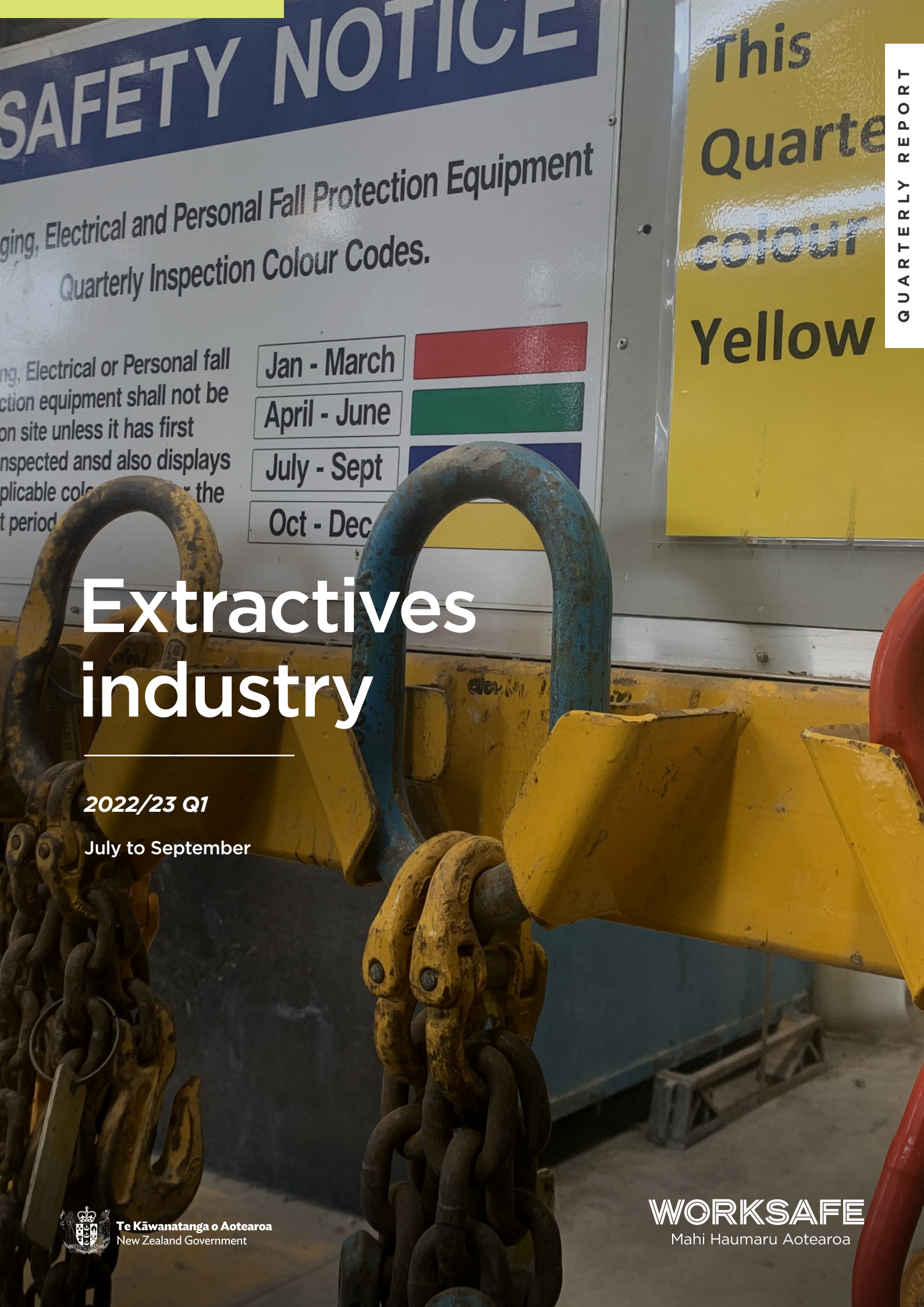

QUARTERLY REPORT

Extractives industry

2022/23 Q1

July to September

Te Kāwanatanga o Aotearoa
New Zealand Government

WORKSAFE
Mahi Haumaru Aotearoa

About this report

This quarterly health and safety performance report has been prepared by WorkSafe New Zealand 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.

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.

The publishing of this *Q1 2022/23 Extractives industry quarterly report* means we are now entering the fourth year of WorkSafe reporting back to industry. We have published 12 previous reports which we hope are useful to industry and that they are read by operators, managers, and workers.

To begin with, the collating of the information was time consuming, with information often sourced from manually updated spreadsheets. The information reported by industry was individually transferred into spreadsheets from submitted paper/document/email quarterly returns.

We improved our systems by creating an online reporting form located on the WorkSafe website.

The submission of quarterly report data using the online form now means that even with an additional 1,000 quarries and alluvial mines required to report under the regulations, that we will still be able to derive the industry statistics in the same time period.

I know that many of the quarry and alluvial mine operators have started to think about this and are setting themselves up to make the process as efficient as possible for themselves.

The good news is most mines and tunnels quickly settled into the reporting regime and found it quite simple to provide the numbers as required on time.

During this new financial year, we will modify the industry data and graphs in this report to reflect that all of the Extractives industry will be reporting under exactly the same criteria. Previously we had Quarries and Alluvial mines reporting notifiable events under HSWA only, while mines and tunnels were reporting under the Mining and Quarrying Regulations as well.

This will make the performance data easier to understand and will allow all of us to benchmark sector performance better.

The data is valuable, and we hope that industry realise that the reporting requirements that the regulations require of them are certainly not bureaucratic in nature without benefit, but rather the reports are fundamental to us improving safety. And at this stage we do not collect enough data to really focus in on causal factors to a level we would like to. We intend to request more follow up information post HPI in the future.

The importance of sourcing information and deriving intelligence from it is discussed in more detail in the regulator comment section of this report.

Paul Hunt
Chief Inspector Extractives

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1.0 Industry profile

IN THIS SECTION:

1.1 Operations

4

Metalliferous opencast mines
Includes one suspended mine and one mine under rehabilitation

22

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

6

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

1

Coal underground mines
Includes one tourist mine under care and maintenance

8

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

1

Coal exploration
One operational coal exploration project

59

Alluvial mines
Number of mines that have been verified (51) or have notified of an Appointed Manager to WorkSafe (8) (includes 2 iron sands mines)

946

Quarries
Number of quarries that have been verified (831) or have notified of an Appointed Manager to WorkSafe but not yet verified (115)

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 1,047 active operations in New Zealand as at the end of September 2022.

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

721

Metalliferous opencast mines
535 FTEs employed by mine operators and 216 FTEs employed by contractors

786

Coal opencast mines
649 FTEs employed by mine operators and 137 FTEs employed by contractors

428

Metalliferous underground mines
367 FTEs employed by mine operators and 61 FTEs employed by contractors

0

Coal underground mines
0 FTEs employed by mine operators and 0 FTEs employed by contractors

1,223

Tunnels
541 FTEs employed by mine operators and 682 FTEs employed by contractors

<1

Coal exploration
2 workers employed by mine operators worked 150hrs and 1 worker employed by contractors worked 20 hours

459

Alluvial mines
Number of workers is known for 31 of the 59 alluvial mines that are verified and/or have notified of an Appointed Manager. The total number of workers has been extrapolated for the remaining 28 operations

2,985

Quarries
Number of workers is known for 752 of the 946 quarries that are verified and/or have notified of an Appointed Manager. The total number of workers has been extrapolated for the remaining 194 operations

There were 6,692 Extractives FTEs in New Zealand as at the end of September 2022. 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.

Figure 1 shows the total hours worked by the mining and tunnelling sectors in Q1 2022/23. The hours are separated into Employees and Contractors.

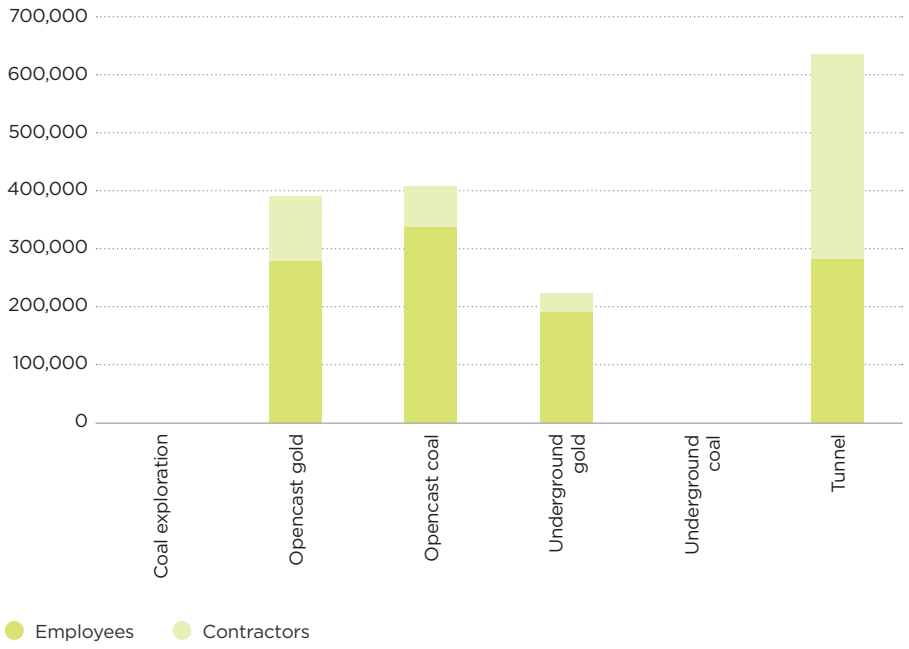

FIGURE 1:
Total hours worked by sector 2022/23 Q1

Figure 2 shows the number of Full Time Equivalents (FTEs) calculated from total hours worked for the mining and tunnelling sectors in Q1 2022/23. The hours are separated into Employees and Contractors.

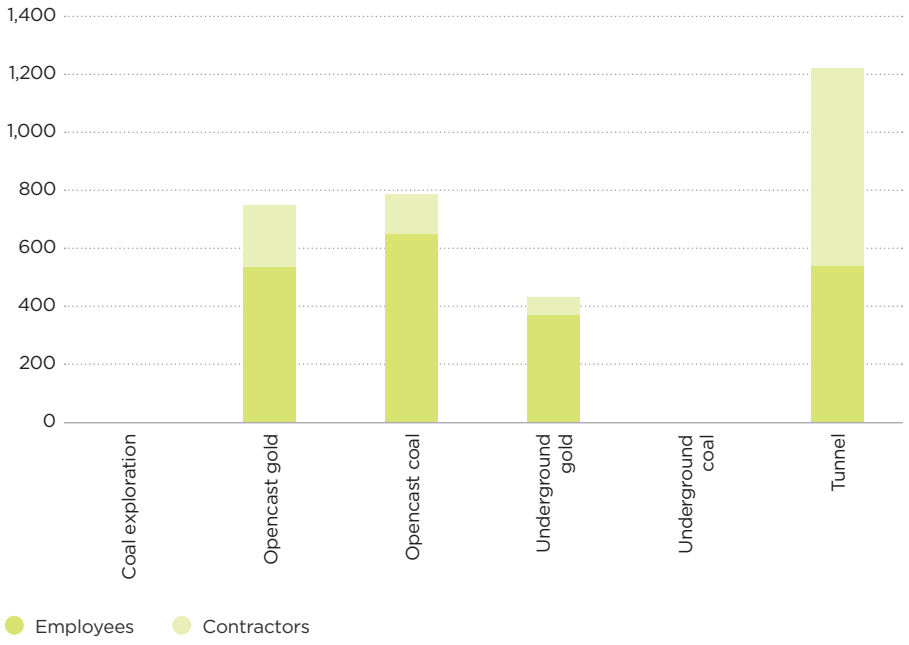

FIGURE 2:
Number of FTEs by sector 2022/23 Q1

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).

The BoE continues to meet the industry demand, holding 48 oral exams over the Q4 period and renewing 85 existing CoCs. The time for applications/renewals to be processed is a few months for the majority, and normally delays are due to the requirement to gather further information to verify CPD or evidence of qualifications etc.

One very important issue the BoE are currently working on is the changes to CoCs as required by the updated Regulations. Currently the requirements to apply for a CoC or to renew one sit in the Regulations with the details (for example, the actual unit standards required) being prescribed in a gazette notice. WorkSafe will now post these requirements in a Safe Work Instrument (SWI).

This process cannot be a simple swap over as the existing requirements are required to be updated. Some unit standards are no longer available, and there is an industry view that the inclusion of some leadership unit standards and health unit standards would be beneficial to most of the CoCs. In 2017 a review was conducted, and some simple changes were agreed after consultation. Most of these did not occur due to the Regulation review being announced early 2018.

The BoE will recommend to WorkSafe that the time is now right to update the requirements for new CoCs. Existing CoC holders will not be affected, other than that some holders may wish to convert an existing CoC to the new requirement, for example, an A Grade Tunnel Manager CoC holder will want to obtain the newly created A Grade Metalliferous Manager CoC.

The BoE has updated the Competency Framework, and this will be the basis for writing a SWI. The SWI will be consulted on with Industry. The target is to have the updated framework in place by 18 July 2023 to align to the Part 2 Regulation changes. WorkSafe will release more information on this as it becomes available.

Table 1 provides a summary of oral exams conducted during the quarter.

TOTAL NUMBER OF ORAL EXAMS HELD Q1 JUL–SEP 22	TOTAL PASSES	% SUCCESS
48	33	71.7

TABLE 1:
Oral exams conducted

Table 2 provides a summary of all CoCs issued during the quarter and the current number of CoCs in circulation at the end of Q1 2022/23.
Note: We no longer report Life Time CoCs.

COC TYPE	TOTAL COCs RENEWED Q1 Jul–Sep 2022	TOTAL NEW COCs ISSUED Q1 Jul–Sep 2022	TOTAL NUMBER OF CURRENT COCs
A Grade Quarry Manager	28	7	243
B Grade Quarry Manager	30	18	340
A Grade Opencast Coal Mine Manager	7	2	56
B Grade Opencast Coal Mine Manager	3	1	49
A Grade Tunnel Manager	2	0	38
B Grade Tunnel Manager	3	2	70
Site Senior Executive	7	2	48
First Class Coal Mine Manager	1	0	15
First Class Mine Manager	0	0	18
Coal Mine Deputy	1	0	28
Coal Mine Underviewer	1	0	18
Mechanical Superintendent	1	0	23
Electrical Superintendent	1	1	17
Ventilation Officer	0	0	4
Mine Surveyor	0	0	13
Site Specific	0	0	3
Winding Engine Driver	0	0	0
Total	**85**	**33**	**983**

TABLE 2: Certificates of Competence in circulation

2.0 Health and safety performance

IN THIS SECTION:

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 three years and for Q1 of 2022/23 for mines and tunnels (Table 3) and quarries and alluvial mines (Table 4).

MINES AND TUNNELS	2019/20 QUARTERLY AVERAGE	2020/21 QUARTERLY AVERAGE	2021/22 QUARTERLY AVERAGE	2022/23 Q1
Number of notifiable events	20	18	20	24
Number of operations that notified events	11	9	11	7

TABLE 3: Mines and tunnels – notifiable events and operations that notified events

Sixteen individual mines and tunnels from a total of 43 reported notifiable events in the past 12 months.

QUARRIES AND ALLUVIAL MINES	2019/20 QUARTERLY AVERAGE	2020/21 QUARTERLY AVERAGE	2021/22 QUARTERLY AVERAGE	2022/23 Q1
Number of notifiable events	18	16	14	19
Number of operations that notified events	15	12	13	18

TABLE 4: Quarries and alluvial mines – notifiable events and operations that notified events

Forty-eight individual quarries and alluvial mines from a total of 1,005 reported notifiable events in the past 12 months.

Figure 3 shows the number of notifiable events reported to WorkSafe by sector from October 2020 to September 2022.

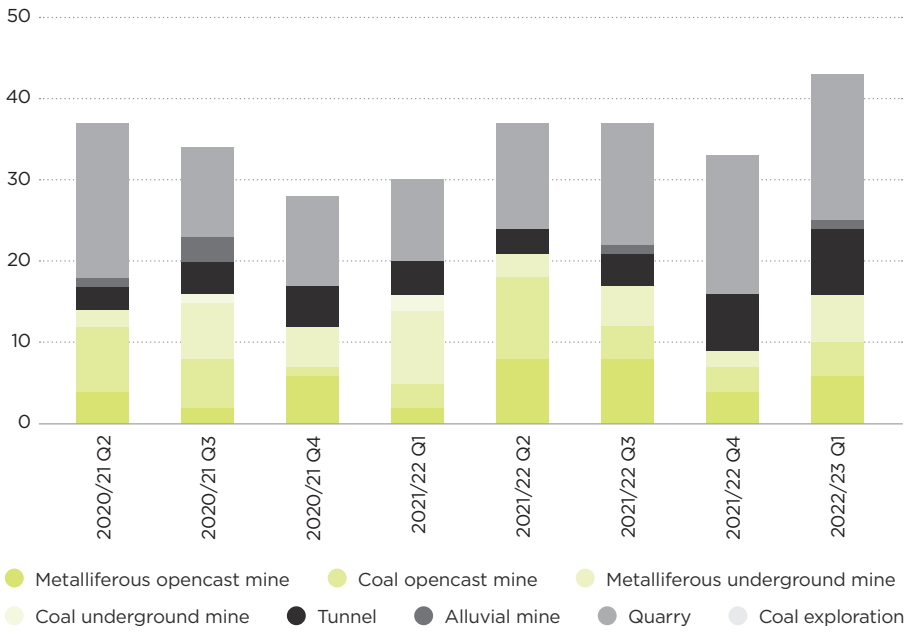

FIGURE 3: Notifiable events by sector

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 October 2019 to September 2022. 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 rolling 12-month average TRIFR is 4.3. Rates have fluctuated over past two years without any clear 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.

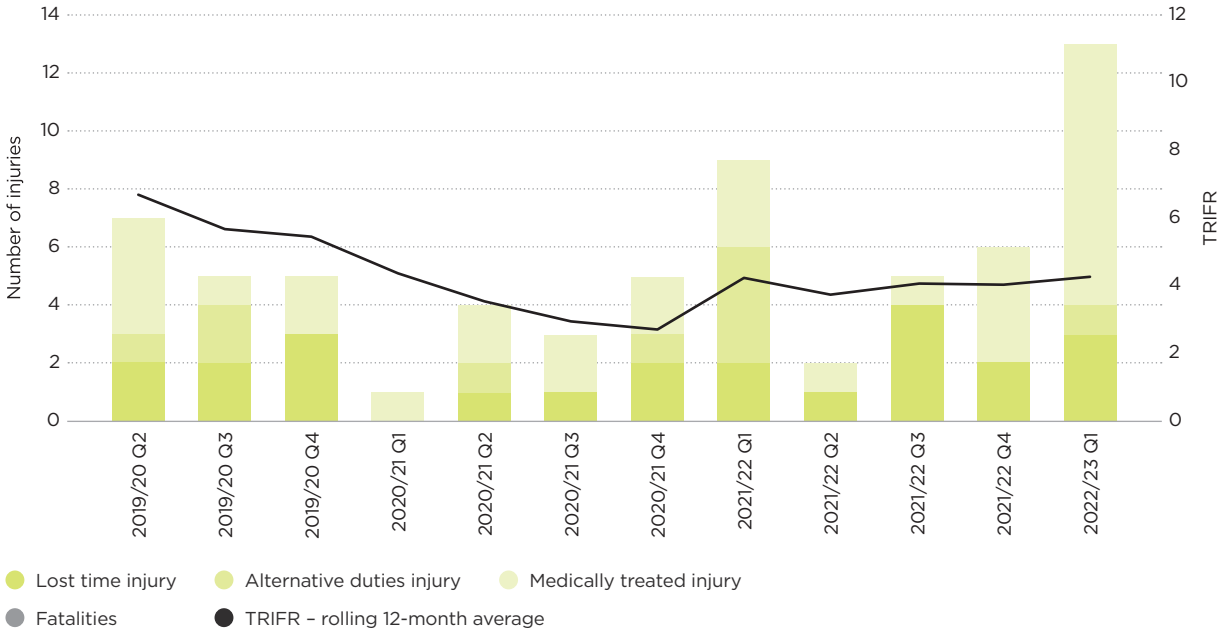

FIGURE 4: TRIFR – mines and tunnels

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 January 2020 to June 2022. 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 January 2020 to June 2022 was over $22,600 per injury.

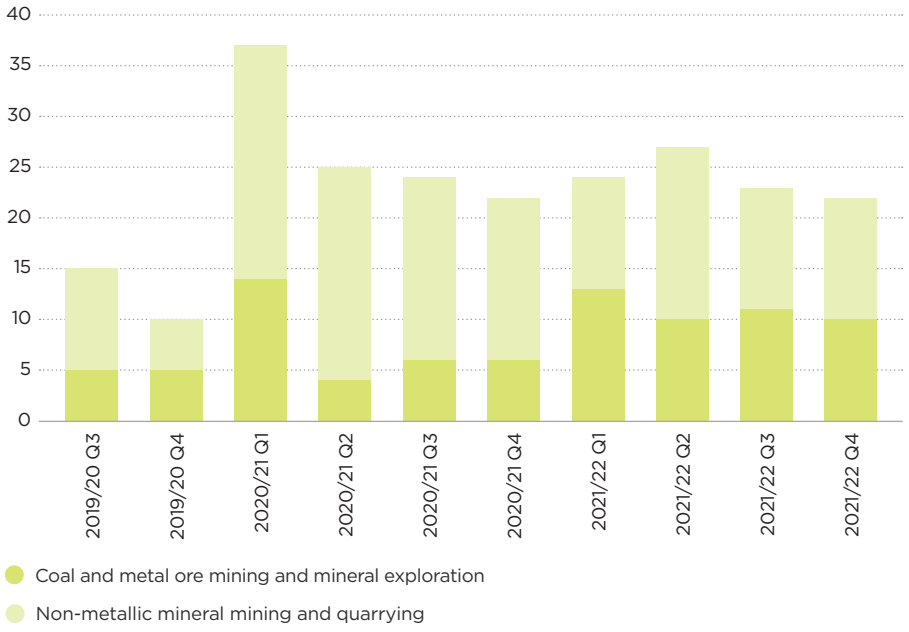

FIGURE 5:
Number of injuries resulting in more than a week away from work

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 an four month lag applied to the data to allow time for the claim information to stabilise, so data for the past quarter 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 50% of notifiable events in the mining and tunnelling sectors in the past 12 months have occurred in relation to vehicles and plant (26%), and fire, ignition, explosion or smoke (24%). These two categories are broken down in more detail in the following section. Forty-nine 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 (32%) and an implosion, explosion or fire (17%).

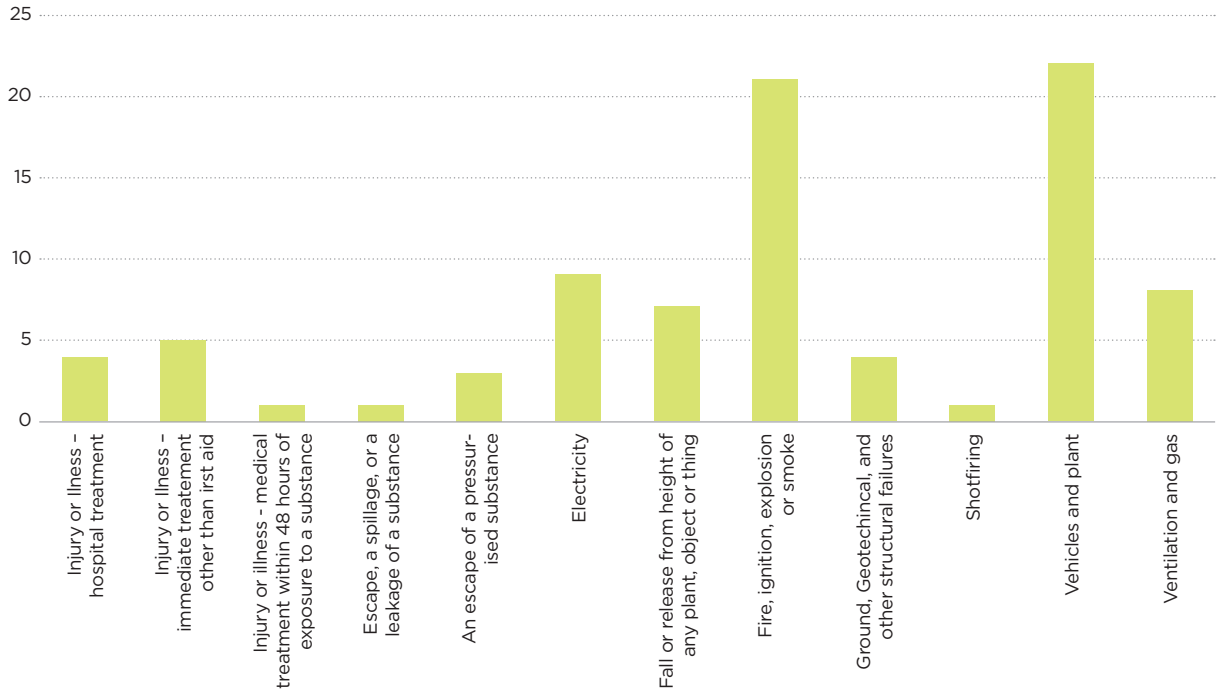

FIGURE 7: Mines and tunnels notifiable event categories for the previous 12 months

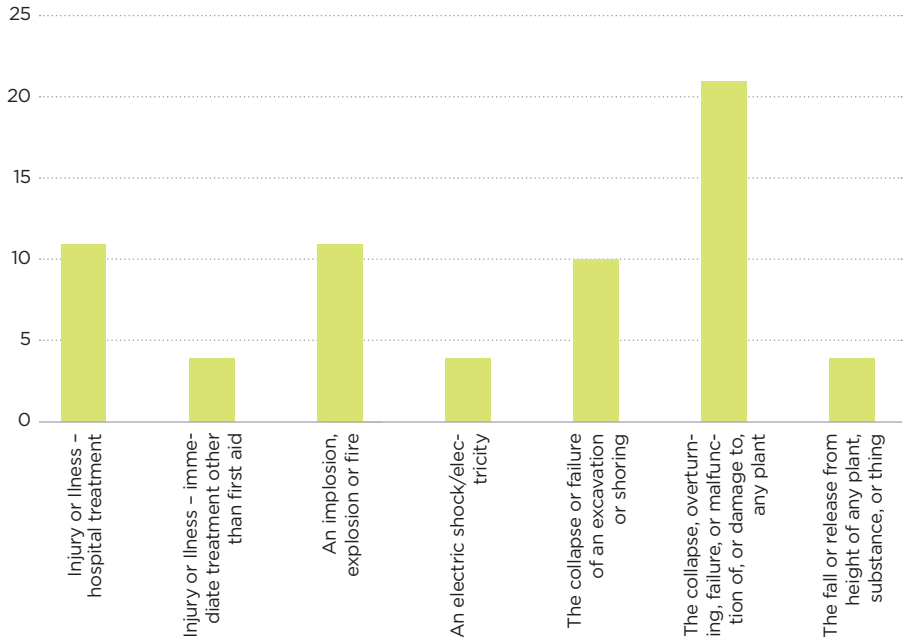

FIGURE 8:
Quarries and alluvial mines notifiable event categories for the previous 12 months

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, 57% involve fires on plant, mobile plant or in buildings associated with mining or tunnelling activities, 5% involves spontaneous combustion, and 38% 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 (27%), overturning of mobile plant (50%), and unintended movement or brake failure (23%).

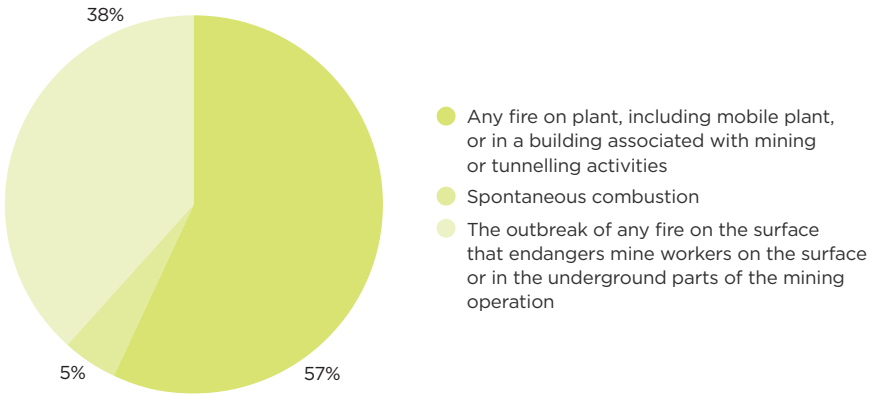

FIGURE 9:
Fire, ignition, explosion or smoke-related notifiable event sub-categories

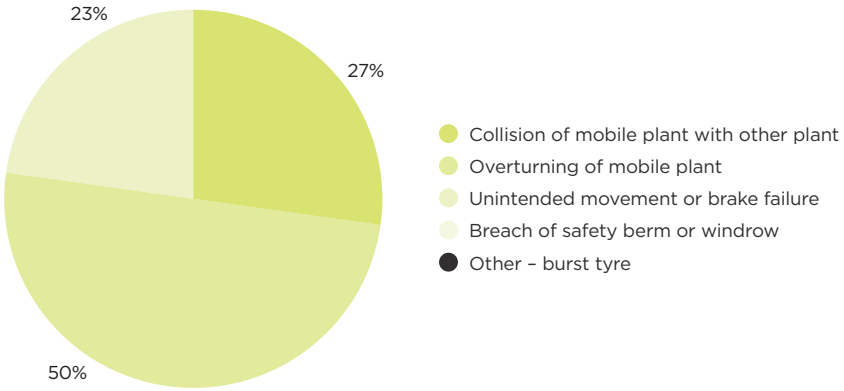

FIGURE 10: Vehicles and plant-related notifiable event sub-categories

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 37% of operations in the past 12 months, and quarterly reports were submitted by 100% 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 4.8% 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

Under the revised Mining and Quarrying Regulations there are now more reporting and notification requirements for quarry and alluvial mine operators.

The requirement to notify the appointment of the manager for the operation remains unchanged. There are now requirements to notify on the status of the operation (Commencement, suspension or abandonment), quarterly reporting requirements, and a requirement to report the notifiable events under Schedule 5 of the Mining and Quarrying Regulations.

Why do we want this information?

I think it is obvious that notification about the status of an operation and who is the manager is essential to any regulator understanding where work is being undertaken. We need this up-to-date knowledge to plan our own work, and we also need to know who the manager of the site is to assure us that competent persons are managing the work

The other information that is essential to us is the reporting of incidents. WorkSafe wants to be an intelligence led regulator. We want to understand where actual or potential harm incidents are occurring so we can focus our resources on those areas. Intelligence is considered as the collection, analysis, interpretation, and dissemination of data and information to be used for making decisions. At this stage WorkSafe collects data and we derive basic intelligence. This enables simple decisions about what safety areas we should focus on.

All Extractives sites must report those notifiable events in listed HSWA under sections 23, 24, 25 as well as those listed in Schedule 5 of the Mining and Quarrying Regulations. There are 39 specific events or occurrences that must

be notified in Schedule 5. In reality, we only expect to receive notifications for a small percentage of the Schedule 5 categories for quarries and alluvial mines (Many of the events are underground or coal specific)

We now have a set of data that is reliable and even if we have underreporting, we are still confident in the frequency spread of types of incidents. The three years of data we have published shows through statistical consistency that we have high rates of incidents involving mobile plant, for example.

Unfortunately, this data only tells us what occurred and does not necessarily tell us much about why the incidents are occurring. To go deeper and to assist us to determine what causal factors contribute the most regularly to incidents, we will be required to seek further information. The fact that reporting identifies knowledge gaps and, in some ways, generates a requirement for more reporting is positive.

The WorkSafe extractives team have decided it will develop some secondary reporting sheets that we require to be completed following some types of high frequency incidents. They will be simple questions that we would think any investigation would consider. For example, for vehicle roll overs we will develop a series of questions to gather information on road and environmental conditions, vehicle maintenance, operator training levels, fatigue issues, specific processes being undertaken at time of incident etc.

As WorkSafe, should be made aware of all HPIs in New Zealand when they occur, and we should be able to develop a large database that is representative of the New Zealand Extractive industry. The purpose is to develop good intelligence to a level of detail that will identify the most common contributing causal factors to our most frequent HPIs, and for us to then be able to direct the industry about where they should allocate focus and resource.

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 – 2022/23 Q1

Table 5 provides a summary of high potential incidents notified to WorkSafe in Q1 2022/23. The summaries are an abridged version from the operator's notification report.

INCIDENT DATE	SUMMARY	CONSIDERATIONS
Jul 22	Underground workers smelt smoke and investigated to find a lithium battery still attached to a sabre saw (not charging) on fire within an enclosed large steel toolbox. It was extinguished using two fire extinguishers. Read the WorkSafe safety alert for this incident.	– Fire or explosion – Risk assessment – Equipment selection – Emergency management – Training
Jul 22	Changing/lifting out a screen, excavator has slewed and boom contacted a worker's legs. Ambulance attended scene and the worker has been taken to hospital. Injured person has had one surgery and will require a second. One leg is broken and the second leg has crush injuries.	– Lifting – Exclusion zones – Job planning – Risk assessment – Supervision – Training

INCIDENT DATE	SUMMARY	CONSIDERATIONS
Jul 22	Vehicle has slipped into a drain. Pulled out at this stage. No one was hurt. No injuries. Trailer half on its site. Isolated vehicle getting it checked independently so it is safe to operate. Site mechanic checked it over and confirmed nothing wrong but still getting someone check it over again. PCBU have photos. Training new employee, driving dump truck, ground soft and gave way. Site manager conducting the training.	– Roads and vehicle operating areas – Job planning – Risk assessment – Supervision – Training
Jul 22	I was informed by a staff member about flooding around the de-watering screen. I went to inspect the flooding and noticed the water pump had tripped out. I then went to the power shed, isolated the power to the plant, reset the trip to the water pump then turned power to the plant back on. Due to on going water issues inside the power shed and having to stand in water I ended up getting a electric shock. I was thrown into the wall of the power shed and received a burn to my right foot.	– Electricity – Site design – Drainage – Job planning – Risk assessment
Jul 22	Two workers were working on top of TFI steel formwork to complete construction by adding a steel section with a telehandler crane. When positioning the segment it did not fit properly so the segment was lifted out and placed on a beam at the top of the formwork (about 3.5m high). The load was derigged, crane moved and in the process of being rigged again when the chains, shorteners caught the segment causing it to overbalance and fall from height. When the segment fell it caught the IP pulling him off the formwork, both landing on the concrete floor. Emergency activated, IP was transported to hospital.	– Fall from height – Job planning – Risk assessment – Supervision – Training
Jul 22	An excavator was pulling a large rubber tyred concrete pump using chain and shackles around a corner and into the large shed. It was being pulled up a slightly rising concrete pavement when the chain/shackle became detached and the pump rolled back down the pavement 5m plus and onto the public road coming to stop perpendicular across the road into the gutter. The pump was immediately pulled off the road and taken underground.	– Job planning – Risk assessment – Supervision – Training
Jul 22	A customer parked his vehicle in the sheeting bay to visit the bathroom. When he returned, the vehicle rolled across the incoming road into bushes on the opposite side. The handbrake was engaged at the time. No other vehicles were involved.	– Roads and vehicle operating areas – Mechanical
Jul 22	Worker was driving the dump truck, the area was on a hill with a pit face of 8–10m. As he drove up the area, the ground underneath collapsed and the cab rolled over and flipped. Read the WorkSafe safety alert for this incident.	– Ground or strata instability – Tips, ponds and voids – Roads and vehicle operating areas – Risk assessment – Drainage – Site inspections
Aug 22	The crane operator was busy setting the crane to lift one of the process pumps in pond number 4. He climbed up at the back of the crane to get lifting gear out of the bin. He climbed off the crane, slipped and fell down to the ground.	– Fall from height – Job planning – Risk assessment – Supervision – Training
Aug 22	A digger operator using a digger, cleaning the floor area around the fixed plant. He contacted the power transformer with the counterbalance when he turned.	– Electrical – Exclusion zones – Job planning – Risk assessment – Supervision – Training

INCIDENT DATE	SUMMARY	CONSIDERATIONS
Aug 22	A boom lift type elevated work platform (EWP) that contained two workers was being used to allow these workers to fix reinforcing steel at height. During this activity a dump truck was being used to transport muck through this area. This process was being managed by the use of a spotter however during a short period of absence of the spotter the truck operator has attempted to pass under the EWP boom. At this time the top of the truck tub has made light contact with the boom of the EWP. There were no injuries or chance of ejection and no damage to repair.	– Fall from height – Exclusion zones – Hard barriers – Job planning – Risk assessment – Supervision – Training
Aug 22	Ground failure blocked entrance to site. No injuries.	– Ground or strata instability – Design – Risk assessment – Site inspections – Drainage
Aug 22	Occurred in workshop, rear of truck jacked up and on stands to carry out suspension checks. Nitrogen level was low in the P4 rear suspension cylinder, the fitter loosened the incorrect bolts for the valve cover causing a loss of Nitrogen and oil from the suspension cylinder.	– Mechanical – Job planning – Risk assessment – Supervision – Training
Aug 22	Submersible pump starting and stopping causing movement and cable has rubbed through on chain used to hang pump.	– Electrical – Site inspections – Risk assessment – Supervision – Training
Aug 22	A mobile plant overturned.	– Roads and vehicle operating areas – Job planning – Risk assessment – Supervision – Training
Aug 22	A worker was attempting to clear a blockage with a metal bar and his arm was drawn into the tail drum (slotted). He was taken away in ambulance. He has sustained a large deep laceration to his left arm. Later found out arm was fractured requiring a cast. Scene not preserved.	– Guarding – Job planning – Risk assessment – Supervision – Training
Aug 22	Ute rollover. Driving on a quarry haul road prior to completing an inspection of the drill area. The vehicle has rolled back and gone up the open edge protection and then rolled over. There is no injury to the worker.	– Roads and vehicle operating areas – Supervision – Training
Aug 22	A water recycling retention pond used for water suppression and aggregate cleaning, has collapsed. The surrounding land has slid down the sloped bank to rest in a gully with no further movement possible. The pond has drained and the water has left through waterchannels, and filtration ponds. An inspection the day before indicated no structural failures, damages or instability. Structural repair is underway to restore water retention and resume operations. The region has experienced consistent rain for a period of two weeks. The previous week there was 200mm of rain recorded. There was light to moderate rain during the previous day and overnight. No injuries or any potential for injury. Incident occurred outside operational hours in an area where workers are not present during operational hours.	– Tips, ponds and voids – Site inspections – Drainage
Aug 22	Worker was moving the deadman switch for a drop saw and received a mild electric shock (described as a tingle). The saw was not in use at the time.	– Electrical – Job planning – Risk assessment – Supervision – Training

INCIDENT DATE	SUMMARY	CONSIDERATIONS
Aug 22	A section of formwork was being lifted and lowered onto the supporting frame for the final lining formwork assembly work that was occurring on top of the already constructed concrete tunnel box. A scaffold framework and scrim was set above the edge of the formed tunnel and the formwork construction. A fitter was using a 600mm podgy bar with one hand to adjust and align the bolt holes of the two components, with the lowering movement of the formwork and the holes not aligned, the podgy bar was levered up, resulting in the fitter losing his grip of the bar. The bar has flicked out away from the formwork over the scrim and fallen below (approximately 11m) and away from the edge (approximately 3–5m) into the tunnel box work area hitting steel starter bars and then a scissor lift, immediately adjacent to a couple of workers.	– Fall from height – Exclusion zones – Job planning – Risk assessment – Supervision – Training
Aug 22	A mobile plant overturned. An articulated dump truck was carting ripped quarry rock to a temporary stockpile on a bench close to the entrance of the quarry. The operator backed in too close to a previously tipped load. The left back wheels of the dump truck went onto the previously tipped material. The tray of the dump truck tilted and tipped over on its right hand side.	– Tips, ponds and voids – Roads and vehicle operating areas – Job planning – Risk assessment – Site inspection – Supervision – Training
Sep 22	ADT watercart lost traction on a ramp, operator stalled engine and reported that the service brakes did not hold the truck. Park brake applied which arrested the truck. Brake checking including functionality testing underway.	– Roads and vehicle operating areas – Mechanical – Risk assessment – Prestart inspections – Supervision – Training
Sep 22	The excavator was tracking along the sand road and the roadway has collapsed causing the excavator to slump onto its side. No injury was caused.	– Ground or strata instability – Design – Risk assessment – Site inspections – Supervision – Training
Sep 22	Failure of ground support caused fall of ground from the backs.	– Ground or strata instability – Risk assessment – Ground monitoring – Site inspections – Supervision – Training
Sep 22	There were two excavators working in closed proximity to each other and the driver of one excavator has gotten down from the cab and looks to have tried to walk behind the other excavator which has slewed from right to left and the back of the counterweight has struck him. He was taken to hospital by ambulance has pain in the back and one leg. IP has suffered a hip fracture and is admitted to hospital.	– Exclusion zones – Job planning – Risk assessment – Change management – Supervision – Training
Sep 22	Contractor was unloading Calcium Hydrated Lime out of the tanker and believed the tank was empty and disconnected the dispatch hose and spilled the lime resulting lime making contact with the operator and no injuries to operator.	– Hazardous substances – Job planning – Isolation – Risk assessment – Supervision – Training

TABLE 5: High potential incidents – 2022/23 Q1

Table 6 and figure 11 shows the number of high potential incidents per quarter during the last two years for all extractives operations.

QUARTER	Q2 OCT-DEC 2020	Q3 JAN-MAR 2021	Q4 APR-JUN 2021	Q1 JUL-SEP 2021	Q2 OCT-DEC 2021	Q3 JAN-MAR 2022	Q4 APR-JUN 2022	Q1 JUL-SEP 2022	TOTAL PREVIOUS 12 MONTHS
Number of high potential incidents per quarter	24	23	16	21	23	28	20	27	**98**

TABLE 6: High potential incidents per quarter

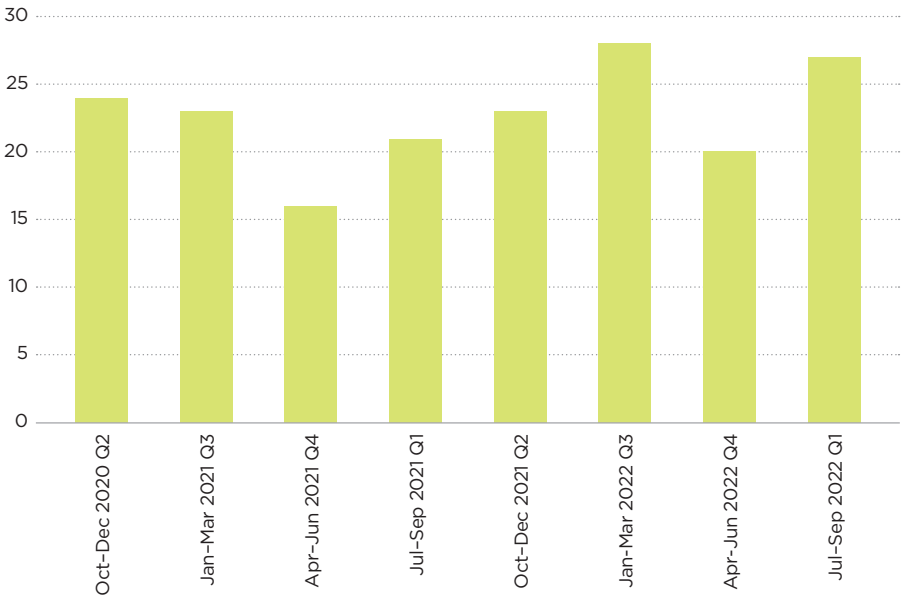

FIGURE 11: Number of high potential incidents per quarter

2.7 High potential incidents – investigation outcomes

High potential incident case study

Aug 22	A worker was attempting to clear a blockage with a metal bar and his arm was drawn into the tail drum (slotted). He was taken away in ambulance. He has sustained a large deep laceration to his left arm. Later found out arm was fractured requiring a cast. Scene not preserved.

TABLE 7: High potential incident – investigation outcomes case study

THE INCIDENT

A worker was attempting to remove a rock that was jammed along the conveyor belt system within the sand wash plant. The worker was using a metal bar in an attempt to dislodge the rock when the bar got caught in one of the slots on the slotted drum. His left hand was drawn in, he then used his right hand to free himself. He sustained a serious laceration and broken thumb. The worker then climbed down the wash plant and raised the alarm. He was taken to the medical centre in an ambulance.

The Health and Safety Manager advised he checked the WorkSafe website but did not think that it constituted a notifiable event as was not serious enough.

FIGURE 12:
Photograph of tail drum involved in the incident

THE INVESTIGATION IDENTIFIED

The cause of the incident was attributed to:

- oversize stone present in the feedstock
- insufficient guarding in place to prevent worker from trapping their hand in a pinch point
- lack of feed supply which encourages workers to dig deeper into yard, this introduces contamination including over size rock
- top of conveyor where it flattens off at roller allows some oversize product to roll off the side of the belt.

REGULATOR COMMENTS AND RECOMMENDATIONS

Previous enforcement history

An inspection of the operation was undertaken by Extractives inspectors during October 2015. At the time of the inspection, the majority of taildrums were slat type drums with no guarding in place. There were numerous chain belts with ineffective or no guarding in place. There were also no return roller nip guards on all conveyors. Based on these observations, inspectors determined that there was ineffective or inadequate guarding installed on the plant, with exposed nip, trap or crush points.

A prohibition notice was issued requiring that the operation of the wash plant be stopped until steps had been taken to address the ineffective or inadequate guarding installed on the plant.

The prohibition notice was lifted in November 2015 when evidence was provided to WorkSafe that effective and adequate guarding had been installed on the plant.

It appears that between 2015 and 2022 this guarding was removed or modified.

Duty to maintain effective control measures

It is a duty under the Health and Safety at Work (General Risk and Workplace Management) Regulations 2016 to maintain effective control measures. Regulation 7 – Duty to maintain effective control measures – states that: a PCBU who implements a control measure to eliminate or minimise risks to health and safety must ensure that the control measure is effective, and is maintained so that it remains effective, including by ensuring that the control measure is and continues to be:

a. fit for purpose, and

b. suitable for the nature and duration of the work, and

c. installed, set up, and used correctly.

Guarding

Where elimination of the hazard is not practicable, guarding is often an effective isolation control. For conveyor systems, most of the serious accidents and fatalities are a result from the machinery, and associated in-running nip-points, not being adequately guarded. Often the machine is running too fast or is too powerful to allow the person to stop the machine or pull the body part out. This can result in severe friction burns, amputation or significant (including fatal) crushing injuries.

A fixed enclosure guard is a fixture which, when in position, prevents access to a hazard or area by enclosure. Fixed enclosure guards are commonly used to guard head and tail drums as well as belt and chain drives.

Nip point guards are commonly used for guarding return rollers for conveyors. As per *AS/NZS 4024* nip guards shall extend for a minimum of 150mm from the nip point and across the width of the belt for the full length of the idler or pulley and shall be closely fitted, with a gap not exceeding 4mm. It should be noted that nip point guards do not provide adequate protection from injury due to entrapment of hair, skin or clothes.

As per *AS/NZS 4024.3610–2015*, nip point guards shall not be used when the 5mm clearance cannot be maintained (examples where this might occur include belt flex, clip joints, chevron belts, cleats, mechanical fasteners and similar).

As per *AS/NZS 4024.3610:2015*, guards must be locked and only removable through the use of a tool that is only available to selected competent personnel.

Guards should be designed so it is not necessary to remove them for regular lubrication, servicing, inspection, or adjustments such as, adjusting monitoring devices and re-setting belt tracking switched. There should be provision for the placement of remote lubrication points that should remain readily visible and enable visual verification that lubrication is effective.

Further information

Health and Safety at opencast mines, alluvial mines and quarries good practice guidelines, section 12 Machinery and equipment

AS/NZS 4024 Series Safety of Machinery

The Ergonomics of machine guarding guide is also a good reference document for indicating what sizes guards should be to help prevent workers reaching into hazardous areas.

3.0 Regulatory insights

IN THIS SECTION:

3.1 Building a tunnel in New Zealand

Things to know before you start

Many overseas jurisdictions regulate the tunnelling industry under general construction focused regulations or codes of practice. In New Zealand, there is a specific regulation that deals with the construction of tunnels. It pays to understand this legislation long before work starts on site.

So, what defines a tunnel under construction? When does it start and when does tunnelling finish? What works are associated with tunnelling? What exactly is a tunnel in the eyes of the law?

The regulation dedicated to the safety of workers constructing tunnels is the Health and Safety at Work (Mining Operations and Quarrying Operations) Regulations 2016. These regulations also clarify what is excluded from the definition of a tunnelling operation.

Many projects have started without applying the regulations only to find that the contractor misunderstood the law. Changing tack partway through a project is expensive.

WHAT IS A TUNNELLING OPERATION?

Firstly, a fundamental question needs to be answered before a detailed examination of the definition of what is, and what is not a tunnelling operation is made. The regulations only apply if the **purpose** of the excavation is to create or enlarge a tunnel or shaft. Some cut and cover tunnel projects have mistakenly thought they were excluded because they were not tunnelling with overhead cover, yet they were still building a tunnel.

So, if you are setting out to create or enlarge a tunnel or shaft, you should pick up a copy of the regulations and check. WorkSafe regularly get asked if a pipe or culvert is a tunnel or if a deep excavation is a shaft. Knowing what is excluded from the regulatory definition answers these questions.

Your project is not a tunnelling operation covered by the regulations if you do not intend that any person will work in the tunnel or shaft or if it is less than 15m in length/depth, but only if no explosives are used underground in the tunnel or shaft; and the concentration of methane is unlikely to be more than 0.25% of the general body of air in any working area of the tunnel or shaft.

The definition of a tunnelling operation is broader than many contractors think. If a cut and cover tunnel project that cannot be undertaken without workers entering the excavation, for example, surveyor taking a depth reading or drill rigs within the excavation, the regulations apply. Contractors should not focus solely on the excavation process when applying the regulations. Other surface-based activity associated with the tunnel construction could apply, for example, segment or pipe storage areas, maintenance areas or spoil handling.

WorkSafe get asked about situations where constructors are laying pipe. Is there a difference between a pipe or tunnel? WorkSafe take the view that if workers need to enter the pipe (over 15m) to excavate a face, then it is a tunnel. If the pipe laying does not require workers to enter the pipe during excavation, it's excluded from the regulations. Health and safety systems must be in place prior to the physical development of the tunnel and WorkSafe should be notified two months before commencement.

TUNNEL REPAIRS

Some tunnel repair projects have started out as general repair work then ended up being work under the regulations after tunnel linings were removed and roof collapses identified. If you are not sure about how much repair work triggers the regulations, contact WorkSafe for their view.

MULTIPHASE PROJECTS

Some tunnelling projects span several years and involve shafts, underground drives, and cut and cover aspects of the build. Fit out works can start at one area of the project before other parts have completed excavations. Constructors need to think about sequencing what work falls under the regulations and when parts of the tunnel or shaft will no longer be covered by the regulations. This can become very complex in the case of twin tunnels entering previously abandoned areas. The best advice for asset owners is to contact WorkSafe during the design phase and prior to awarding contracts to better understand how the regulations will impact on constructors, particularly those bidding from overseas and not familiar with the regulations.

Dave Bellett

Deputy Chief Inspector Extractives

4.0
The regulator

IN THIS SECTION:

4.1 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.

4.2 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 8 shows the range of assessments undertaken in Q1 2022/23 by sector.

		ASSESSMENTS	MINE	TUNNEL	ALLUVIAL MINE	QUARRY
Preventative	Site-based	Targeted assessments				
		Regulatory compliance assessments		2	1	
		Site inspections	7	6	3	38
		Targeted inspections	3	1		
	Desk-based	PHMP/PCP review		25		
		Mine plan review	6	7		
		High risk activity	2			
		COVID-19 assessment				
Reactive	Site-based	Concerns – inspection			2	2
		Notifiable events – inspection	5	3	1	9
	Desk-based	Concerns – desk-based	1			1
		Notifiable event – desk-based	7	1		2

TABLE 8: Proactive and reactive site and desk based assessments conducted in Q1 2022/23

Figure 13 shows the number of proactive and reactive site- and desk-based assessments undertaken by the regulator in Q1 2022/23. This quarter 59% of our activities were site-based, and 75% of activities were proactive.

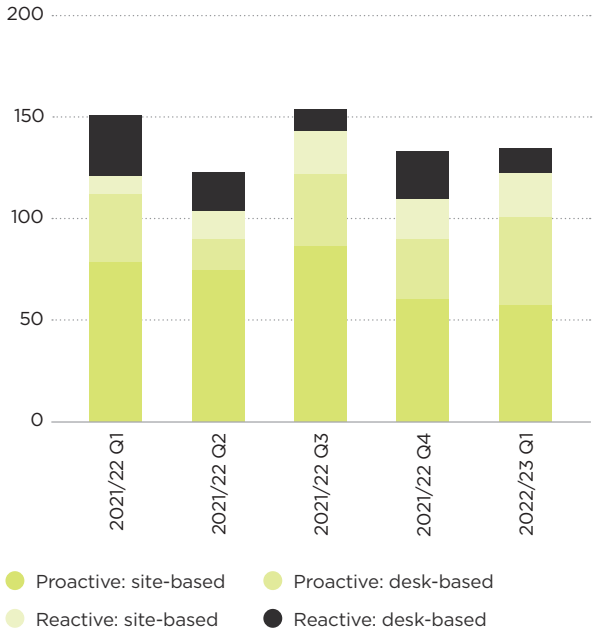

FIGURE 13:
Proactive and reactive site and desk-based assessments

Figure 14 shows the number of assessments undertaken by the regulator in Q1 2022/23 by sector. This quarter, 39% of our assessments were for quarries, 23% for mines, 33% for tunnels and 5% for alluvial mines.

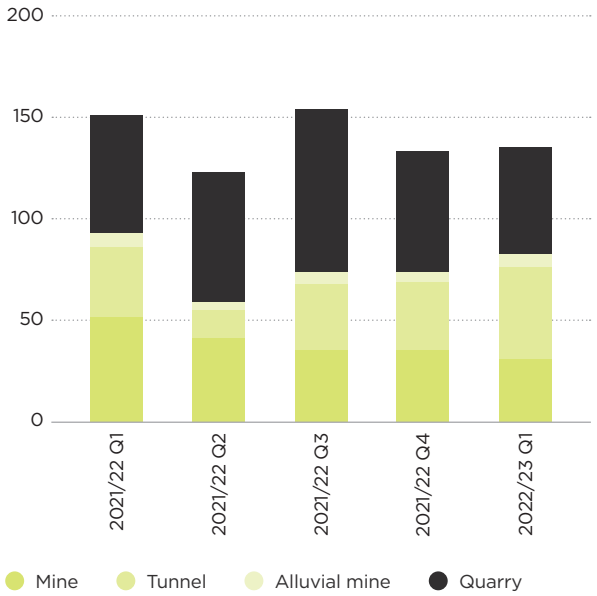

FIGURE 14:
Assessements by sector

4.3 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 Q1 2022/23 by notice type and by sector. This quarter, a total of 168 enforcement actions were issued. Of those, 4% of were prohibition notices, 15% were improvement notices, 80% were directives and 1% were sustained compliance letters. The majority of the enforcement actions were issued to the mining (16%) and quarrying (67%) sectors.

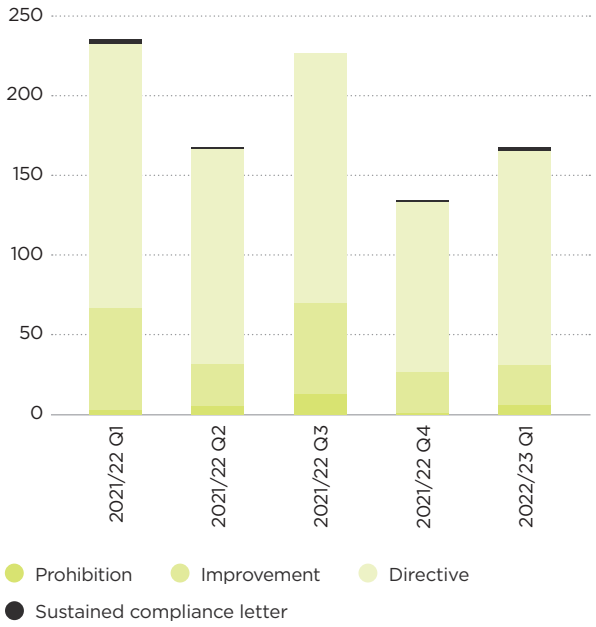

FIGURE 15: Enforcement actions issued by type

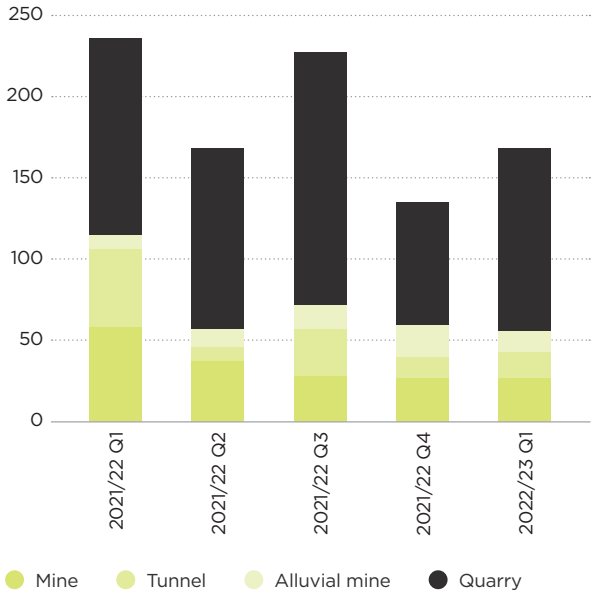

FIGURE 16: Enforcement actions issued by sector

Figure 17 shows the number of enforcement actions issued in Q1 2022/23 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 (21%), guarding (15%) and Health and Safety Management System (10%).

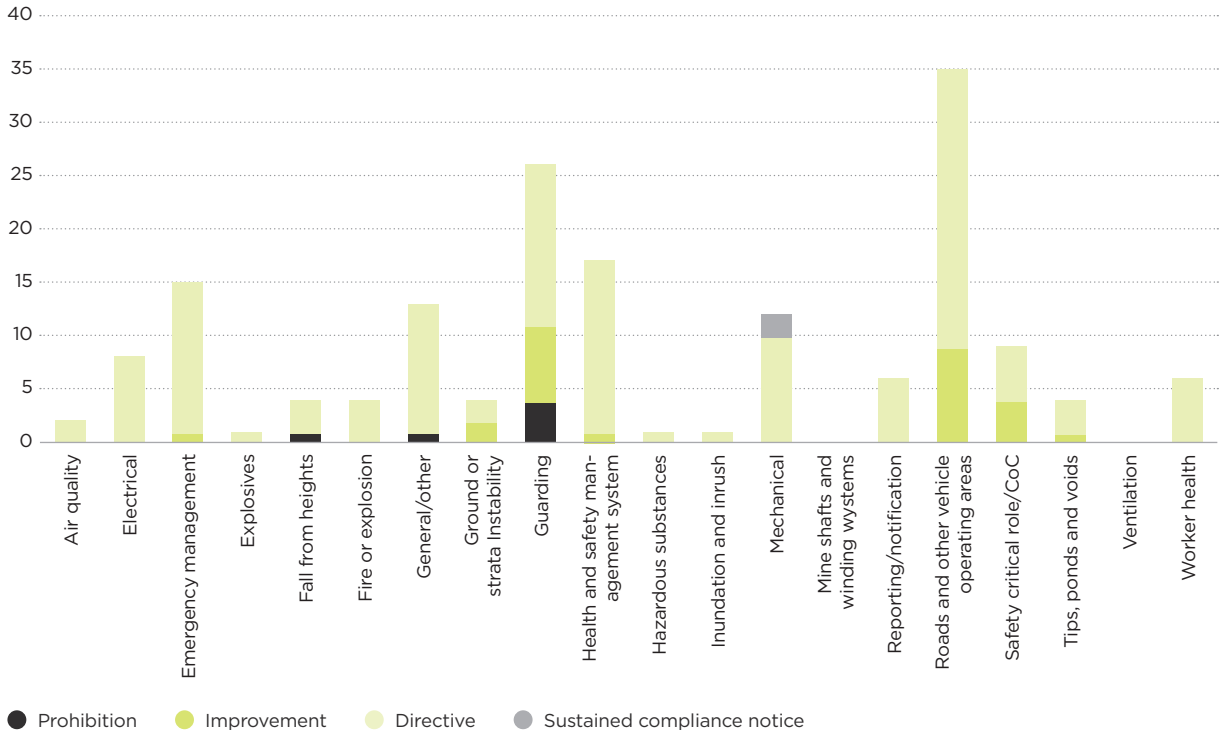

FIGURE 17: Enforcement actions issued by category 2022/23 Q1

Regulator activity comment

The numbers of inspections (assessments) has remained stable and the requirement to use enforcement in the quarter is slightly increased. The breakdown of assessments and enforcement per sector is consistent. Inspectors have allocated a significant amount of time to engagement activities since the 18 July revised Regulation implementation. Eleven introductory sessions were completed across all of New Zealand and the inspectors have started to roll out the more detailed 4-hour workshops targeting small operators, to assist with development of their compliant HSMS. This focus on education and engagement will continue for the next 12 months in the Quarry and alluvial mine sectors. Mines and tunnels will continue with the normal risk based inspection plan.

Disclaimer

WorkSafe New Zealand has made every effort to ensure the information contained in this publication is reliable, but makes no guarantee of its completeness.

It should not be used as a substitute for legislation or legal advice. WorkSafe is not responsible for the results of any action taken on the basis of information in this document, or for any errors or omissions.

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