

Extractives industry

2020/21 Q3

January to March

Foreword

Our mission is to transform New Zealand's health and safety performance towards world-class. To achieve this requires the commitment not just of WorkSafe New Zealand, but of businesses, workers and a wide range of other players in the health and safety system.

Unfortunately, there has been one more fatality in our industry with the death of an operator in the South Island after a tree fell on the machine he was operating.

It may be that industry did not have knowledge or report of this incident, which occurred in March. This was due to the operation not having been notified to WorkSafe as a quarrying operation. Due to the nature of the activities being undertaken on the site at the time, it is deemed to be a quarry as per the definition in legislation and should have been notified. So unfortunately, this fatality is an Extractives industry incident.

As this incident is under investigation, I cannot make comment on the circumstances or potential contributory factors of the incident until the investigation is concluded.

But I would not like to publish any quarterly report where a fatality has occurred in our industry without acknowledging the loss of a worker and giving condolences to the worker's families and friends.

Any fatality should remind us that our industry has many risks and that we all need to be vigilant to ensure our people's safety – so that all workers return home healthy and safe each day.

Revised regulations

As all of industry is aware, the Health and Safety at Work (Mining Operations and Quarrying Operations) Regulations 2016 have been reviewed, and revised regulations will soon be coming into force.

The drafting of these revised regulations is well advanced, but I have not been advised of an exact implementation date nor do I have knowledge of what the exact final wording of the changes will be. But I do think I should start to make comments where I am able to on the implications of the revised regulations. So, starting in this quarterly report I will give high level advice to alert those who may be affected and to allow them to prepare.

So, a first few key points regarding the revised regulations are highlighted below:

- They will likely be drafted by the end of this year and will potentially be in place early next year.
- Many quarries will be included in the Principal Hazard regime.
- For quarries, the use of explosives as the differentiation for requiring either an A or B grade quarry manager CoC will no longer be used. Instead, the 'more than 4 workers plus a manager' definition will be applied, which is similar to what has been used in the past.

- Transitional arrangements will be included, that is, providing time for operators to make changes before the regulations fully come into force.
- WorkSafe will update guidance to reflect the revised regulations and will also conduct workshops for industry to educate them on the changes.
- All of industry will be included in the notification requirements.
- Targeted stakeholders will soon be asked to comment on an exposure draft of the revised regulations. This is not an opportunity for further consultation but rather an opportunity for the key stakeholders who did participate in the original review to confirm that the intent agreed upon at the time has been transferred into the revised regulations.

So, although the final version of the revised regulations has not yet been written, from now on, where appropriate, I will use the quarterly report to update industry on either implementation dates or expected regulatory content.



A handwritten signature in black ink, appearing to read 'Paul Hunt'.

Paul Hunt

Chief Inspector Extractives

About this report

This quarterly health and safety performance report has been prepared by WorkSafe to provide extractives-specific information to mining, tunnelling and quarrying operations in New Zealand.

The information is derived from a variety of sources but the predominant source is industry itself, through notifiable incident reporting and mining and tunnelling sector quarterly reporting.

The report also contains information on the activities of the regulator, as well as commentary on industry performance and focus areas for regulation.

Operators should use the information presented in this report to assist them in improving safety management systems and undertaking risk assessments at their sites.

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1.0

Industry profile

IN THIS SECTION:

- 1.1 Operations
- 1.2 People
- 1.3 Developing competence



1.1 Operations

3

Metalliferous opencast mines
Includes one mine under care and maintenance and one mine under rehabilitation

22

Coal opencast mines
Includes four mines under care and maintenance, and one undertaking rehabilitation

7

Metalliferous underground mines
Includes two mines under care and maintenance and two operating tourist mines

2

Coal underground mines
Includes one tourist mine under care and maintenance

7

Tunnels
Does not include tunnels that notified commencement but did not begin operating in the quarter

0

Coal exploration
No notifications of drilling commencement in the quarter

71

Alluvial mines
Number of mines that have been verified (65) or have notified of an Appointed Manager to WorkSafe (6) (includes 2 iron sands mines)

1,069

Quarries
Number of quarries that have been verified (931) or have notified of an Appointed Manager to WorkSafe but not yet verified (138)

An important aspect of understanding the health and safety performance of the extractives industry is to understand its makeup in terms of the number and scale of operations and the number and competency of workers involved.

There were 1,181 active operations in New Zealand as at the end of March 2021.

Active mining operations include those that are operating, intermittently operating, under care and maintenance, or undertaking rehabilitation, as well as tourist mines. Active quarries and alluvial mine numbers include operations that have been verified as actively or intermittently operating (that is, visited by WorkSafe), or have notified WorkSafe of an Appointed Manager.

The numbers of operations will vary from quarter to quarter. In these first quarterly reports, many of the changes are due to verification of sites by our inspectors, rather than actual changes to operations.

1.2 People

661

Metalliferous opencast mines

463 FTEs employed by mine operators and 198 FTEs employed by contractors

733

Coal opencast mines

623 FTEs employed by mine operators and 110 FTEs employed by contractors

381

Metalliferous underground mines

332 FTEs employed by mine operators and 49 FTEs employed by contractors

24

Coal underground mines

16 FTEs employed by mine operators and 8 FTEs employed by contractors

536

Tunnels

428 FTEs employed by mine operators and 109 FTEs employed by contractors

0

Coal exploration

No coal exploration in the quarter

278

Alluvial mines

Number of workers is known for 30 of the 71 alluvial mines that are verified and/or have notified of an Appointed Manager. The total number of workers has been extrapolated for the remaining 41 operations

3,065

Quarries

Number of workers is known for 743 of the 1,069 quarries that are verified and/or have notified of an Appointed Manager. The total number of workers has been extrapolated for the remaining 326 operations

The numbers of workers will also vary from quarter to quarter. Changes in the number of quarry and alluvial mine workers largely reflect the changes in the number of active operations verified by inspectors. Part of those verifications includes determining the number of workers at each operation.

A notable change is anticipated in the number of tunnel workers with two large tunnel operations in Auckland going operational in 2020. Thousands of different types of workers will be exposed to these operations over the duration of the projects. The number of tunnel workers reported this quarter increased by 35 from last quarter.

Figure 1 shows the total hours worked by the mining and tunnelling sectors in Q3 2020/21. The hours are separated into Employees and Contractors.

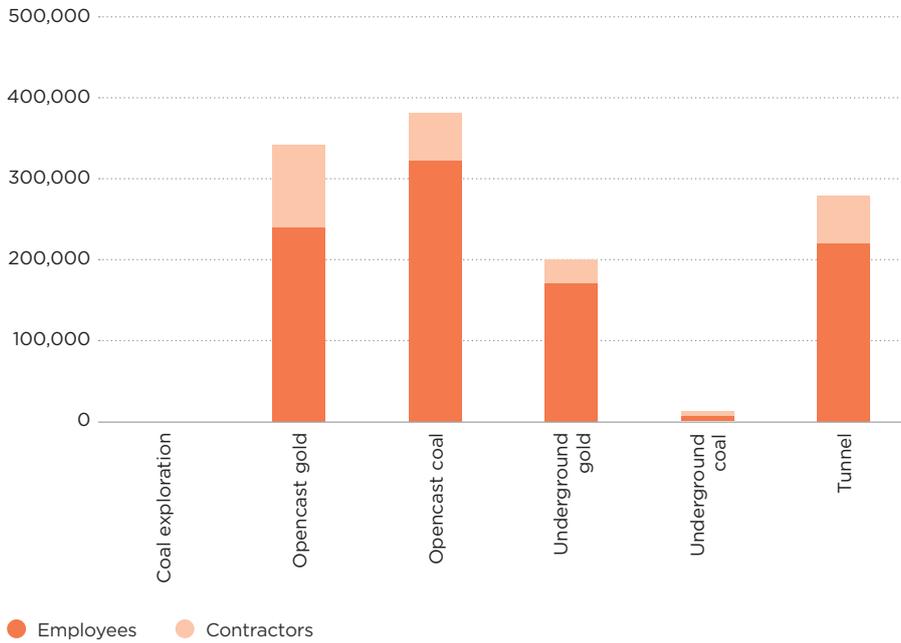


FIGURE 1:
Total hours worked by sector 2020/21 Q3

Figure 2 shows the number of Full Time Equivalents (FTEs) calculated from total hours worked for the mining and tunnelling sectors in Q3 2020/21. The hours are separated into Employees and Contractors.

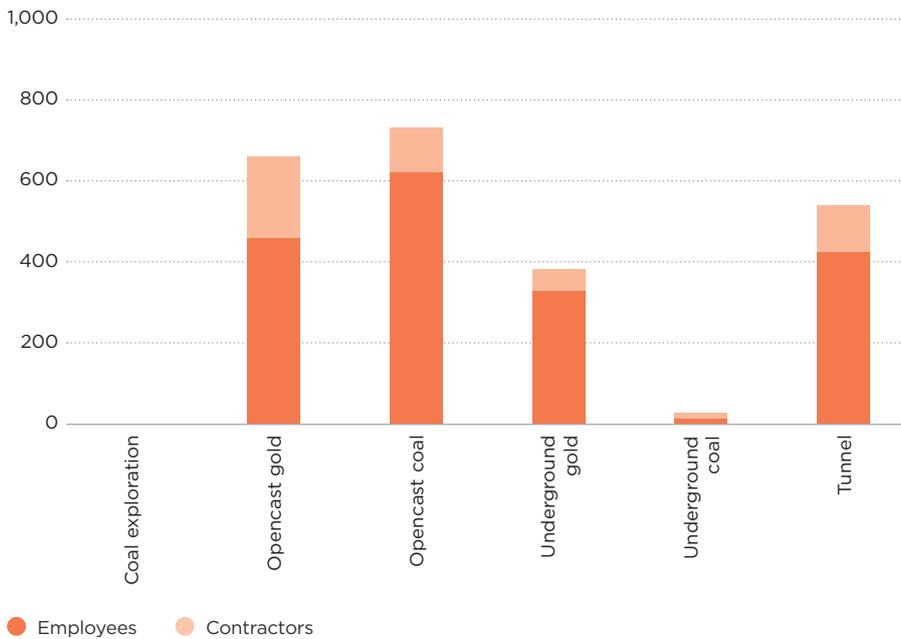


FIGURE 2:
Number of FTEs by sector 2020/21 Q3

1.3 Developing competence

WorkSafe has responsibility for setting the competency standards in the Extractives Industry. Improving the competence of the people in the industry is one of the most important aspects of improving health and safety performance. WorkSafe appoints the New Zealand Mining Board of Examiners (BoE) to recommend competency requirements, conduct oral examinations and to issue, renew, cancel or suspend Certificates of Competence (CoCs).

In July 2020 the first CoCs issued under the new regulations began to expire and those wishing retain a CoC were required to submit a renewal application with CPD log books.

The table below uses the 31 June 2020 date as a benchmark. This is the date when we stopped just issuing new CoCs, but also started to have expired or renewed CoCs.

At this stage the BoE are dealing with hundreds of renewals, as this year they are processing the mass expiry of the first year of the CoC issue (600). The table below reflects fully processed renewals but does not include those in process that are delayed. It is expected that by quarter 2 next year the BoE will have settled down to processing a steady flow of renewals and the table will reflect all those with CoCs. At this stage there are about 20 to 30 further CoC applicants who are likely to be renewed for this period in the near future, so the reduction of 150 CoCs in circulation is likely to reduce.

Early submissions indicate that a 30% non-renewal of CoCs is likely. This can be due to: CoC holders leaving industry, no requirement or desire to use the CoC, reduction in industry demand (underground coal), or multiple CoC holders only retaining some or one of their CoCs or a higher CoC having been gained since issue (for example, someone does not renew a B Grade as they have recently achieved a A Grade).

This shortfall is only filled by new persons gaining CoCs. In subsequent quarterly reports we will provide more analysis on the renewal statistics.

Table 1 provides a summary of all CoC's issued up to 30 June 2020 and current number of CoCs in circulation at the end of Q3 2020/21.

COCC TYPE	TOTAL NUMBER OF COCCs ISSUED (2015 to 30 Jun 2020)	TOTAL NUMBER OF CURRENT COCCs (31 Mar 2021)	CHANGE IN NUMBER OF CURRENT COCCs 1 Jul 2020 to Mar 2021
A Grade Quarry Manager	315	273	-42
B Grade Quarry Manager	482	436	-46
A Grade Opencast Coal Mine Manager	71	62	-9
B Grade Opencast Coal Mine Manager	64	65	1
A Grade Tunnel Manager	32	37	5
B Grade Tunnel Manager	74	60	-14
Site Senior Executive	62	59	-3
First Class Coal Mine Manager	21	13	-8
First Class Mine Manager	31	21	-10
Coal Mine Deputy	44	34	-10
Coal Mine Underviewer	35	24	-11
Mechanical Superintendent	25	26	1
Electrical Superintendent	17	15	-2

COC TYPE	TOTAL NUMBER OF COCs ISSUED (2015 to 30 Jun 2020)	TOTAL NUMBER OF CURRENT COCs (31 Mar 2021)	CHANGE IN NUMBER OF CURRENT COCs 1 Jul 2020 to Mar 2021
Ventilation Officer	3	4	1
Mine Surveyor	13	11	-2
Site Specific	1	2	1
Winding Engine Driver	3	1	-2
Total	1,293	1,143	-150

TABLE 1: Certificates of Competence in circulation

2.0

Health and safety performance

IN THIS SECTION:

- 2.1 Notifiable events
- 2.2 Injuries
- 2.3 Types of events
- 2.4 Mine and tunnel focus areas
- 2.5 Regulator comments
- 2.6 High potential incidents
- 2.7 High potential incidents
- investigation outcomes



2.1 Notifiable events

Notifiable events are required to be reported to WorkSafe under S23(1), S24(1) and S25(1) of the Act, and for mining and tunnelling operations, under Schedule 5 of the Regulations. Notifiable events include any notifiable incidents, notifiable injuries or illnesses, or fatalities.

The tables below show the number of notifiable events and the number of operations that notified events for the previous two years and for Q1, Q2 and Q3 2020/21 for mines and tunnels (Table 2) and quarries and alluvial mines (Table 3).

MINES AND TUNNELS	2018/19 QUARTERLY AVERAGE	2019/20 QUARTERLY AVERAGE	2020/21 Q1	2020/21 Q2	2020/21 Q3
Number of notifiable events	18	20	17	17	20
Number of operations that notified events	9	11	8	10	11

TABLE 2: Mines and tunnels – notifiable events and operations that notified events

Eighteen individual mines and tunnels from a total of 41 reported notifiable events in the past 12 months.

QUARRIES AND ALLUVIAL MINES	2018/19 QUARTERLY AVERAGE	2019/20 QUARTERLY AVERAGE	2020/21 Q1	2020/21 Q2	2020/21 Q3
Number of notifiable events	14	18	17	20	14
Number of operations that notified events	13	15	8	19	12

TABLE 3: Quarries and alluvial mines – notifiable events and operations that notified events

Forty individual quarries and alluvial mines from a total of 1,069 reported notifiable events in the past 12 months.

Figure 3 shows the number of notifiable events reported to WorkSafe by sector from April 2019 to March 2021.

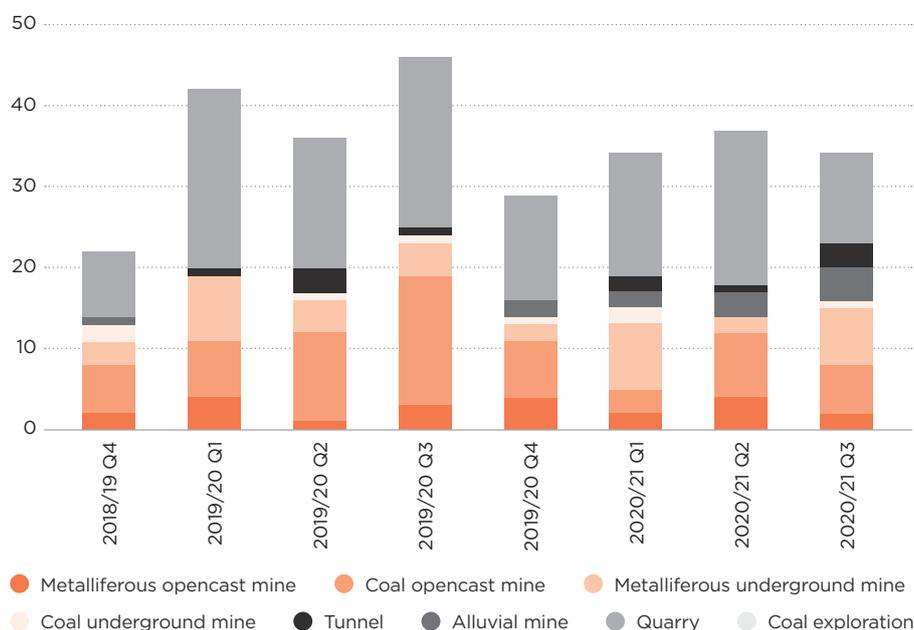


FIGURE 3:
Notifiable events
by sector

2.2 Injuries

Additional information about injuries is reported to WorkSafe for mining and tunnelling operations in the form of Quarterly Reports and Records of Notifiable Events under Schedules 6 and 8 of the Regulations. Figure 4 shows the number of injuries by injury type reported to WorkSafe by the mining and tunnelling sectors from April 2018 to March 2021. The graph also shows the rolling 12-month average for the Total Recordable Injury Frequency Rate (TRIFR), the rate of recordable injuries that occurred per million hours worked. The current TRIFR is 2.5. As we noted in Q1 the rate seemed to be abnormally low. It seemed to normalise in Q2 and with Q3 data it is now indicating an improving trend.

While TRIFR is not the only measure indicating the health of the industry, it is a useful indicator of how workers are being injured and should be interpreted in conjunction with other data such as notifiable event information. It is interesting to note that despite the drop in TRIFR the rate of HPIs reported over all seven quarters of this report has remained stable.

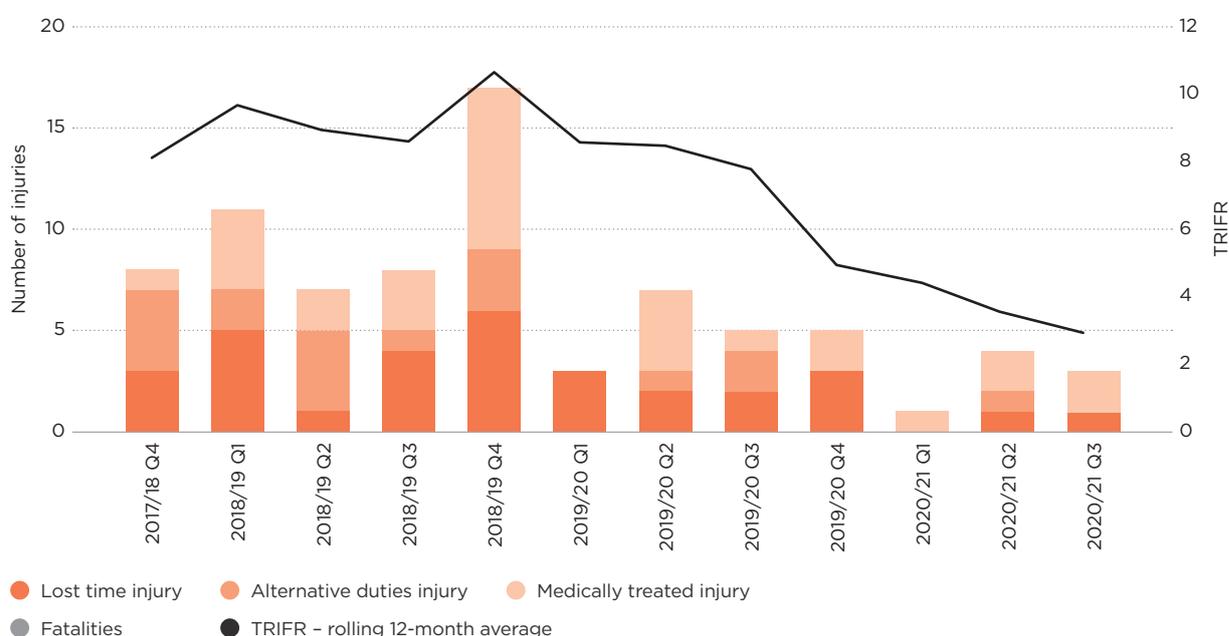


FIGURE 4: TRIFR - mines and tunnels

The following injury definitions are taken from Schedule 8 of the Regulations:

- **Lost-time injuries** are events that involved injury or illness of a mine worker that resulted in the inability of the worker to work for 1 day or more (not including the day of the event) during the reporting period (whether the worker is rostered on that day or not).
- **Alternative duties injuries** are events that involved injury or illness of a mine worker that resulted in the worker being on alternative duties during the reporting period.
- **Medical treatment injuries** are work-related injuries to mine workers that required medical treatment during the reporting period but did not require a day lost from work or alternative duties (other than the day of the event).

Figures 5 and 6 show the number of injuries resulting in more than a week away from work (WAFW), and the sum of the claims costs for those WAFW injuries for the mining and quarrying sectors from April 2018 to September 2020. It is important to note that the number of WAFW injuries for previous quarters may increase over time as ACC can grant claims up to 12 months after an injury has occurred. The claims costs for WAFW injuries for previous quarters will also continue to increase over time as the true costs of those injuries are realised. It may take two years or more for the true costs to be realised. The average cost of extractives sector WAFW injuries between April 2018 and September 2019 was over \$17,500 per injury.

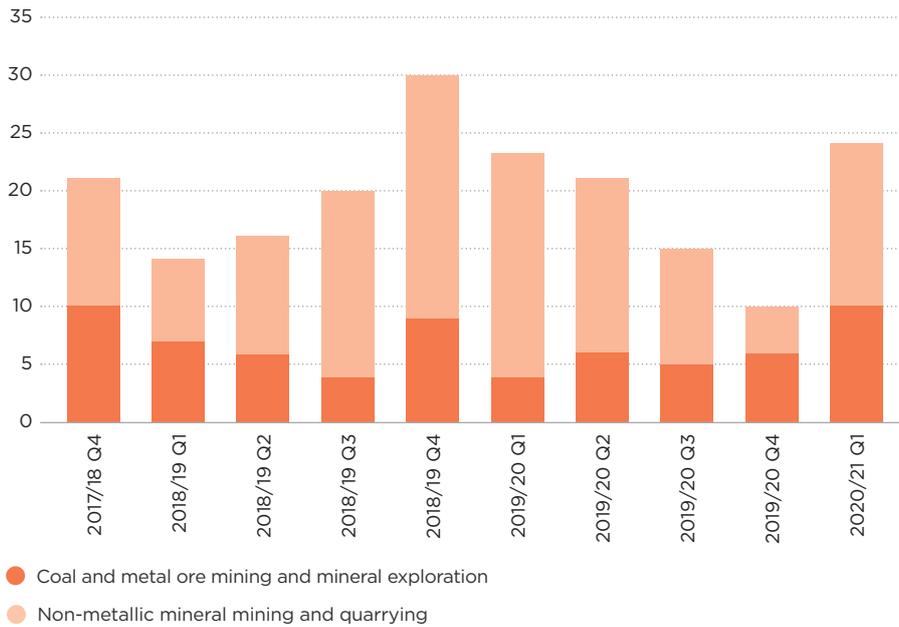


FIGURE 5:
Number of injuries resulting in more than a week away from work

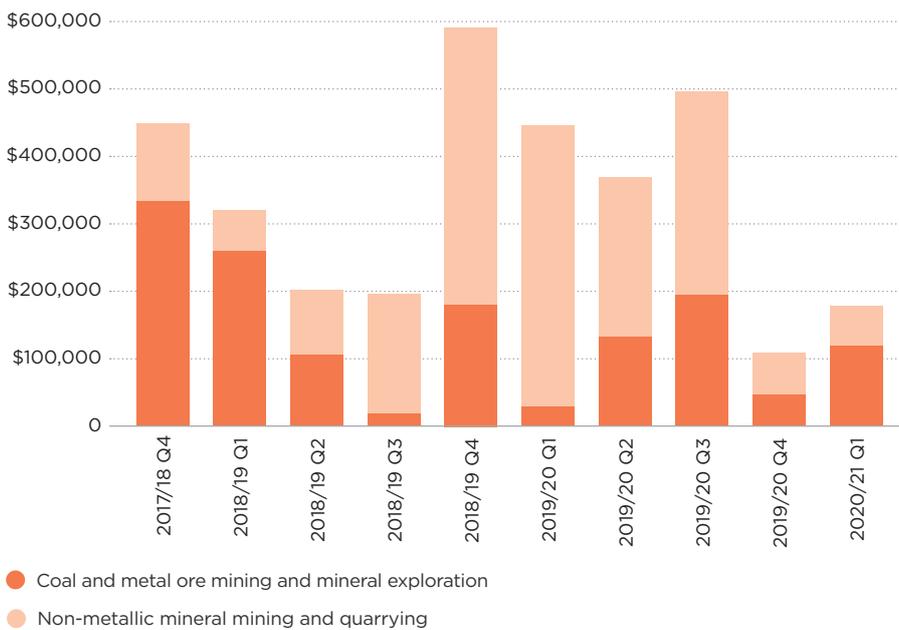


FIGURE 6:
Sum of claims cost (excluding GST) for injuries resulting in more than a week away from work

The data for these graphs comes from our System for Work-related Injury Forecasting and Targeting (SWIFT) database. It includes ACC data on approved work-related injury claims that resulted in more than a week away from work (WAFW). There is a seven month lag applied to the data to allow time for the claim information to stabilise, so data for the past two quarters is not yet available. While SWIFT data draws on ACC data, differences in counting criteria mean it may not match ACC counts, and should not be considered official ACC data.

2.3 Types of events

Figures 7 and 8 show the notifiable event categories for events notified to WorkSafe in the previous 12 months, by the mining and tunnelling sectors and the quarrying and alluvial mining sectors, respectively. The data shows that 53 percent of notifiable events in the mining and tunnelling sectors in the past 12 months have occurred in relation to vehicles and plant (27%), and fire, ignition, explosion or smoke (25%). These two categories are broken down in more detail in the following section. Sixty-two percent of notifiable events in the quarrying and alluvial mining sectors in the past 12 months involved the collapse, overturning, failure or malfunction of, or damage to plant (41%) and an implosion, explosion or fire (21%).

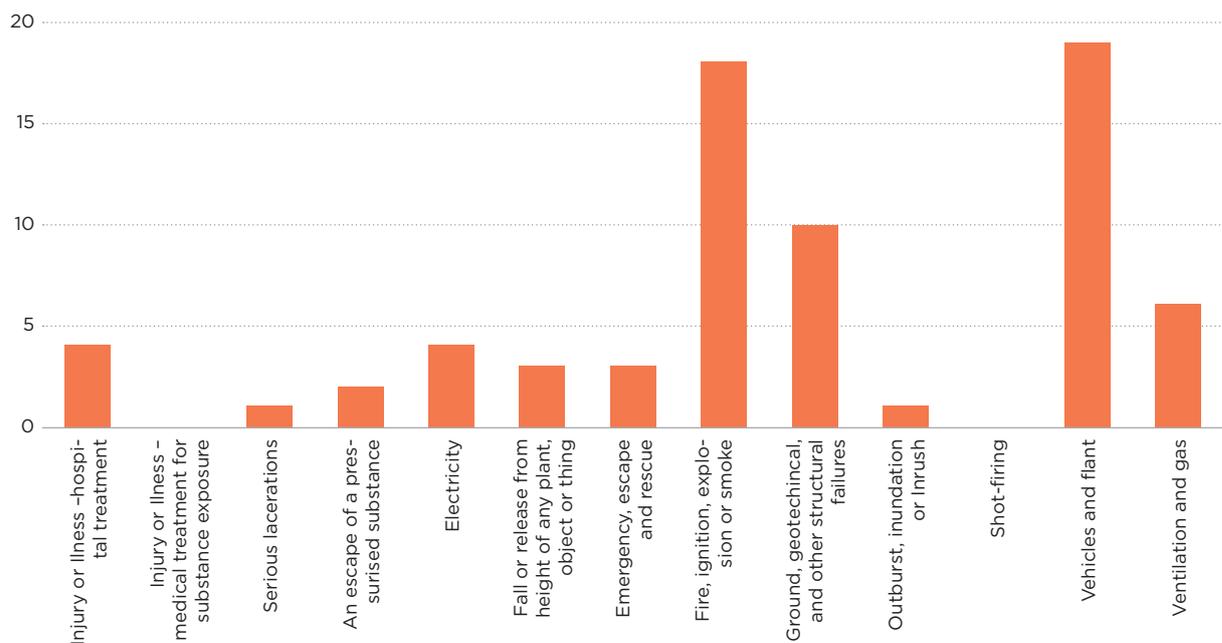


FIGURE 7: Mines and tunnels notifiable event categories for the previous 12 months

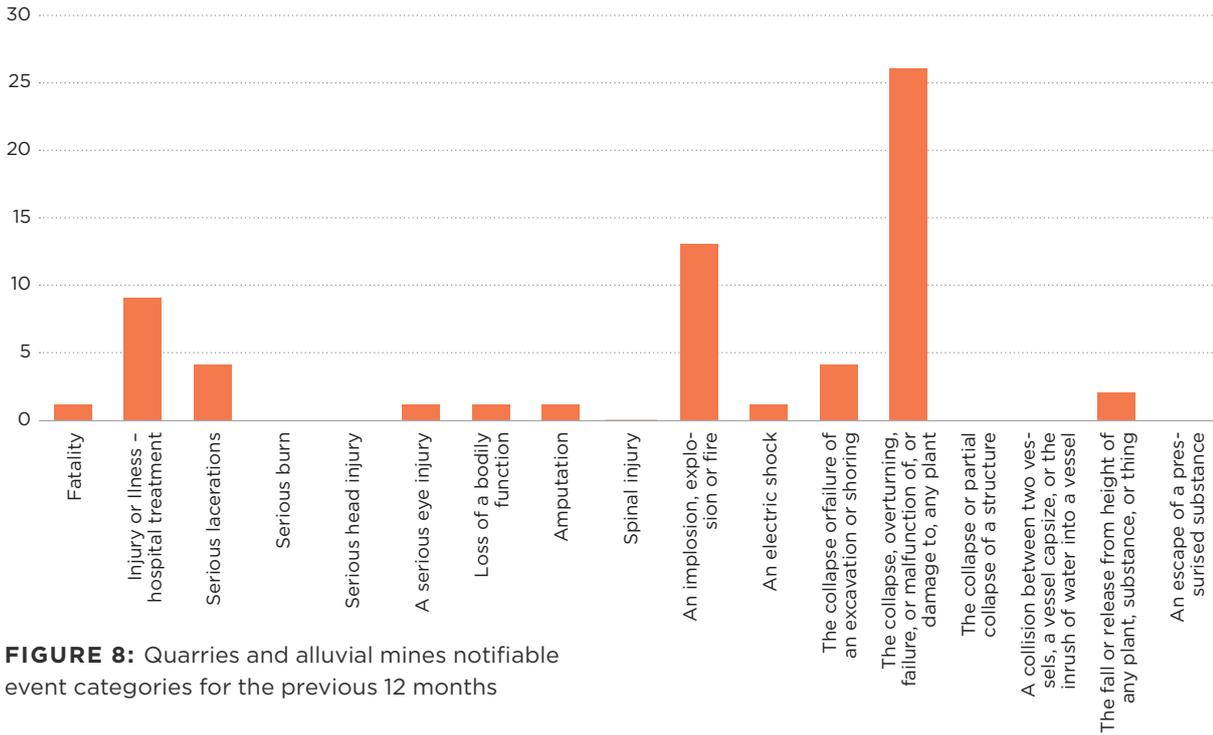


FIGURE 8: Quarries and alluvial mines notifiable event categories for the previous 12 months

2.4 Mine and tunnel focus areas

Where there is a high frequency of notifiable events in any Schedule 5 category, we have broken these events down in more detail to identify key focus areas. We will target our inspections to ensure that operators have adequate controls in place to address these risks.

Figures 9 and 10 break down the two largest notifiable event categories for mines and tunnels in the past 12 months into the corresponding Schedule 5 sub-categories. The data shows that for notifiable events related to fire, ignition, explosion or smoke, 83% involve fires on plant, mobile plant or in buildings associated with mining or tunnelling activities, and 11% involves spontaneous combustion, and 6% involves the outbreak of a fire on the surface or underground. The vehicle and plant-related notifiable events involve collision of mobile plant with other plant (21%), overturning of mobile plant (58%), unintended movement or brake failure (10%), and breach of a safety berm or windrow (11%).

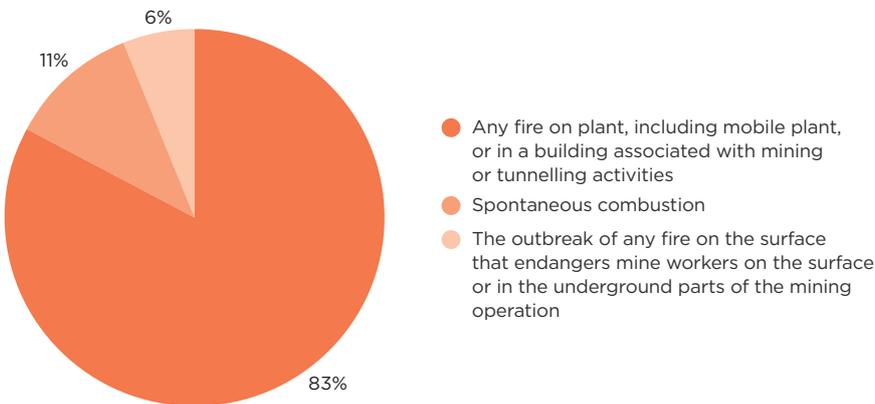


FIGURE 9: Fire, ignition, explosion or smoke-related notifiable event sub-categories

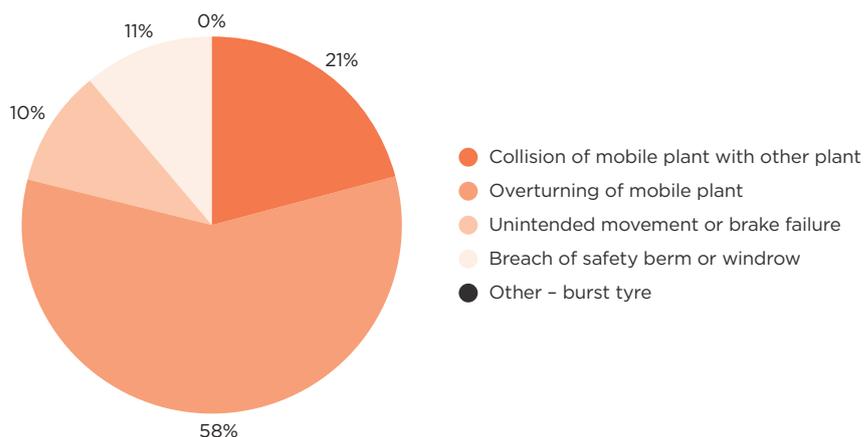


FIGURE 10:
Vehicles and plant-
related notifiable
event sub-categories

Consistency of reporting

Mining and tunneling data are received from a high proportion of those operations and are considered to be accurate. Notifiable events were reported by 44% of operations in the past 12 months, and quarterly reports were submitted by 91% of operations this quarter.

Quarrying and alluvial mining data are received from a much lower proportion of those operations and are likely to be less accurate. Notifiable events were reported by just 3.7% of operations in the past 12 months. The SWIFT data on WAFW injuries consistently shows higher numbers of injuries in the quarry sector, suggesting under-reporting of events. More accurate reporting from the quarry sector is expected when the requirements for reporting under Schedules 5 and 8 are implemented for quarries.

2.5 Regulator comments

Last quarter's report reminded industry of the basic steps required for the management of risk at Extractives sites. In particular, we reminded industry that when change has occurred in processes or circumstances that this change should trigger new risk assessment. It was noted that investigations into many of the incidents that were reported to Worksafe determined that incidents were due to a failure to identify that change had occurred or to recognise the effects of the change.

This quarter we will look at another causal factor commonly identified in high potential incident investigations: human error. That human error is a contributor to incidents should not be a surprise, but what is a surprise is that the human errors that are identified were often predictable and that there had been an expectation or reliance that humans would perform perfectly without error.

When the imperfect human then makes this quite predictable error, the investigation report blames the worker, and few changes are made to the work environment, that is, no changes to equipment or processes apart from replacing the odd worker or prescribing the undertaking of more training. This type of response is unlikely to improve worker safety and often fails to meet the so far as is reasonably practicable step duty.

The actions listed in investigation reports to address these human errors are predominantly just more new administrative controls or refresher training of a worker. The investigators, and importantly the persons accepting and approving the findings and recommendations of the investigators' reports, do not consider more fundamental controls like changing equipment or processes or isolating any areas of concern with hard barriers, that is, using the hierarchy of controls.

If a worker's safety is reliant on their own, or other workers'/supervisors'/managers' day-to-day judgement always being correct, or the near perfect coordinated execution by a worker when operating plant and equipment, then the process will invariably fail and there will be injuries or worse.

That these incidents will occur and reoccur should not be a surprise.

Human error is never (or very rarely) the root cause – it may be a causal factor, but there is certainly another control missing that would have prevented a human error causing a serious incident or mitigated the consequence of the human error. Operators should consider the environment they are putting workers into and ensure that the design of the environment allows simple mistakes to be tolerated without significant adverse outcomes. The types of human errors that are likely to occur should be identified in risk assessments and the work should be designed to consider these errors. Operators should ensure that the design of the work will reduce the likely frequency of the errors or reduce the consequence of the errors.

If an investigation finding is dominated by conclusions of human error as the causal factors, then it is likely that the work design is inadequate and that there have been insufficient hard barriers built into the system.

It should be noted that adherence to rules or compliance with procedures and processes is also important and that rule breaking should not be tolerated. If non-compliances are tolerated, a culture of routine violations is established at an operation. Often this culture is identified too late to avoid serious harm to workers and is only exposed after an investigation into an HPI.

It is the operator's responsibility not to accept violations, through effective supervision and by good example. Non-compliance should never be tolerated and reasons for non-compliance should be investigated, for example, are the rules sensible?

The investigation example included in this quarterly report in 2.7 again involves failure to identify change and manage that change, but then also shows how human error can contribute when the compliance with a rule by a worker becomes a critical control.

2.6 High potential incidents

A high potential incident at a mine, quarry or tunnel is an event, or a series of events, that causes or has the potential to cause a significant adverse effect on the safety or health of a person.

High potential incidents – 2020/21 Q3

Table 4 provides a summary of high potential incidents notified to WorkSafe in Q3 2020/21. The summaries are an abridged version from the operator's notification report.

INCIDENT DATE	SUMMARY	CONSIDERATIONS
Jan 21	Failure of ground control underground. Two to three combi plates have popped off split sets unlocking the overlap between two to three sheets of mesh, releasing a pile of scats from behind the mesh.	<ul style="list-style-type: none"> - Ground and strata - Workplace inspection - Job planning - Risk assessment
Jan 21	A worker was in the bottom of a shaft working on linking horizontal steel reo bars to vertical steel reo bars for the wall lining. Another steel fixer was working directly above them on scaffold (scaffold deck height 2m) weaving 16mm steel bar through the vertical reo bars. The worker on top was levering tube so it can fit in the gap, once the reo bar was free, reo bar slid down the gap hitting the worker below. The reo bar hit the worker below on their hard hat and then connected with the worker's right hand. The worker sustained minor bruising on the back of their right hand. No first aid was required.	<ul style="list-style-type: none"> - Job planning - Risk assessment - Supervision - Training - Fall from heights

INCIDENT DATE	SUMMARY	CONSIDERATIONS
Jan 21	Pit wall failure in open pit.	<ul style="list-style-type: none"> - Ground and strata - Design - Risk assessment
Jan 21	50-ton excavator was mining coal, trammed back to set up the digger platform better. In doing so one of the digger tracks were close to the edge of the bench and the edge collapsed and the digger rolled off the bench onto the cut below, coming to rest upside down. The cab side was undamaged and the operator was able to walk out un-injured.	<ul style="list-style-type: none"> - Tips, ponds and voids - Job planning - Risk assessment - Workplace inspection - Design - Supervision - Training
Jan 21	During night shift operations, a loaded 777 truck was hauling overburden material to the dumping location, and the truck has got into a skid and gone sideways then tipped onto the offside.	<ul style="list-style-type: none"> - Roads and operating surfaces - Traffic management - Training
Jan 21	While attempting to locate a hydraulic oil leak on the jumbo boom the Nipper has had their hand near the leak site when the Jumbo Operator has moved the controls. The pressurised oil has hit the Nipper's thumb, penetrating through the latex glove and into their thumb.	<ul style="list-style-type: none"> - Job planning - Risk assessment - Equipment maintenance - Isolation - Supervision - Training
Jan 21	Digger loading crusher slid off muck pile.	<ul style="list-style-type: none"> - Ground and strata - Risk assessment - Job planning - Training - Supervision
Jan 21	Broken rock of approximately 60kgs has fallen from the backs of a drive. Fall of ground was due to the galvanised ground support failing. Initial observations noted that the mesh was corroded.	<ul style="list-style-type: none"> - Ground and strata - Workplace inspection - Job planning - Risk assessment
Feb 21	While tipping off load, the tail gate failed to open and the dumper reared up and lifted the front section off the ground and it tipped over with operator in the cab.	<ul style="list-style-type: none"> - Job planning - Risk assessment - Supervision - Training
Feb 21	A rock has fallen off the wall in a ladderway, falling onto an internal platform making the ladderway unpassable.	<ul style="list-style-type: none"> - Ground and strata - Emergency management - Risk assessment - Workplace inspection
Feb 21	Face collapse underground. Approximate volume of 10 tonnes of failed material (mostly clay). There was no injury and the area was cordoned off at the time.	<ul style="list-style-type: none"> - Ground and strata - Design - Risk assessment - Job planning
Feb 21	11kv cable was disconnected by contractor without appropriate isolation or communication and approval.	<ul style="list-style-type: none"> - Contractor management - Risk assessment - Job planning - Supervision - Isolation
Feb 21	A small fall of ground at underground mine, resulting in around 70kg of material falling out of a split in the mesh. It seems that the split in the mesh has been caused due to some ground movement along a fault that is associated with a recent stope firing.	<ul style="list-style-type: none"> - Ground and strata - Design - Risk assessment - Workplace inspection

INCIDENT DATE	SUMMARY	CONSIDERATIONS
Feb 21	Operator was tramping out from underground at the end of shift and noticed a flash in the engine bay. They immediately pulled off the decline and activated the AFFF. There was no propagation of fire and it seems the flame was extinguished by the AFFF. Initial inspections by the mechanics indicate that the flame is due to coolant residue flashing.	<ul style="list-style-type: none"> - Fire or explosion - Equipment selection and design - Equipment maintenance
Feb 21	A section of 415v cable was being lifted up and over the shaft to be extended down the shaft. The cable joint snagged on the fence around the top of the shaft. As it snagged it unplugged at the joint and section of cable fell into the shaft. No injury.	<ul style="list-style-type: none"> - Fall from height - Job planning - Risk assessment
Mar 21	The crawler crane servicing the shaft had lowered the hook down into the shaft to pick up the 5.5t excavator. The excavator had been slung and the workers in the shaft had moved to the safe zone under the ladder bay before the lifting was to commence. Just before the lift started the crane cable pulled out of the wedge and dropped the cable and hook and block into the shaft, damaging the excavator. No injury reported.	<ul style="list-style-type: none"> - Fall from height - Job planning - Risk assessment - Lifting and rigging
Mar 21	Contractors were moving shot rock and noticed some emulsion. Contractors stopped excavating and notified operator's Supervisor, who then inspected the area, set up an exclusion zone and notified the shot-firer. Shot-firer inspected area, finding a uninitiated Booster (150gram).	<ul style="list-style-type: none"> - Explosives - Risk assessment - Workplace inspection - Training
Mar 21	Whilst hauling blocky material the operator has felt the load shift whilst negotiating a corner. Subsequently the truck body has rolled onto its side spilling the load. The truck cab remained in the upright position, there were no injuries.	<ul style="list-style-type: none"> - Roads and operating surfaces - Traffic management - Supervision - Training
Mar 21	A LHD fitted with a ducks bill made contact with the front of an SMV (slightly above the bumper) at slow speed. The SMV had 7 people, including the driver in it. No damage or injury reported.	<ul style="list-style-type: none"> - Roads and operating surfaces - Traffic management - Supervision - Training
Mar 21	Underground LHD machine was being operated on tele-remotes when it overturned onto its side. Once on its side the engine has failed and caused oil to run onto the hot engine and emit smoke into the underground workings, triggering an evacuation of the mine.	<ul style="list-style-type: none"> - Fire or explosion - Emergency management
Mar 21	Tree has fallen onto digger and crushed worker. Fatal injuries were sustained.	<ul style="list-style-type: none"> - Ground or strata - Design - Risk assessment - Job planning
Mar 21	Excavator operator loaded an oversize rock onto haul truck. The size and placement of the rock on the deck caused uncontrolled movement of the truck; haul truck came to rest on the rear of the tail of the deck.	<ul style="list-style-type: none"> - Workplace inspection - Supervision - Training - Explosives - Risk assessment
Mar 21	Excavator operator found a misfired detonator and booster in the muckpile.	<ul style="list-style-type: none"> - Explosives - Risk assessment - Workplace inspection - Training

TABLE 4: High potential incidents – 2020/21 Q3

Table 5 and figure 11 shows the number of high potential incidents per quarter during the last year for all extractives operations.

QUARTER	Q2 OCT-DEC 2019	Q3 JAN-MAR 2020	Q4 APR-JUN 2020	Q1 JUL-SEP 2020	Q2 OCT-DEC 2020	Q3 JAN-MAR 2021	TOTAL PREVIOUS 12 MONTHS
Number of high potential incidents per quarter	28	34	15	20	24	23	82

TABLE 5: High potential incidents per quarter

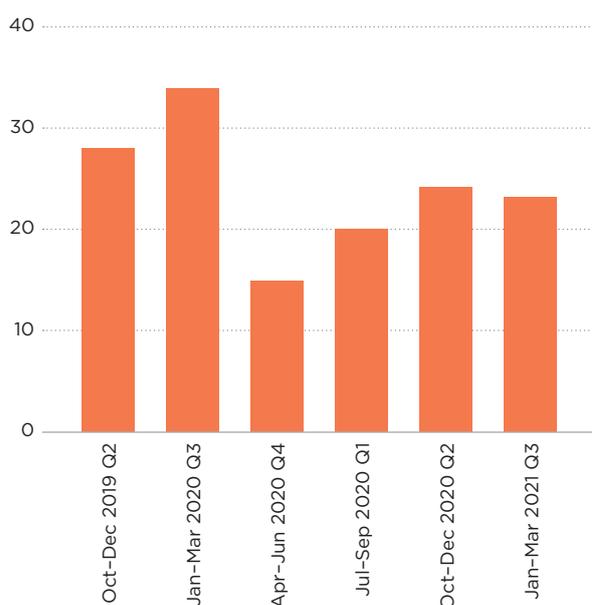


FIGURE 11:
High potential incidents per quarter

2.7 High potential incidents - investigation outcomes

INCIDENT DATE	SUMMARY	CONSIDERATIONS
Jan 21	50-ton excavator was mining coal, trammed back to set up the digger platform better. In doing so one of the digger tracks were close to the edge of the bench and the edge collapsed and the digger rolled off the bench onto the cut below, coming to rest upside down. The cab side was undamaged and the operator was able to walk out un-injured.	<ul style="list-style-type: none"> - Tips, ponds and voids - Job planning - Risk assessment - Workplace inspection - Design - Supervision - Training

TABLE 6: High potential incident - investigation outcomes case study



FIGURE 12: Incident scene photographs

The incident

The morning of the incident the shift commenced with the Pre-Shift Information (PSI) meeting that all mine workers attend. Hazards communicated at the PSI were signs of venting in a coal seam and that it was being monitored. No other specific hazards associated with coal winning were raised.

The excavator operator proceeded to their work area and conducted a Pre-Start inspection of the excavator (no faults found). On completion of the Pre-Start inspection, the excavator operator proceeded to the coal bench to begin mining the block of coal where an unidentified overhang was present.

The excavator loaded two articulated haul trucks with coal before scarifying the coal surface the excavator was positioned on with the penetration tips of the bucket and starting to pull the windrow from the coal edge onto the coal area to develop a level platform and progress the mining sequence. This was conducted to improve the stability of the operating area the excavator was positioned on. (Solid uneven coal is very slippery for an excavator to work on).

As the excavator operator progressed in the pad construction, they were moving the excavator 'parallel' to the coal bench edge towards the unidentified overhang while pulling the windrow from 'right to left' onto the active mining floor area and levelling the material out. The excavator operator slewed the machine to the 'right hand' side to look at the position of the excavator and the edge of the coal bench. The excavator operator then pulled some more windrow material onto the operational area when a large lump of coal was then exposed from the bucket. The operator then moved the excavator back an estimated 1m to enable them to break the lump of coal up with the bucket.

The excavator is now positioned directly above the unidentified overhang, and as the operator put pressure onto the lump of coal with the bucket, the weight through the excavator was transferred to the rear of the track frame. This weight transfer has overloaded the unidentified overhang of coal, which has given away, resulting in the 'right hand' side of the excavator becoming unsupported and the machine fell off the bench landing on its roof.

The emergency response plan was initiated by a witness operating a dump truck in the area. The emergency response team gathered and were at the scene of the incident within minutes. The excavator operator had extracted themselves from the excavator through the operator's side door and was standing next to the machine when the Shift Supervisor arrived at the location. The operator was assessed, and no injuries were sustained. Once it was determined that the excavator operator was not injured, the Emergency Response Team were stood down.

The investigation identified

The excavator operator positioned the excavator within 1m of the coal bench edge directly over top of an unidentified overhang. The ground pressure applied to the overhang from the excavator positioning the offside track on top of it has caused the wedge to fail, causing the excavator to fall from bench.

Contributing factors identified:

- Inadequate processes for inspecting coal during pre-shift inspections when underground workings are present.
- The JSEA had not been updated or reviewed for working in the area for 10 days.
- Training does not identify all potential hazards associated with underground workings, specifically cleaning out drives.
- The excavator operator did not identify any hazards associated to their work area, less than adequate individual risk management tools used (that is, take-five).
- Risk management practices have not been adequately completed by operational staff.
- Acceptance of individuals failing to utilise risk management tools.
- The excavator operator positioned the excavator within 1m of the coal face edge, in breach of the Excavators Operations SOP which states that a 2.5m separation distance must be maintained from active bench edges.
- The Excavators Operations SOP is an 'administrative control' and relies on the compliance of the machine operator to maintain 2.5m from a bench edge.
- The Excavator Operations SOP has generic content that covers all aspects of excavator operations at the operation, however it is not specific to coal winning.
- The coal within the area of the wedge failure is hard and contains poorly developed sub-vertical conjugate joint sets. This weakness in the coal seam is a contributing factor to the wedge failing.
- The additional loading resulting from impact of digger breaking a coal lump with the bucket was enough to exceed the shear strength of the bench crest resulting in a wedge failure bound by high angle conjugate joints.

KEY LEARNINGS IDENTIFIED

We must also consider 'complacency' creeping in for our experienced operators who may have normalised their daily tasks and are not undertaking basic risk management practices. This will lead to increased incident rates and a high possibility of increased severity outcomes for such events.

This can be mitigated through effective leadership, supervisors and workers working together to identify hazards present not only in the void hazard zone but over the entire site, developing controls for the identified hazards and

communicating these via PSI and site safety communication initiatives to get the buy in from all Mine Workers, including scheduled refresher training on critical risk areas, such as work area assessment and task set-up.

That in this instance the emergency response was immediate and appropriate.

Regulator comments

In the last 18 months we have been notified of five excavator tip-overs on Extractives sites. There was no loss of life, but all incidents could have resulted in a fatality. Excavators are commonly used on Extractives sites and effective controls around their use are critical for operator safety. Multiple factors resulted in the incidents, but machines operating in unsafe areas was common in all incidents.

See the [Excavator tip overs safety alert](#) published on the WorkSafe website.

Recommendations

Operators must not be put into a position in which there is a high risk of tip-over.

Work should be designed to minimize the exposure of diggers and the operators to the risks that may be present in the workplace. Consideration of alternate processes to minimise specific identified risks should be considered.

The frequency of inspection of work areas should be sufficient to ensure risks will be identified prior to work commencing and that the area should then be adequately monitored to ensure that workers are not inadvertently exposed to developing risks. Operators will not always be well placed to monitor these risks.

Any complacency in attitude by workers should be dealt with immediately and adherence to rules monitored continuously.

Recommended controls include:

- the site operator must have systems to ensure work is planned and operating areas assessed prior to work by the supervisor and machine operator
- digger operators do a dynamic risk assessment before starting each job
- the safest route is selected when moving an excavator around the site
- there is never digging underneath an excavator
- work is always carried out a safe distance from the edge of a face or any void beneath the working area
- Standard Operating Procedures should be written where possible
- work areas are designed to control the hazards
- that work areas are monitored to ensure all developing risks are identified
- roll-over protection is fitted to all cabs including excavators, and ensure operators wear seat belts and keep doors closed
- that there is an emergency response to a roll over, including provision of equipment or persons to ensure a safe recovery of the operator from the machine in any circumstance
- there are always two exits from the excavator.

Mitigation controls to protect health and safety include:

- fitting ROPs structures
- operating using vehicle seat belts and doors closed
- providing secondary emergency egress from the cab.

3.0

The regulator

IN THIS SECTION:

- 3.1 Our activities
- 3.2 Assessments
- 3.3 Enforcements



3.1 Our activities

The Extractives Specialist Health and Safety Inspectors at WorkSafe use a range of interventions to undertake their duties. Inspectors strive to achieve the right mix of education, engagement and where required enforcement. This section of the report includes a summary of the interventions used by the Extractives Inspectors during the quarter.

3.2 Assessments

Proactive assessments aim to prevent incidents, injuries and illness through planned, risk-based interventions. Reactive activities are undertaken in response to reported safety concerns or notifiable events. Assessments can be either site- or desk-based in nature.

For proactive site-based assessments, the objectives of each visit are agreed and the appropriate inspection tool is selected. Targeted assessments and regulatory compliance assessments can take several days on site with a team of inspectors attending. These multi-day inspections may be 'targeted' to assess the controls in place for a particular principal hazard (for example, WorkSafe has been targeting 'roads and other vehicle operating areas' as a result of the high number of notifiable events in this area), or they may involve a more general assessment of 'regulatory compliance'. Site inspections and targeted inspections are generally completed in a one day site visit but can also focus on specific topics.

As well as site-based assessments, the Inspectors spend considerable time undertaking desk-based assessments. Proactive desk-based assessments include the review of Principal Hazard Management Plans (PHMPs), Principal Control Plans (PCPs), mine plans, and high risk activity notifications. Responding to notifiable events and safety concerns may involve a site-based or desk-based assessment, or both.

Table 7 shows the range of assessments undertaken in Q3 2020/21 by sector.

		ASSESSMENTS	MINE	TUNNEL	ALLUVIAL MINE	QUARRY
Preventative	Site-based	Targeted assessments				
		Regulatory compliance assessments				
		Site inspections	15	12	2	43
		Targeted inspections	5			
	Desk-based	PHMP/PCP review		8		
		Mine plan review	6	5		
		High risk activity	1			
	COVID-19 assessment					
Reactive	Site-based	Concerns - inspection				2
		Notifiable events - inspection	2			2
	Desk-based	Concerns - desk-based				1
		Notifiable event - desk-based	18	1	1	3

TABLE 7: Proactive and reactive site and desk based assessments conducted in Q3 2020/21

Figure 13 shows the number of proactive and reactive site- and desk-based assessments undertaken by the regulator in Q3 2020/21. This quarter 65% of our activities were site-based, and 76% of activities were proactive.

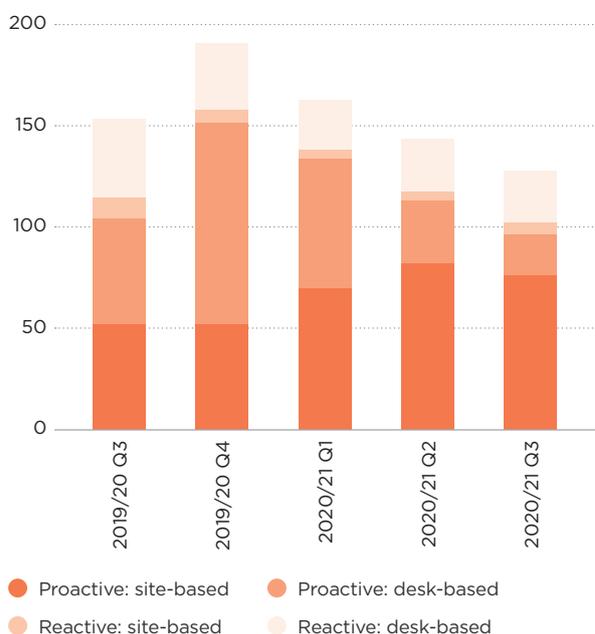


FIGURE 13:
Proactive and reactive site and desk-based assessments

Figure 14 shows the number of assessments undertaken by the regulator in Q3 2020/21 by sector. This quarter, 40% of our assessments were for quarries, 37% for mines, 20% for tunnels and 2% for alluvial mines.

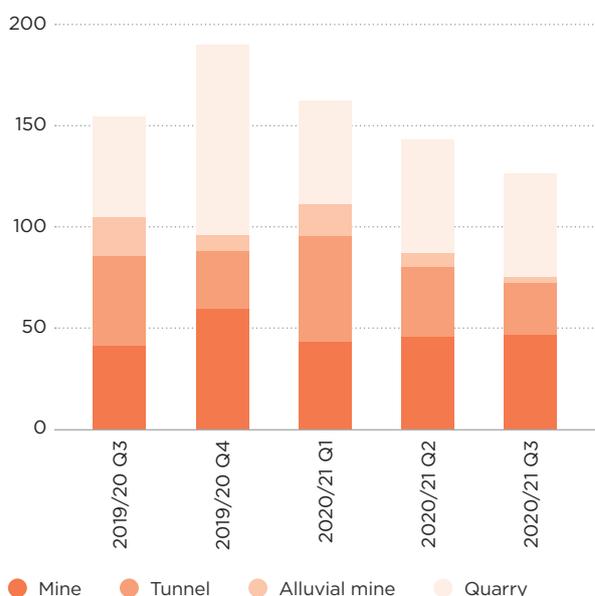


FIGURE 14:
Assesments by sector

3.3 Enforcements

Enforcement actions issued by WorkSafe include prohibition and improvement notices and directive letters. Enforcement actions are issued according to our Enforcement Decision Making (EDM) Model when health and safety issues are identified through assessments.

Figures 15 and 16 show the number of enforcement actions issued in Q3 2020/21 by notice type and by sector. This quarter, a total of 125 enforcement actions were issued. Of those, 2% of were prohibition notices, 25% were improvement notices, 71% were directives and 2% were sustained compliance letters. The majority of the enforcement actions were issued to the mining (16%) and quarrying (69%) sectors.

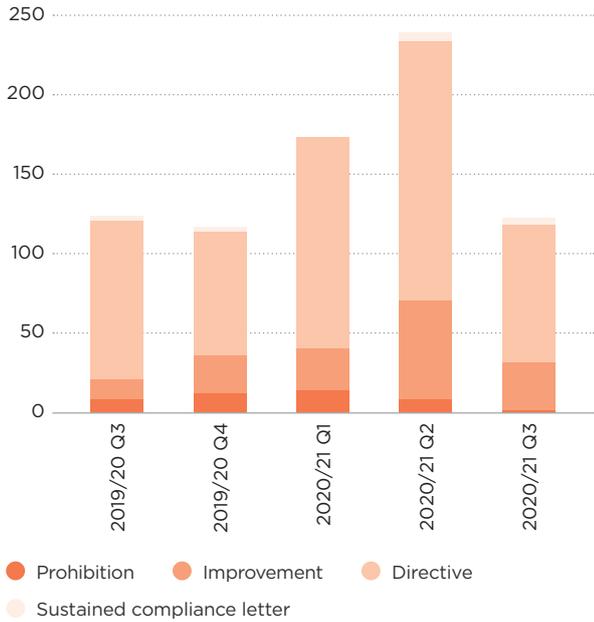


FIGURE 15:
Enforcement actions issued by type

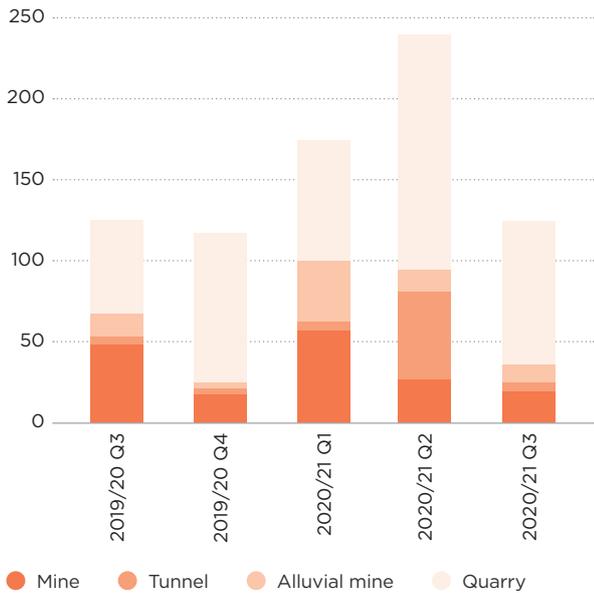


FIGURE 16:
Enforcement actions issued by sector

Figure 17 shows the number of enforcement actions issued in Q3 2020/21 by category, and provides an indication of the key areas of concern to our inspectors. This quarter, the majority of enforcement actions were issued for health and safety issues relating to roads and other vehicle operating areas (29%).

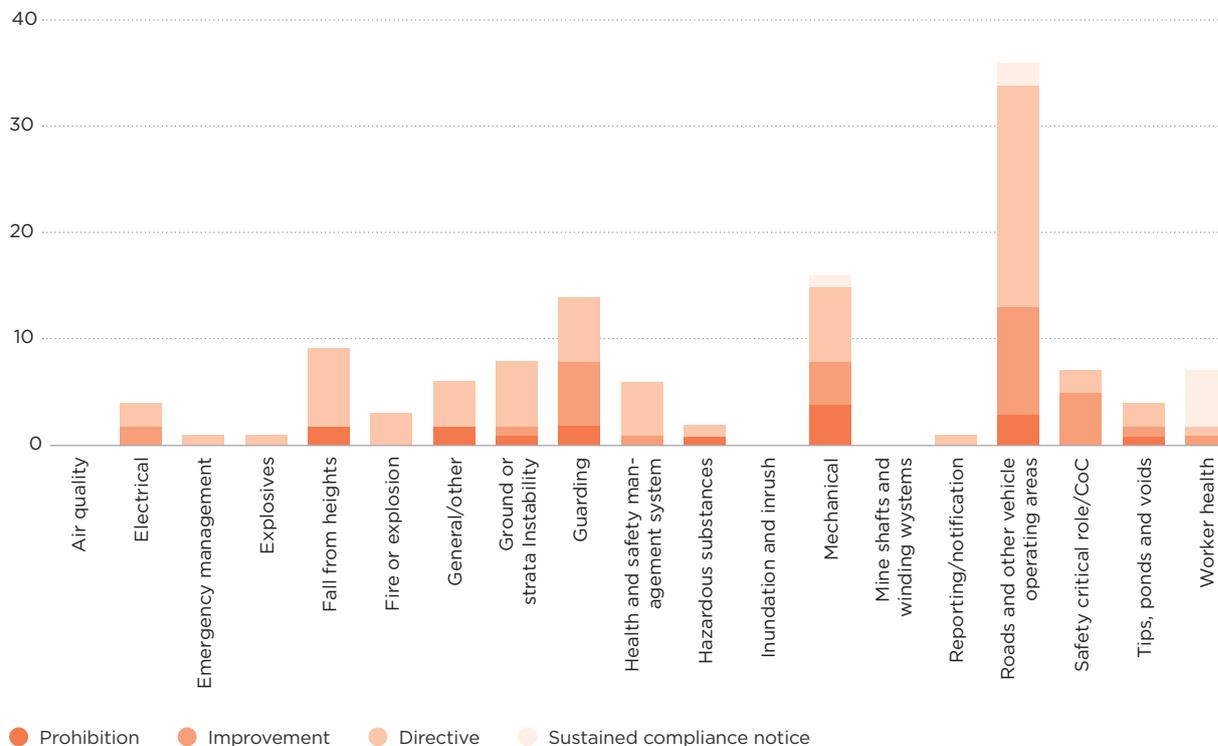


FIGURE 17: Enforcement actions issued by category 2020/21 Q3

Regulator activity comment

The Q3 enforcement activity is very similar to the previous year’s Q3 with the New Year holiday period resulting in fewer inspections over that time.

The proportion of enforcement actions has continued to reflect an appropriate mix of prohibition, improvement and directives, over the risk categories.

Disclaimer

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