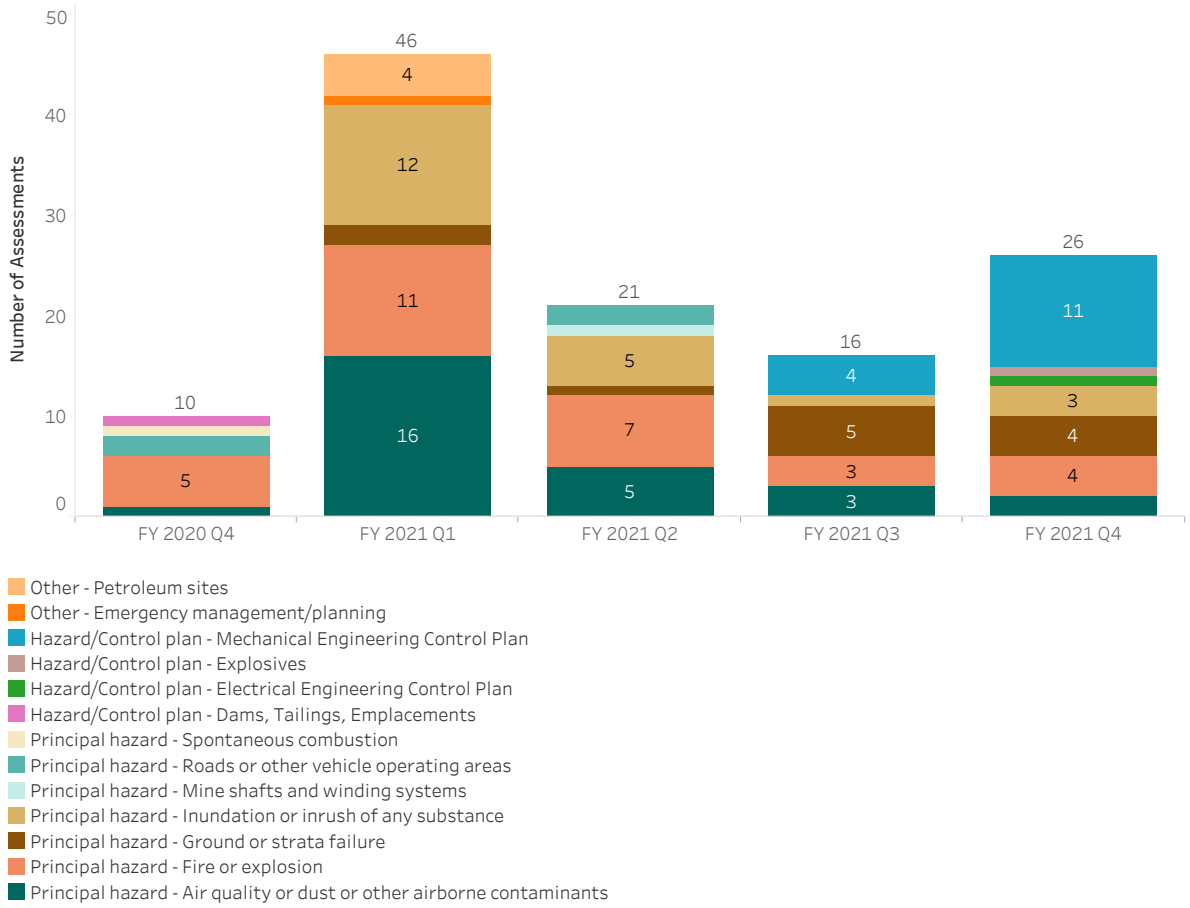


Targeted assessment program

Our targeted assessment program establishes a risk-based and proactive approach for assessing the extent to which critical controls for managing principal mining hazards have been identified, implemented and are being monitored.

This quarter, targeted assessments focused on entanglement hazards as managed within mechanical engineering control plans.

FIGURE 27. TARGETED ASSESSMENTS BY PRINCIPAL HAZARD, HAZARD/ CONTROL PLAN AND OTHER APRIL 2020 TO JUNE 2021



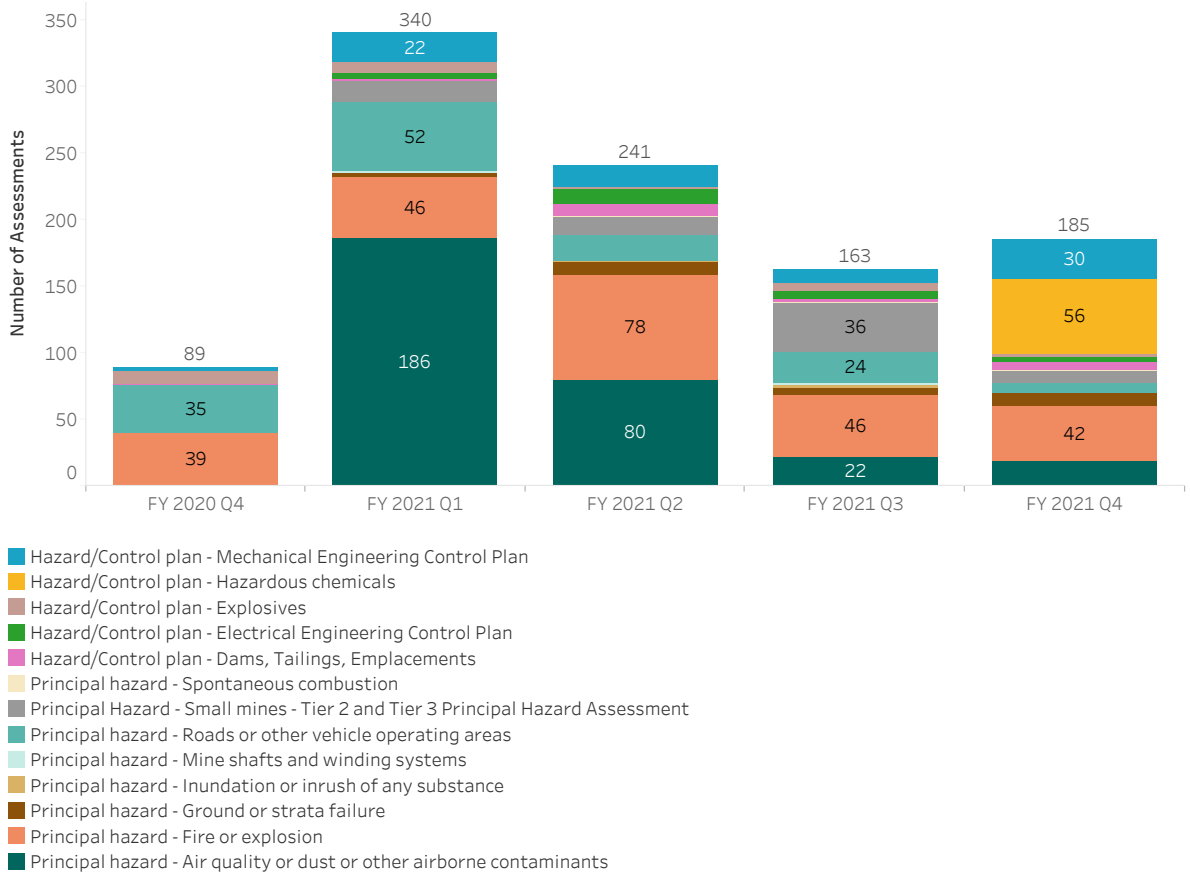
Planned inspections

Planned inspections assist in identifying compliance weaknesses which could lead to an incident or injury. These assessments focus on the physical implementation of critical controls in the operating areas of a mine.

This quarter saw a focus on assessments relating to principal hazards on fire or explosion and air quality or airborne contaminants.

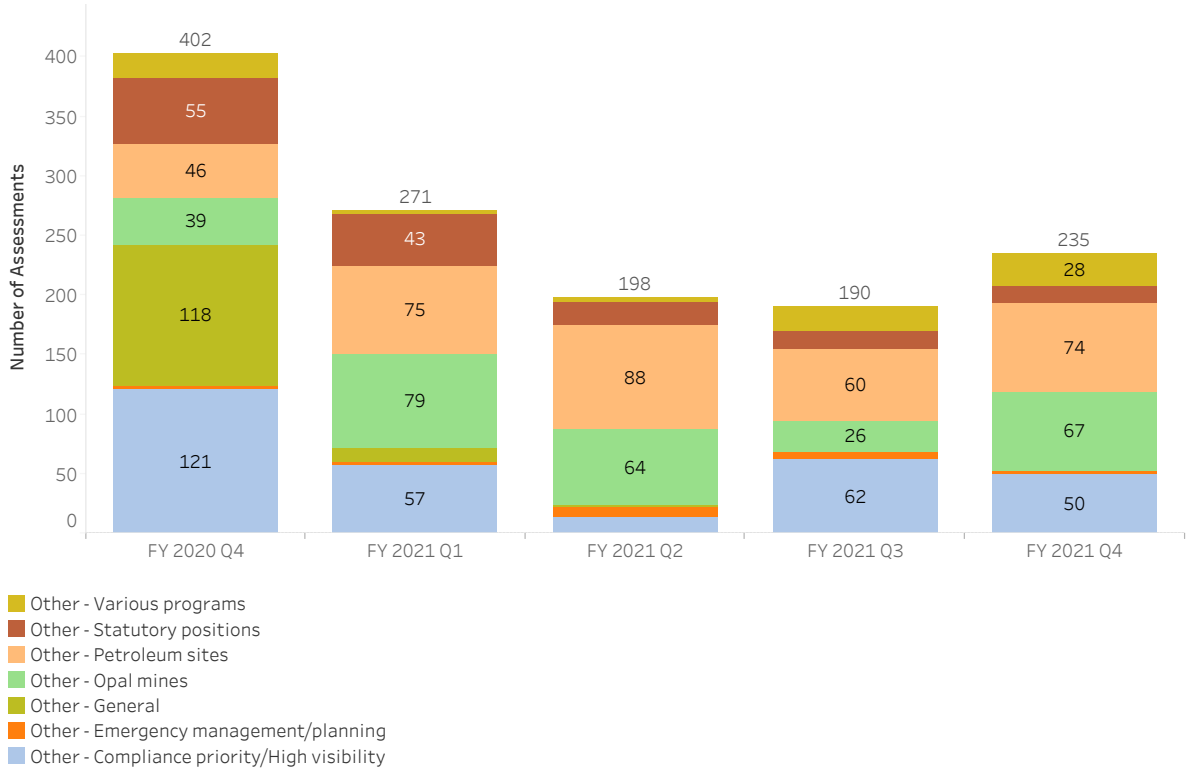
Hazard control plans for mechanical engineering and hazardous chemicals were also a focus for the quarter.

FIGURE 28. PLANNED INSPECTIONS BY PRINCIPAL HAZARD AND HAZARD/ CONTROL PLANS APRIL 2020 TO JUNE 2021



For other hazards, this quarter also saw an ongoing focus on petroleum sites, opal mines and compliance priority assessments on high visibility.

FIGURE 29. PLANNED INSPECTIONS BY 'OTHER' HAZARD APRIL 2020 TO JUNE 2021

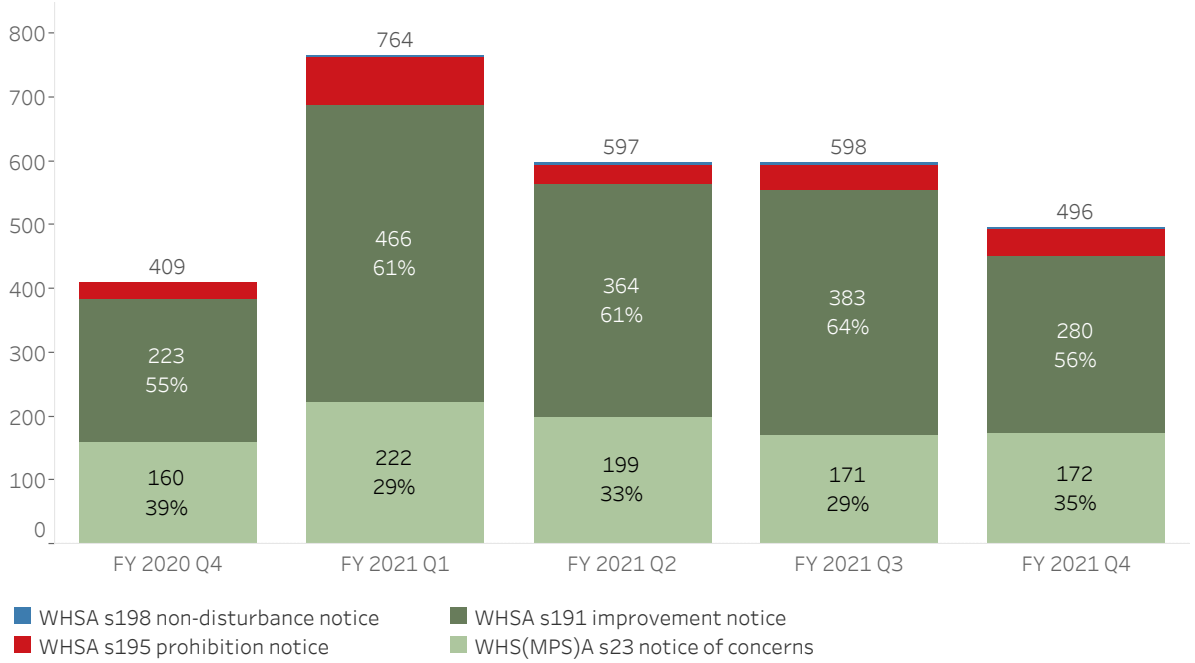


Safety notices issued

We issue risk-based safety notices including prohibition and improvement notices, notices of concern (written notice of matters) and non-disturbance notices.

The graph below shows the number and types of safety notices issued during each of the five quarters since April 2020. This quarter saw a decrease in the number of improvement notices issued.

FIGURE 30. SAFETY NOTICES ISSUED BY NOTICE TYPE APRIL 2020 TO JUNE 2021



This quarter saw an increased number of safety notices issued in the coal sector which corresponded to the increased number of assessments undertaken in the sector.

FIGURE 31. SAFETY NOTICES ISSUED BY SECTOR APRIL 2020 TO JUNE 2021