Resources Regulator
Department of Regional NSW

January – March 2022

Fires on mobile plant

Published by the Department of Regional NSW

Title: Fires on mobile plant, January – March 2022

First published: October 2022

Department reference number: RDOC22/191448

Authorised by

Chief Inspector

Amendment schedule		
Date	**Version**	**Amendment**
October 2022	1.0	First published

Contents

Overview

In FY 2022 Q3, there were:

NOTIFIED INCIDENTS

42

- **33** Surface coal (79%)
- **5** Underground metals (12%)
- **3** Surface metals (7%)
- **1** Construction materials (2%)

A decrease of 17 from 59 in FY2022 Q2

NOTICES ISSUED

2

ANCILLARY REPORTS COMPLETED

42 (Average completion was 93%)

Incident notifications classified against material unwanted events (MUE)

MUE		Most common threat with failed critical control		Most common failed critical control
Fire or explosion surface **37**	**19 of 37**	Accumulated flammable leaks and spills	**19 of 37**	Flammable fluid containment
Fire or explosion underground **5**	**4 of 5**	Mechanical energy in the presence of fuel	**4 of 5**	Flammable fluid containment

Ancillary reports summary

Heat source	Fuel source	Failed component	Extinguished by
52%	**33%**	**36%**	**43%**
EXHAUST SYSTEM	**HYDRAULIC OIL**	**HOSE**	**HANDHELD FIRE EXTINGUISHER**

Executive Summary

This report has been prepared by the NSW Resources Regulator for the NSW mining industry, original equipment manufacturers and suppliers. It contains quarterly data of notified incidents involving fires on mobile plant (FOMP) for the period 1 January 2022 to 31 March 2022.

The Regulator's position is that all fires on mobile plant are avoidable and preventable and we have adopted a zero-tolerance approach where mine operators have not taken appropriate steps to manage this risk.

Fires on mobile plant are inherently dangerous. They affect the safety of workers and have potentially catastrophic consequences. Despite a focus on the issues in recent years, the number of incidents remains high. The Regulator is committed to working with industry to ensure health and safety obligations are being met to reduce the number of fires on mobile plant and to prevent potentially catastrophic events.

Quarterly data for 1 January 2022 to 31 March 2022 identified the following:

- There was a 29% decrease in fire on mobile plant incidents since last quarter.
- The exhaust system was the heat source for 52% of incidents this quarter. This is an increase from last quarter, when the exhaust system was listed as the heat source in only 27% of incidents.
- The hose remains the most common single failed component since FY 2020 Q2, involved in 36% of fire of mobile plant incidents this quarter.

Significant incidents

March 2022 – IncNot0041856

At an underground Metalliferous mine an operator of a Normet Charmec 1610B shot firing rig was travelling between levels when they were asked to pull off the decline. The operator parked up and exited the cabin when they noticed an orange glow coming from the offside near the exhaust and saw flame. The operator put out the fire with the onboard fire extinguisher. The fire was caused by oil on the lagging which was wrapped around a pipe in the engine bay.

Figure 1: Shot firing rig

February 2022 – IncNot0041565

At an open cut coal mine a Mobile Manufacturing Unit (MMU) bulk master 6 had returned from the pit empty from about 30 minutes travel time when the operator got out of the truck and could smell burning. The operator checked the machine and observed a flame coming out from above the catalytic converter behind the rear of the cab. The operator then drove the truck forward clear of the reload point and extinguished the flame with a fire extinguisher. The fire was caused by the acoustic insulation on the inside cover becoming contaminated with residual AN oils which had fallen onto the side of the catalytic converter and igniting.

Figure 2: Fire location on MMU

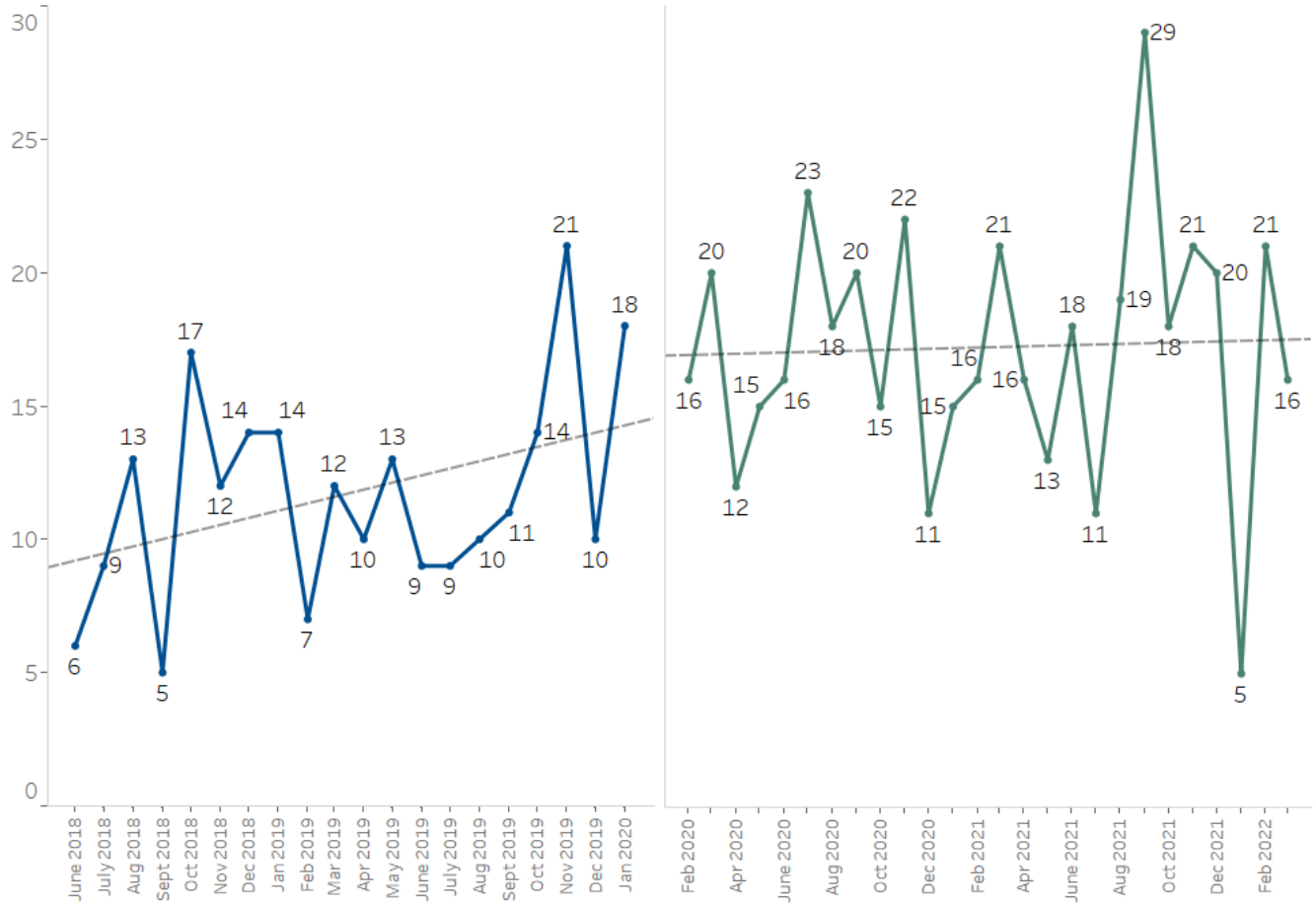
Notified incidents

Notified incidents between June 2018 and March 2022

Figure 3 relates to incidents involving fires on mobile plant notified to the Regulator each month since June 2018, based on the date the incident occurred.

In February 2020, amendments to the Work Health and Safety (Mines and Petroleum Sites) Regulation 2014 saw a change to the duty to notify all incidents involving fires on mobile plant. The two trend graphs below represent the periods before and after this amendment took place, revealing a slight increase in FOMP notified incidents since this time.

Figure 3: Notified incidents between 1 June 2018 and 31 March 2022



Notified incidents by legislative requirement to report

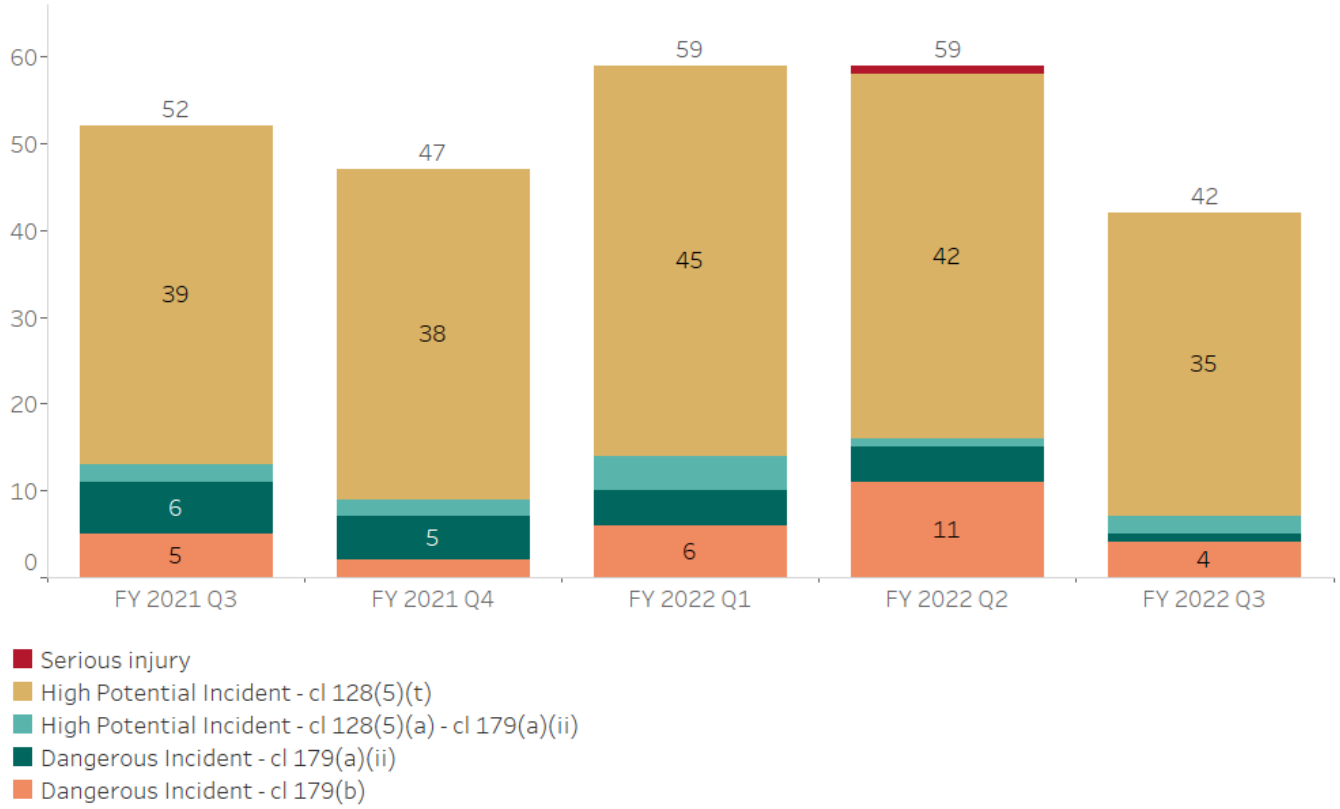
Figure 4 highlights the number of notified incidents recorded by the legislative requirement to report.

The majority of fires on mobile plant notified to the Regulator since 1 January 2021 were recorded as a high potential incident under cl 128(5)(t), where there was 'an uncontrolled fire on mobile plant that is in operations (whether operated directly, remotely or autonomously)'.

Four incidents were recorded this quarter as a dangerous incident under cl 179(b) where there was 'a fire in the underground parts of a mine, including where fire is in the form of an oxidation that releases heat and light'.

No serious injuries were recorded for FOMP incidents in this quarter.

Figure 4: Notified incidents by legislative requirement to report between 1 January 2021 and 31 March 2022



Notified incidents by mine and operation type

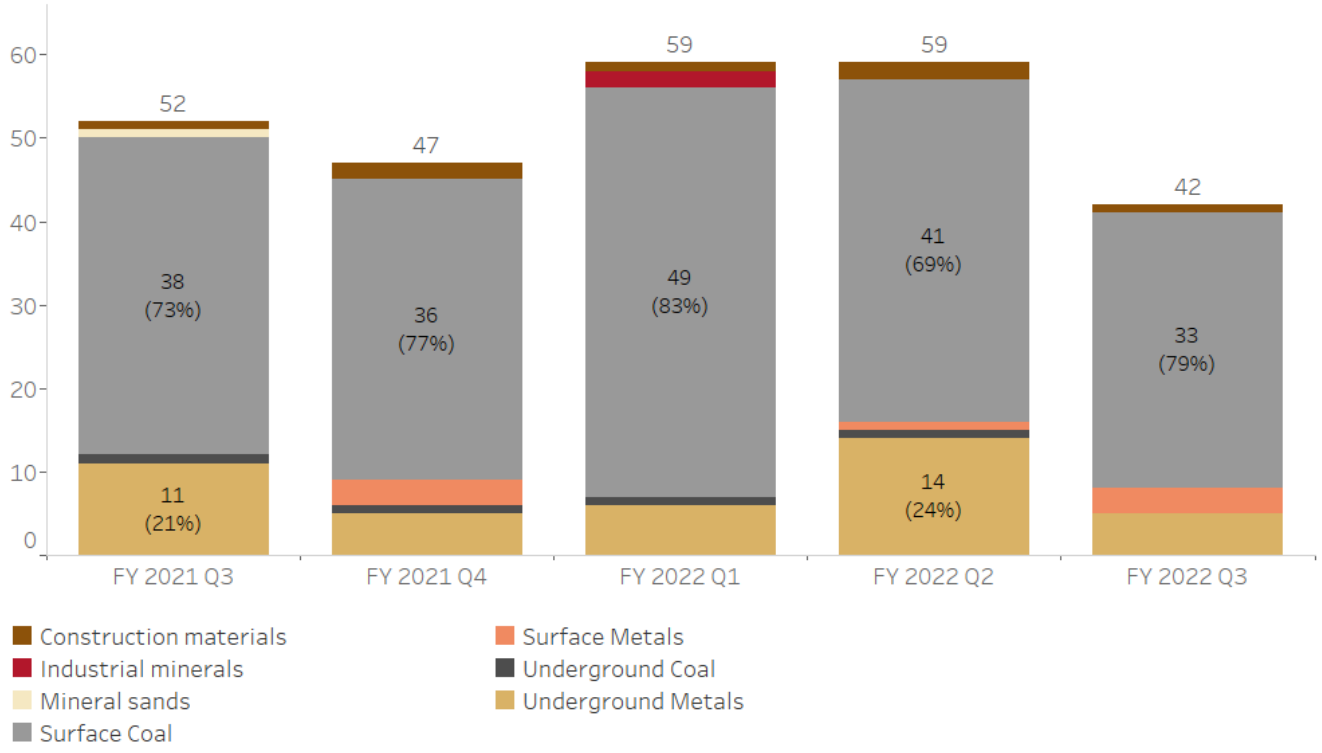
Figure 5 shows the number of notified incidents by mine type and operation type.

There was a 20% decrease in notified incidents occurring at mines categorised as surface coal this quarter, however this mine type still has the highest percentage of notified incidents.

There was an increase in notified incidents occurring at mines categorised as surface metals, with three notifiable incidents this quarter compared to one last quarter.

There were no FOMP incidents at mines categorised as underground coal this quarter.

Figure 5: Notified incidents by mine and operation type between 1 January 2021 and 31 March 2022

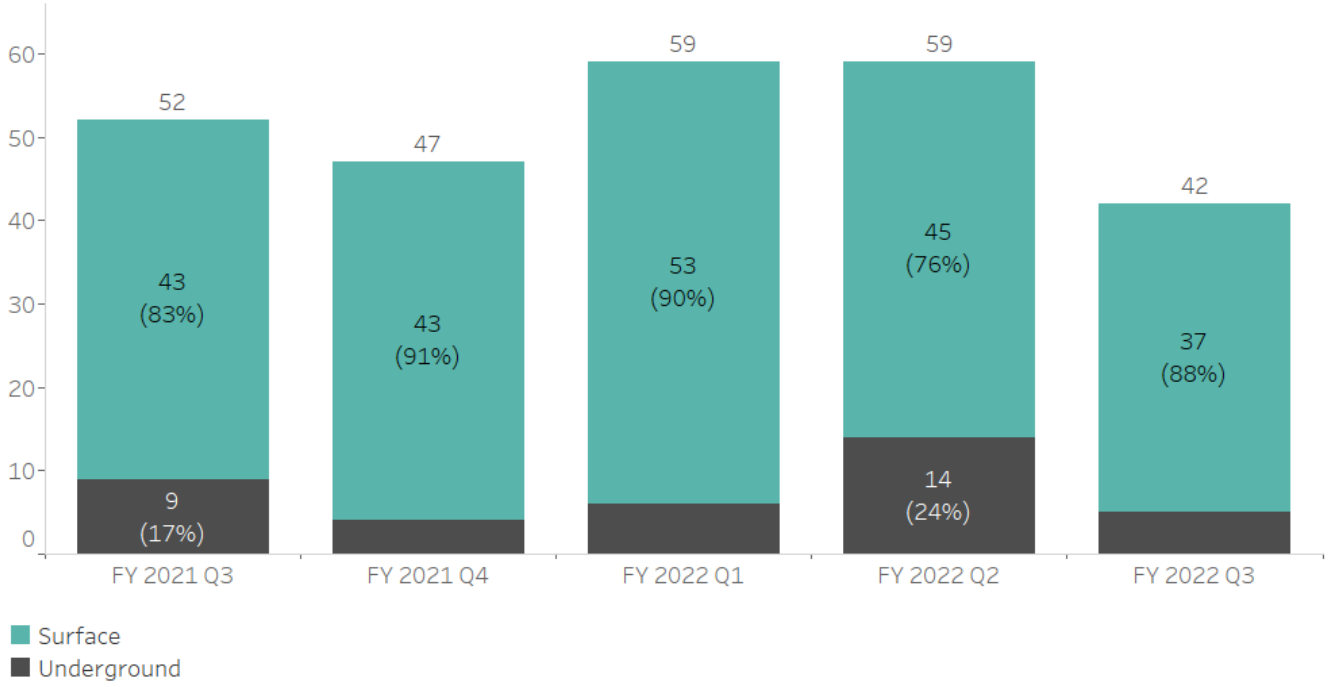


Notified incidents by primary location

Figure 6 shows that the actual location of FOMP incidents, irrespective of the mine operation type, typically occurs on the surface rather than underground.

There have been 5 fire on mobile plant incidents reported as occurring underground for this quarter, a decrease from 14 underground incidents last quarter.

Figure 6: Notified incidents by primary location between 1 January 2021 and 31 March 2022



Notified incidents by mine type, operation type and incident location

Notified incidents occurring on the surface at a surface coal mine account for 79% of all fires on mobile plant this quarter, which is a higher percentage of total incidents than the last quarter (69%).

There has been a 62% reduction this quarter in incidents occurring underground at a mine classified as an underground metals mine.

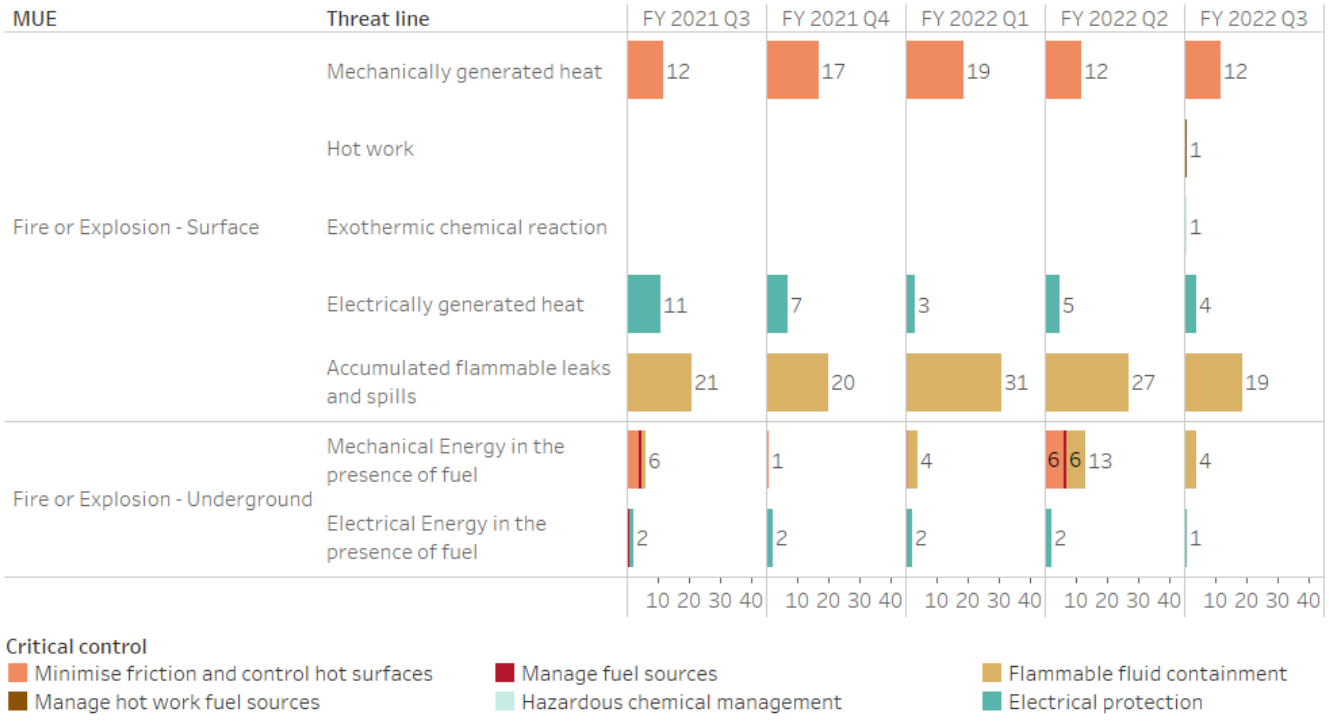
Table 1: Notified incidents by mine type, operation type and incident location between 1 January 2021 and 31 March 2022

MINE TYPE/OPERATION TYPE/ INCIDENT LOCATION	FY2021 Q3	FY2021 Q4	FY2022 Q1	FY2022 Q2	FY2022 Q3	GRAND TOTAL
Coal/surface/surface	38	36	49	41	33	197
Coal/underground/surface	1	1	1	-	-	3
Coal/underground/underground	-	-	-	1	-	1
Metals/surface/surface	-	3	-	1	3	7
Metals/underground/surface	2	1	-	1	-	4
Metals/underground/underground	9	4	6	13	5	37
Mineral sand /surface/surface	1	-	-	-	-	1
Construction materials/surface/surface	1	2	1	2	1	7
Industrial minerals/surface/surface	-	-	2	-	-	2
Grand total	52	47	59	59	42	259

Classified notified incidents by hazard, threat and critical control

Hazard management bowties are a widely used risk management tool that incorporate preventative and mitigating controls onto threat lines that relate to a material unwanted event (MUE). The Regulator uses MUE bowtie frameworks when proactively assessing how mine sites manage their principal hazards. Since October 2019, these MUE bowtie frameworks have also been used to classify notified incidents. Classifications highlight increased areas of risk at the hazard, MUE, threat and critical control level.

Figure 7: Notified incidents classified by MUE, threat and critical control between 1 January 2021 and 31 March 2022

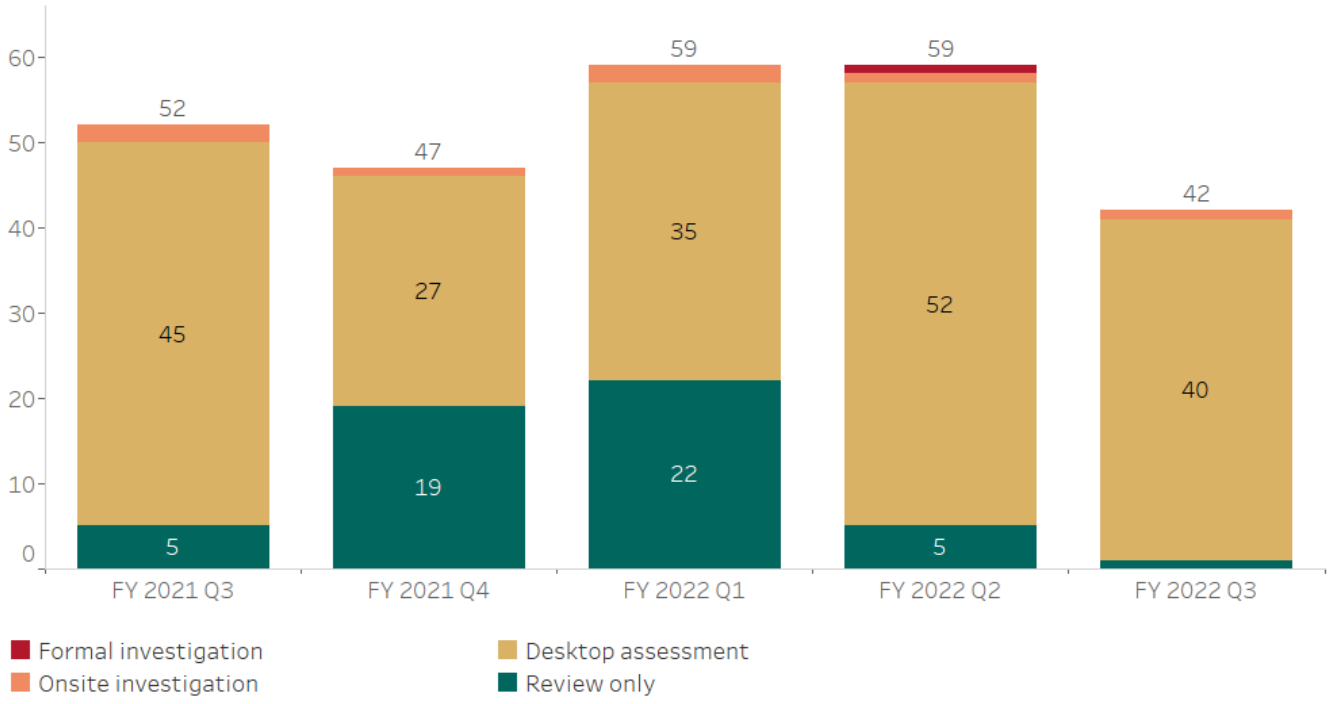


Our response to notified incidents involving FOMP

As part of the Regulator's position paper on preventing fires on mobile plant, all fires that occur on mobile plant are preventable. For each incident reported, it was assessed and the outcomes reviewed. This involved an inspector attending the mine (onsite investigation) or a review of the investigation findings and actions (desktop assessment).

Figure 8 shows that for this quarter, a desktop investigation was our response to 95% of fires on mobile plant incidents, with one onsite investigation being commenced this quarter.

Figure 8: Notified incidents by response level between 1 January 2021 and 31 March 2022

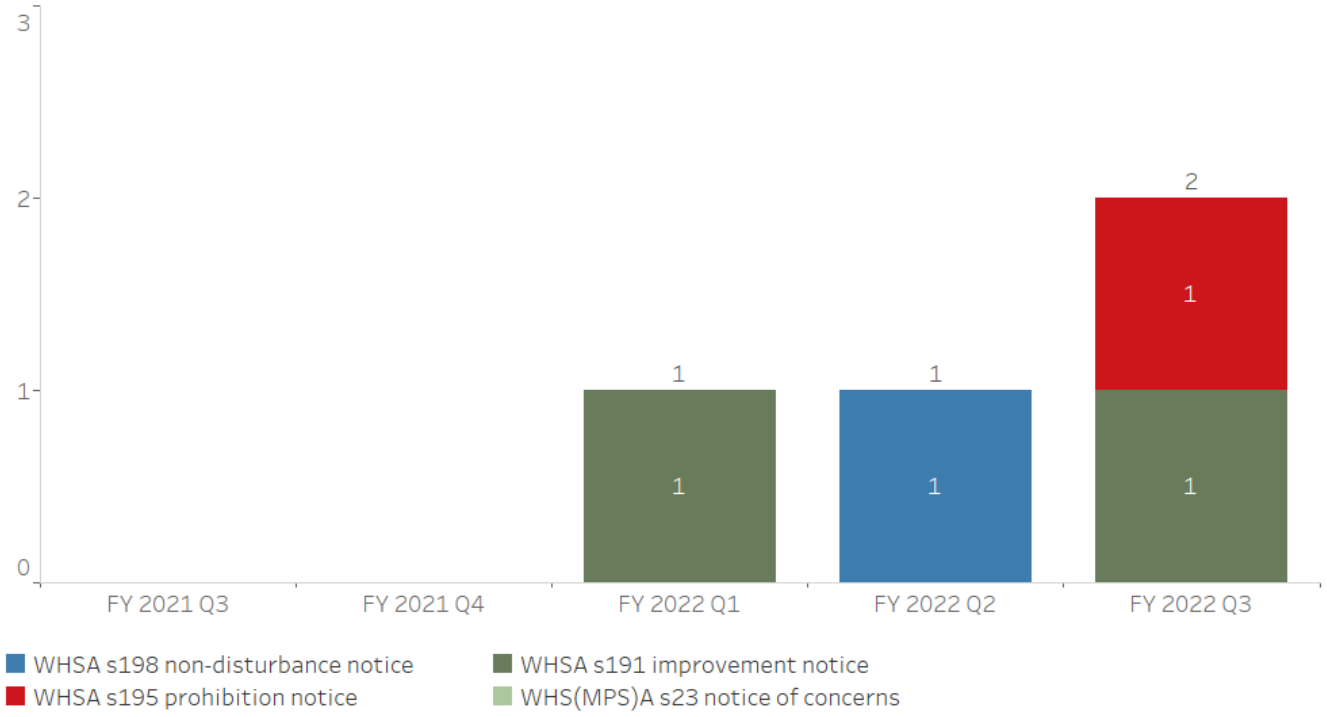


Notices issued

As part of the Regulator's position paper on preventing fires on mobile plant where a mine operator has not taken appropriate steps to manage the risk of fires on mobile plant, escalated enforcement action will be taken.

Figure 9 shows that two notices were issued in relation to notified incidents involving FOMP this quarter, being one s191 improvement notice and one s195 prohibition notice, both issued under the *Work Health and Safety (Mines and Petroleum Sites) Act 2013.*

Figure 9: Notices issued in relation to FOMP incidents between 1 January 2021 and 31 March 2022



Fires on mobile plant ancillary reports

When an incident involving fires on mobile plant is notified to the Regulator, additional information, known as an ancillary report, must be submitted via the Regulator Portal no later than 30 days after the incident was required to be notified. At the time of this report, 42 ancillary reports were completed for FY2022 Q3.

Ancillary reports – combination heat/fuel sources

Data for heat sources and fuel sources for FOMP notifiable incidents this quarter indicate that the exhaust system heat source category and hydraulic oil fuel source category combined for twelve out of 42 incidents (29%) recorded in ancillary reports. The second most common combination this quarter was exhaust system and 'other', accounting for six out of the 42 incidents (14%).

The exhaust system was the heat source for 52% of incidents this quarter.

Figure 10: Ancillary reports - fuel sources combined with heat sources, between 1 January 2022 and 31 March 2022

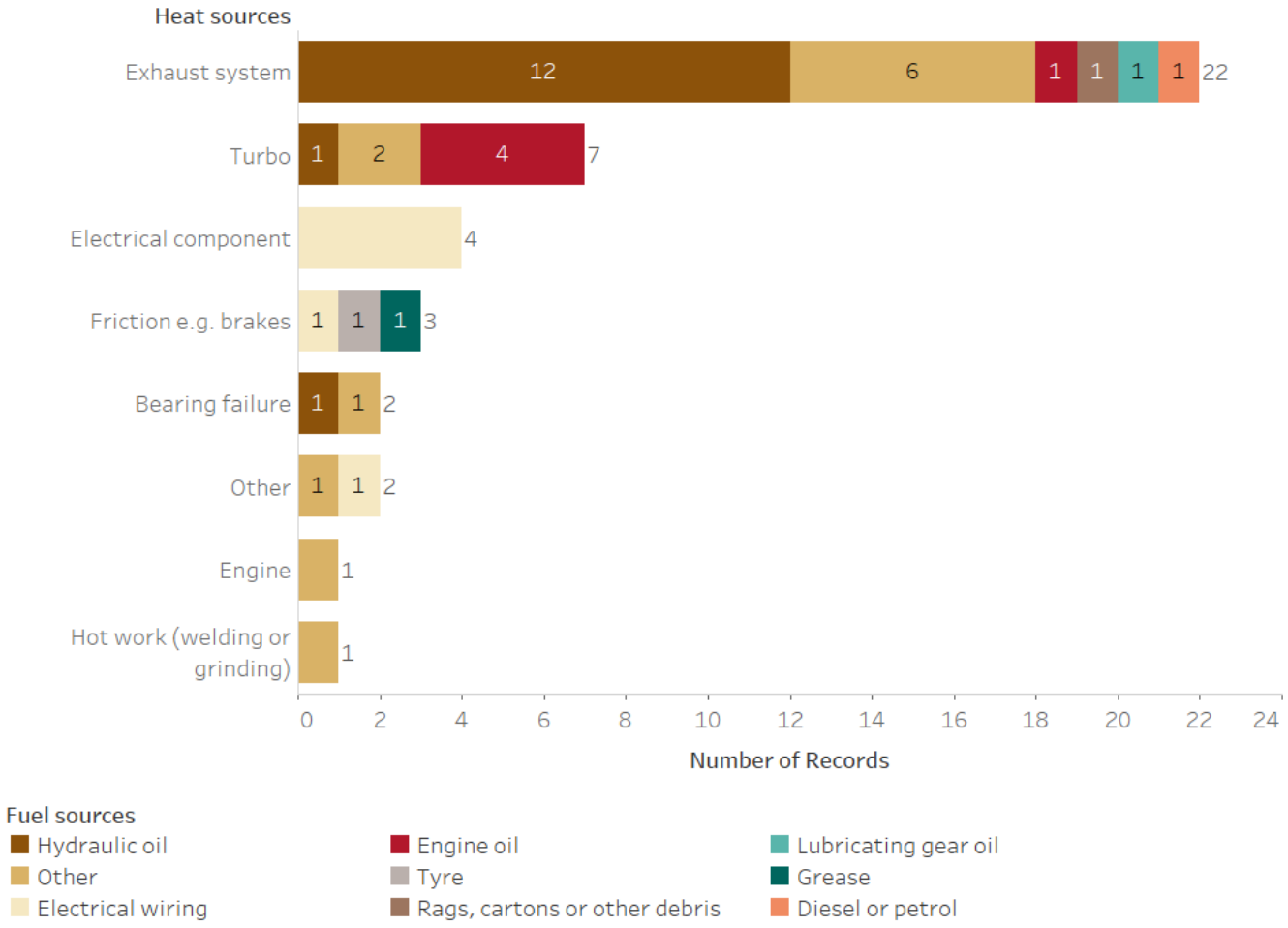


Table 2: Ancillary reports – fuel sources combined with heat sources, between 1 January 2021 and 31 March 2022[1]

HEAT SOURCE + FUEL SOURCE	FY2021 Q3	FY2021 Q4	FY2022 Q1	FY2022 Q2	FY2022 Q3	GRAND TOTAL
Electrical component + electrical wiring	6	6	5	9	4	30
Exhaust system + hydraulic oil	3	5	7	3	12	30
Turbo + engine oil	8	4	8	3	4	27
Turbo + hydraulic oil	4	3	6	7	1	21
Exhaust system + engine oil	2	7	6	4	1	20
Exhaust system + other	1	1	4	3	6	15
Exhaust system + diesel or petrol	3	2	3	5	1	14
Turbo + other	4	3	2	2	2	13

[1] 10 or more incidents since 1 January 2021

Ancillary reports – extinguished by

Figure 11 shows that a handheld fire extinguisher remains one of the highest recorded methods of extinguishment. The second highest method of extinguishment this quarter was recorded as a manually deployed fire protection system, recorded in 13 notified incidents of fire on mobile plant.

Figure 11: Ancillary reports - extinguished by, between 1 January 2022 and 31 March 2022

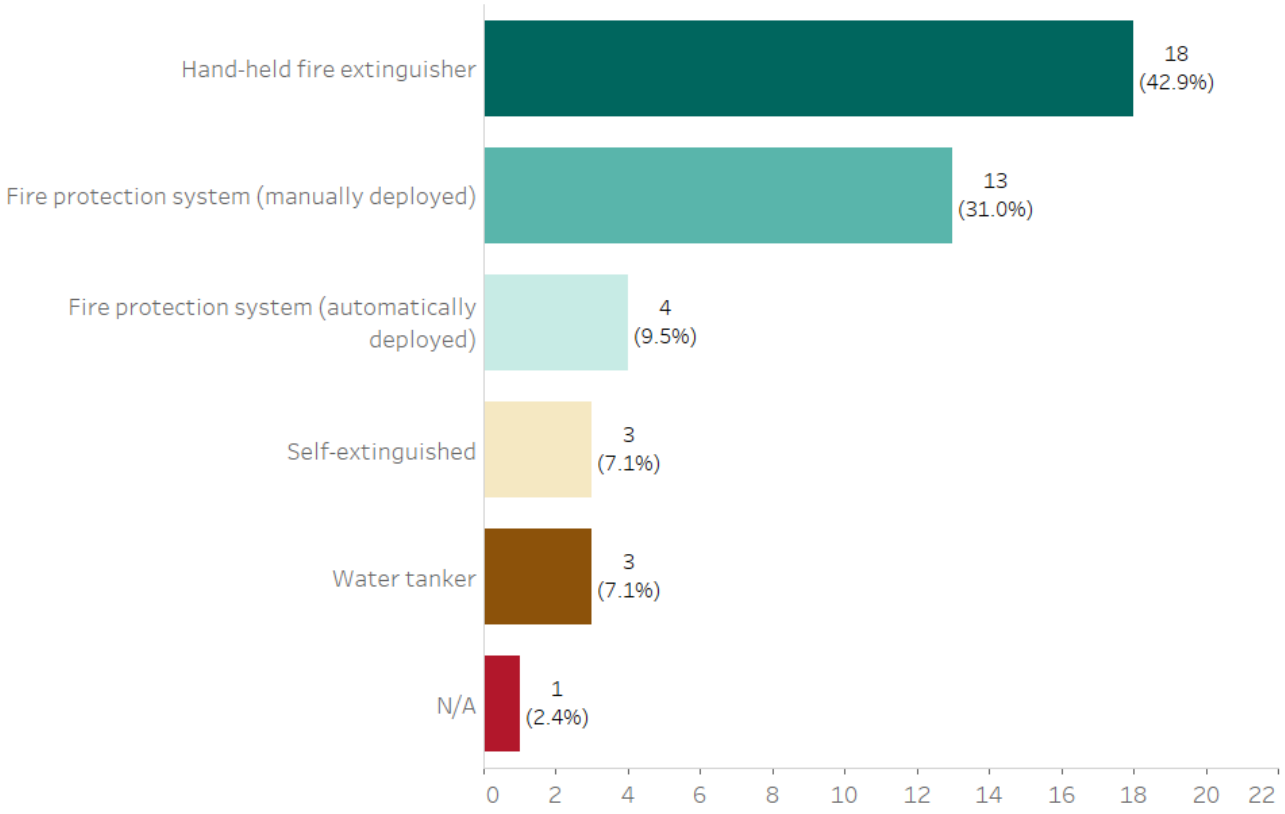


Table 3: Ancillary reports – extinguished by, between 1 January 2021 and 31 March 2022

EXTINGUISHED BY	FY 2021 Q3	FY 2021 Q4	FY 2022 Q1	FY 2022 Q2	FY 2022 Q3	GRAND TOTAL
Handheld fire extinguisher	21	20	21	26	18	106
Fire protection system (manually deployed)	15	11	17	14	13	70
Fire protection system (automatically deployed)	3	6	11	4	4	28
Self-extinguished	5	5	5	6	3	24
Water tanker	4	2	4	5	3	18
Other	3	3	-	3	-	9
N/A	-	-	1	-	1	2
Did not extinguish	1	-	-	1	-	2

Ancillary reports - failed component

The hose remains the most common single failed component since FY 2020 Q2, involved in 36% of fire of mobile plant incidents this quarter.

The Regulator recently conducted a review of incidents in which the failed component was listed as 'other' to reduce future FOMP incident notifications with this category.

Figure 12: Ancillary reports - failed components, between 1 January 2022 and 31 March 2022

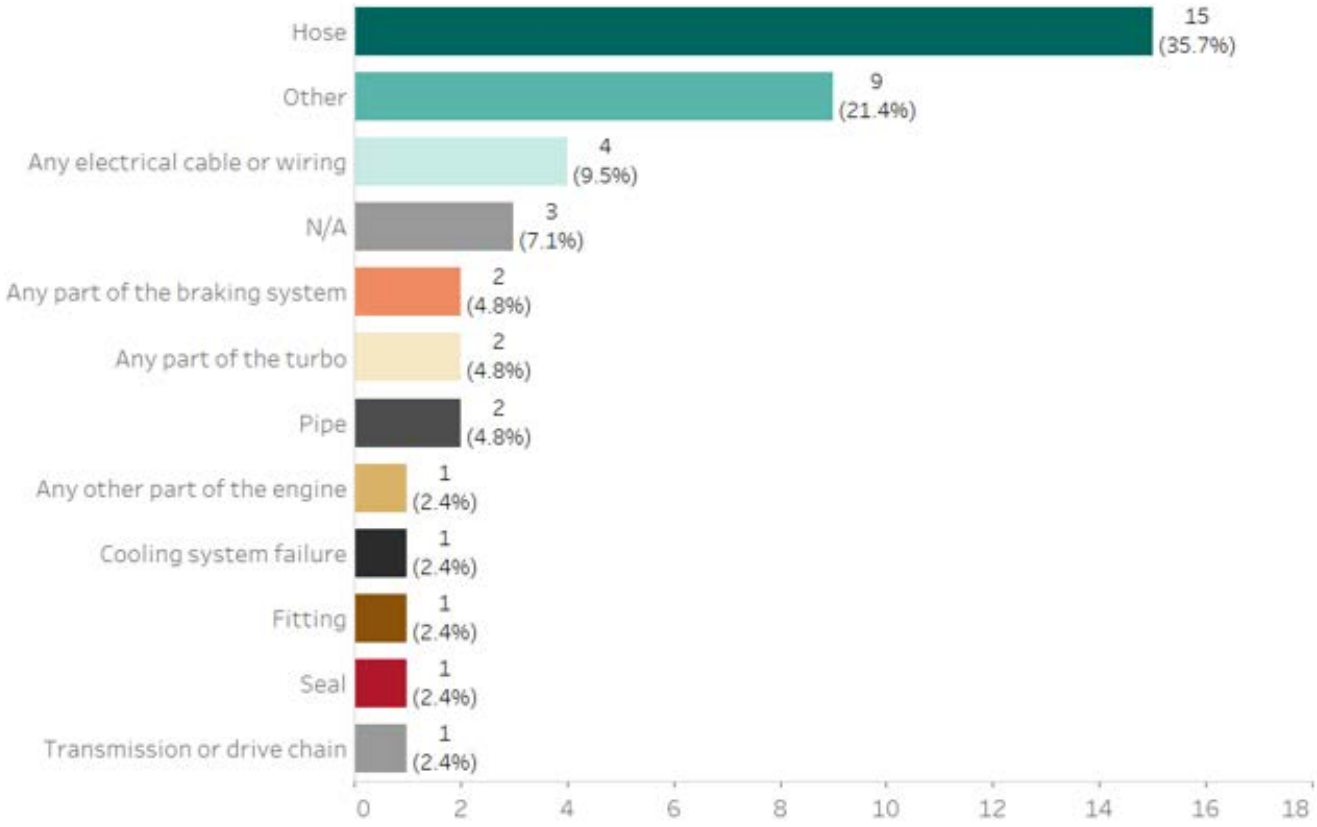


Table 4: Ancillary reports – failed component, between 1 January 2021 and 31 March 2022

FAILED COMPONENT	FY 2021 Q3	FY 2021 Q4	FY 2022 Q1	FY 2022 Q2	FY 2022 Q3	GRAND TOTAL
Hose	14	9	12	12	15	62
Other	5	9	15	9	9	47
Any electrical cable or wiring	8	7	5	8	4	32
Any part of the turbo	5	6	6	5	2	25
Fitting	4	3	5	8	1	21
Seal	5	3	5	3	1	17
Any other part of the engine	2	4	5	1	1	13
Any part of the braking system	1	2	--	4	2	9
Pipe	3	1	1	2	2	9
N/A	1	1	2	1	3	8
Any part of the starter motor	1	2	1	2	-	6
Cooling system failure	2	--	2	1	1	6
Transmission or drive chain	1	--	--	2	1	4

Ancillary reports - combination failed component and cause of component failure

The most common combination this quarter was ‘hose and wear and tear’, with eight notified incidents out of 42 (19%) noting this combination. This is an increase from last month where only 3% of incidents were categorised with this combination.

The second highest combination this quarter was ‘other’ and ‘other’, combining for 12% of incidents. These categories may be recorded as ‘other’ for several reasons including human errors or uncategorised component failures. The Regulator recently conducted a review of incidents in which failed components and cause of component failure were listed as ‘other’ to reduce the instances of this grouping in future reports.

Figure 13: Ancillary reports - failed component and cause of component failure, between 1 January 2022 and 31 March 2022

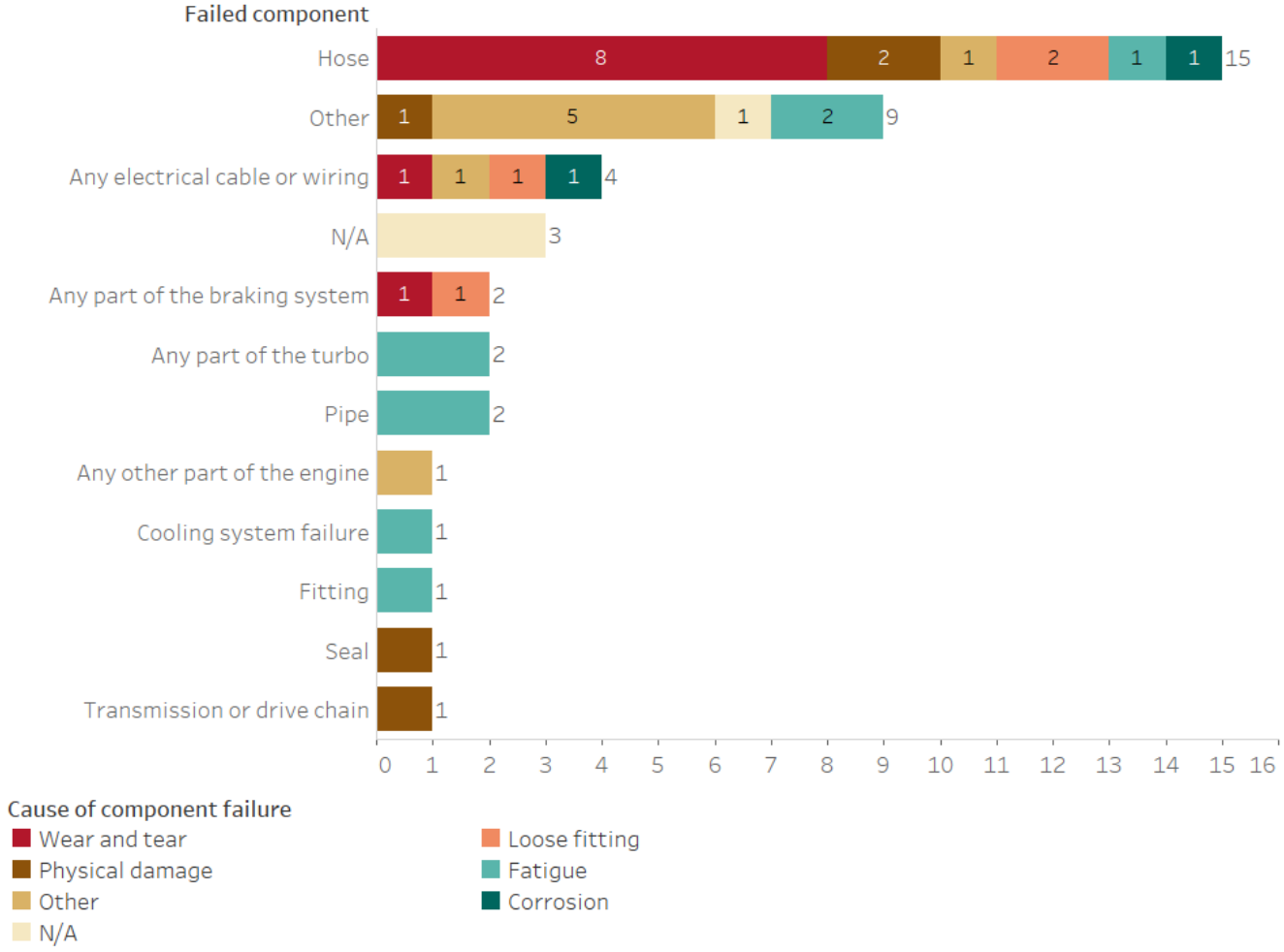


Table 5: Ancillary reports - failed component and cause of component failure, between 1 January 2021 and 31 March 2022 [2]

FAILED COMPONENT + CAUSE	FY 2021 Q3	FY 2021 Q4	FY 2022 Q1	FY 2022 Q2	FY 2022 Q3	GRAND TOTAL
Other + other	5	8	11	6	5	35
Hose + wear and tear	6	4	1	2	8	21
Hose + physical damage	2	3	3	3	2	13
Any electrical cable or wiring + other	2	4	2	3	1	12
Any electrical cable or wiring + wear and tear	3	3	1	2	1	10
Fitting + loose fitting	2	1	4	3	-	10
Hose + other	1	-	5	3	1	10

[2] 9 or more incidents since 1 January 2021

Incident details

The information in the table provides a brief summary of the fire on mobile plant incidents reported this quarter.

Mine type / Operation type	Equipment model	Failed component	Heat source	Fuel source	Extinguished by
Metals/underground	mt5020	hose	turbo	engine oil	fire protection system (manually deployed)
Coal/open cut	d11r	hose	exhaust system	other	fire protection system (automatically deployed)
Coal / open cut	789c	any part of the turbo	exhaust system	engine oil	self-extinguished
Coal / open cut	eneraque 8 head	n/a	electrical component	electrical wiring	hand-held fire extinguisher
Metals / open cut	komatsu hm400-5	n/a	friction e.g. brakes	grease	hand-held fire extinguisher
Coal / open cut	d11t	hose	exhaust system	hydraulic oil	hand-held fire extinguisher
Coal / open cut	p38.13 plus	any part of the braking system	exhaust system	other	hand-held fire extinguisher
Coal / open cut	793d	other	exhaust system	rags, cartons or other debris	fire protection system (manually deployed)
Coal / open cut	l1350	any part of the braking system	friction e.g. brakes	electrical wiring	water tanker
Coal / open cut	d10t	hose	exhaust system	hydraulic oil	fire protection system (manually deployed)
Metals / underground	sf050	hose	exhaust system	hydraulic oil	hand-held fire extinguisher
Metals / open cut	ex1200-6	any part of the turbo	turbo	engine oil	fire protection system (manually deployed)
Coal / open cut	777f	hose	exhaust system	hydraulic oil	self-extinguished
Coal / open cut	d11t	hose	exhaust system	hydraulic oil	hand-held fire extinguisher
Coal / open cut	redrill sks75	pipe	exhaust system	lubricating gear oil	fire protection system (manually deployed)
Coal / open cut	d11t	other	turbo	engine oil	self-extinguished
Coal / open cut	d10t	hose	exhaust system	hydraulic oil	fire protection system (automatically deployed)
Coal / open cut	9800	other	bearing failure	other	hand-held fire extinguisher
Coal / open cut	ex5500-6	seal	exhaust system	hydraulic oil	hand-held fire extinguisher
Coal / open cut	caterpillar 793d haul truck	hose	turbo	hydraulic oil	fire protection system (manually deployed)
Coal / open cut	5600-6	hose	exhaust system	hydraulic oil	fire protection system (manually deployed)

Coal / open cut	24m	any electrical cable or wiring	electrical component	electrical wiring	hand-held fire extinguisher
Coal / open cut	793d xq	n/a	exhaust system	other	water tanker
Coal / open cut	992g	any electrical cable or wiring	other	electrical wiring	hand-held fire extinguisher
Coal / open cut	0.93	other	exhaust system	other	fire protection system (automatically deployed)
Metals / underground	e6c	other	other	other	hand-held fire extinguisher
Coal / open cut	793d	transmission or drive chain	bearing failure	hydraulic oil	fire protection system (manually deployed)
Construction materials / open cut	qj340	other	hot work (welding or grinding)	other	n/a
Coal / open cut	140 m	hose	turbo	other	hand-held fire extinguisher
Coal / open cut	930e - 4	other	friction e.g. brakes	tyre	water tanker
Coal / open cut	777f	hose	exhaust system	hydraulic oil	fire protection system (manually deployed)
Coal / open cut	bulkmaster 6 / fm11	other	exhaust system	other	hand-held fire extinguisher
Coal / open cut	d10t	hose	exhaust system	hydraulic oil	fire protection system (manually deployed)
Coal / open cut	dr460	cooling system failure	exhaust system	hydraulic oil	hand-held fire extinguisher
Metals / underground	landcruiser	any electrical cable or wiring	electrical component	electrical wiring	hand-held fire extinguisher
Coal / open cut	789c	any other part of the engine	engine	other	fire protection system (manually deployed)
Coal / open cut	cat 777f	hose	turbo	other	fire protection system (automatically deployed)
Coal / open cut	d11t	fitting	exhaust system	hydraulic oil	hand-held fire extinguisher
Metals / processing	nps300	any electrical cable or wiring	electrical component	electrical wiring	hand-held fire extinguisher
Coal / open cut	930e	hose	turbo	engine oil	fire protection system (manually deployed)
Metals / underground	r2900g	other	exhaust system	diesel or petrol	hand-held fire extinguisher
Coal / open cut	24m	pipe	exhaust system	other	fire protection system (manually deployed)

For further information refer to our dedicated Fires on mobile plant web page.