SAFETY PERFORMANCE

IN THE WESTERN AUSTRALIAN MINERAL INDUSTRY

ACCIDENT AND INJURY STATISTICS 2009 – 2010

Government of **Western Australia**
Department of **Mines and Petroleum**
Resources Safety

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SUMMARY

Statistics generated from Resources Safety's AXTAT database for the year 2009–10 show a continued levelling out of injury performance indicators for the Western Australian mining industry, with a reversal of the previous year's improvements.

The 68,778 employees in the mining industry in 2009–10 worked a total of 134.64 million hours, a decrease of 6 per cent over the previous year's total.

Three mining industry employees lost their lives during the year, four fewer than in the previous year.

The lost time injury frequency rate (LTIFR) for serious injuries in 2009–10 rose to 2.5, which is a deterioration of 14 per cent on the previous year's rate and equal to the 2007–08 rate. However, the number of lost time injuries (LTIs) reported in recent years has become so small that the value of the LTIFR as an indicator of safety performance is questionable, and recorded improvements in the rate are more marginal.

It is sometimes alleged that LTIs are "managed" to provide favourable accident reporting data. However, disabling injuries (restricted work injuries) are generally not amenable to such manipulation and are more numerous than LTIs. Disabling injury statistics have been collected since the beginning of fiscal 2001–02, with a view to establishing a more effective safety performance indicator than the current LTI-based system. There has been expanded coverage of disabling injury statistics in the annual compilation since 2006– 07.

In 2009–10, 673 disabling injuries were recorded, 65 more than for the previous year. The disabling injury incidence and frequency rates rose to 9.8 and 5.0, respectively.

Annual compilations up to and including 2007–08 did not report injury statistics for exploration activities away from mine sites or on exploration leases. However, following the 2008 amendment of the *Mines Safety and Inspection Act 1994* to clarify provisions dealing with the duties of exploration managers, the compilations now include injury statistics for the exploration sector. The average exploration workforce in 2009–10 was 2,807. There were 38 LTIs, six more than for the previous year. The overall LTIFR was 6.7.

For some years there has been a plateau in most injury performance indicators, and the mineral industry has struggled to maintain an acceptable rate of improvement. Only a significant change in approach is going to provide the mechanisms to achieve the next step change in performance. Traditionally, strategies have been technically oriented, focusing on equipment and systems. As part of the Reform and Development at Resources Safety (RADARS) strategy, approved in September 2009, the Government has committed to supporting positive cultural change in the mineral industry to improve outcomes, with a focus on collaboration and participation in the delivery of safety and health programs.

Resources Safety continues to regulate the mining industry using compliance and enforcement functions such as statutory inspections, investigations and high impact function audits, but there is also an important role in providing education, training support and information to industry. During the year, safety meetings, presentations to mine site employees, and briefings to industry safety and health representatives complemented these regulatory activities.

Resources Safety continues to participate in and assist with development of the National Mine Safety Framework, an initiative of the Ministerial Council on Mineral and Petroleum Resources to achieve a national consistent occupational health and safety regime for the Australian mining industry. The division is also monitoring the national occupational health and safety harmonisation process overseen by Safe Work Australia.

STATISTICAL SUMMARY

MINING

- There were three fatal accidents during 2009–10 — one underground at a gold mine, one underground at a nickel mine and one on the surface at a bauxite and alumina operation.
- There were 422 LTIs, 25 more than for the previous year. Table 5 and Appendix A show a breakdown of the number of injuries by commodity mined.
- There was an average workforce of 68,778 employees in 2009–10, a slight decrease of 3% over the previous year's average. Table 5 and Appendix A show a breakdown of the number of employees by commodity mined.
- The overall LTI duration rate improved by 11%, falling from 21.9 to 19.4. The breakdown of the work days lost for each commodity mined is shown in Table 5 and Appendix A.
- The overall LTIFR deteriorated by 11%, rising from 2.8 to 3.1.
- The overall injury index remained unchanged at 61 during 2009–10.
- Serious LTIs in the mining industry totalled 340, which is 24 more than for the previous year.
- The overall serious LTIFR deteriorated by 14%, rising from 2.2 to 2.5.
- The iron ore sector LTIFR improved significantly by 40%, falling from 2.5 to 1.5.
- The bauxite and alumina sector LTIFR deteriorated significantly by 57%, rising from 2.8 to 4.4.
- The gold sector LTIFR deteriorated significantly by 63%, rising from 1.9 to 3.1.
- The nickel sector LTIFR deteriorated by 33%, rising from 2.4 to 3.2.
- There were 673 DIs, 65 more than for the previous year. Table 11 shows the breakdown of the number of injuries by commodity mined.
- The overall DI frequency rate deteriorated by 16%, rising from 4.3 to 5.0.

EXPLORATION

- There were 38 LTIs during 2009–10, six more than for the previous year.
- There was an average workforce of 2807 employees, an increase of 19% over the previous year's average.
- The overall LTIFR deteriorated slightly by 3%, rising from 6.5 to 6.7.

EXPLANATORY NOTES

Introduction

The statistics published in this annual compilation mainly relate to accidents between 1 July 2009 and 30 June 2010 (2009–10) involving time lost from work of one day or more (lost time injuries) on mines in Western Australia. The day on which the accident occurred is not counted as a day lost. The total number of working days lost through injury in 2009–10 has three components:

i) Initial injuries — days lost in 2009–10 from injuries that occurred in 2009–10

ii) Recurrent injuries — days lost in 2009–10 through recurrences of injuries that occurred in 2009–10 and previous years

iii) Carry-over injuries — days lost in 2009–10 by persons continuously off work from injuries that occurred before 1 July 2009.

Scope

Injuries to all company and contractor employees who worked at mining operations are included in these statistics. The definition of "mining operation" is stated in section 4 of the *Mines Safety and Inspection Act 1994* and includes mining company treatment plants, port facilities and railways.

Mineral exploration is not covered by this report, apart from Tables 1,2, 4, 8 and 10, and Appendix N.

Disabling injuries are only covered in the "Disabling injuries" section and Appendices L and M.

Injuries that occurred in journey accidents not on mine sites (i.e. travelling to or from work) have not been included in calculations of incidence, frequency or duration rates.

Metalliferous mines

All mines other than coal mines are classed as metalliferous mines.

Fatal accidents

Work days lost have not been allocated to fatal accidents, nor have fatalities been included in injury incidence, frequency or duration rate calculations except in Tables 8 and 9, which are in accordance with Australian Standard AS 1885.1:1990 Workplace Injury and Disease Recording Standard. This Standard treats fatalities as lost time injuries with a penalty of 220 work days lost for each.

Collection of information

Accident and injury details are reported monthly to Resources Safety by mine managers and exploration managers, as are the number of persons employed (including contractor employees) and hours worked during the month.

During the twelve months covered in this compilation, an average of 269 mines or groups of mines and 130 exploration companies reported to the AXTAT system.

Some of the terms most commonly used to describe accident type are listed in Appendix O.

DEFINITIONS

LOST TIME INJURY (LTI)

Work injury that results in an absence from work for at least one full day or shift any time after the day or shift on which the injury occurred

SERIOUS INJURY

Lost time injury that results in the injured person being disabled for a period of two weeks or more

DAYS LOST

Rostered days absent from work due to work injury

MINOR INJURY

Lost time injury that results in the injured person being disabled for a period of less than two weeks

DISABLING INJURY (DI)

Work injury (not LTI) that results in the injured person being unable to fully perform his or her ordinary occupation (regular job) any time after the day or shift on which the injury occurred, regardless of whether or not the person is rostered to work, and where alternative or light duties are performed or hours are restricted

INCIDENCE RATE

Number of lost time injuries per 1000 employees for a 12 month period

FATAL INJURY INCIDENCE RATE

Number of fatal injuries per 1000 employees for a 12 month period

LOST TIME INJURY FREQUENCY RATE (LTIFR)

Number of lost time injuries per million hours worked

SERIOUS INJURY FREQUENCY RATE

Number of serious injuries per million hours worked

DISABLING INJURY FREQUENCY RATE

Number of disabling injuries per million hours worked

DURATION RATE

Average number of workdays lost per injury

INJURY INDEX

Number of workdays lost per million hours worked

METALLIFEROUS MINES

All mines other than coal mines are classed as metalliferous mines

DAYS OFF

Total calendar days, whether rostered or not, absent from work or on alternative duties, restricted duties or restricted hours due to work injury

EXPLORATION

Exploration activities not under the control of a Registered Mine Manager; usually associated with exploration leases.

ABBREVIATIONS

C/BY BETWEEN	caught by or between moving or stationary objects or both
C/BY MACHINE	caught by or between operating machine
CHEM/FUMES	chemicals or fumes
COMP	compressed
C/W	contact with
DETON	detonation
DI	disabling injury
ENV	environment
EXP	exposure
FR	frequency rate
JOLT/JAR	jolting or jarring
LTI	lost time injury
LTIFR	lost time injury frequency rate
NOC	not otherwise classified
ON/OFF	on or off
PRESS	pressure
OVER/STREN MOV	over-exertion or strenuous movements
S/AGAINST	struck against
S/BY	struck by
SLIP/TRIP	slip or trip
U/G	underground
U/G ACCESS/HAUL	underground access, travelling or haulage ways
U/G PROD/DEV	underground production or development areas
VEH/MOB	vehicle or mobile equipment

FATAL ACCIDENTS

Fatal accidents during 2009–10

There were three fatal accidents in the Western Australian mineral industry during 2009–10.

- A service crewman employed at an underground gold mine was fatally injured when he fell through an ore pass grizzly onto the muck pile 38 metres below. He had been attempting to cover the grizzly to prevent dust coming out of the ore pass system during tipping operations from higher levels in the mine. His body was discovered in the early hours of the morning.
- An employee of a high-pressure water de-scaling contractor working at an alumina refinery was fatally injured in the early hours of the morning when he fell at least 25 metres inside a process vessel and struck the ground. The vessel comprised two separate but adjoining chambers. The worker apparently fell through an open manhole into the lower chamber of the vessel and then to the ground via a discharge chute.
- An underground loader operator employed at an underground nickel mine was fatally injured when he drove a load-haul-dump (LHD) machine into an open stope void and fell about 24 metres.

Fatal injury incidence rate by mineral mined 2005–06 to 2009–10

Table 1 lists fatal injury incidence rates by mineral mined for the past five years, as well as the grouped information for all surface and underground mines.

The underground fatal injury incidence rate is six times higher than the fatal injury incidence rate for surface operations. This is reflected in the gold and nickel sectors where most of the State's underground mining occurs.

TABLE 1 FATAL INJURY INCIDENCE RATE BY MINERAL MINED 2005–06 TO 2009–10

Category		Fatalities per thousand employees
Mineral	Gold	0.10
	Nickel	0.10
	Iron ore	0.07
	Bauxite and alumina	0.02
Underground		0.24
Surface		0.04
Exploration		0.11

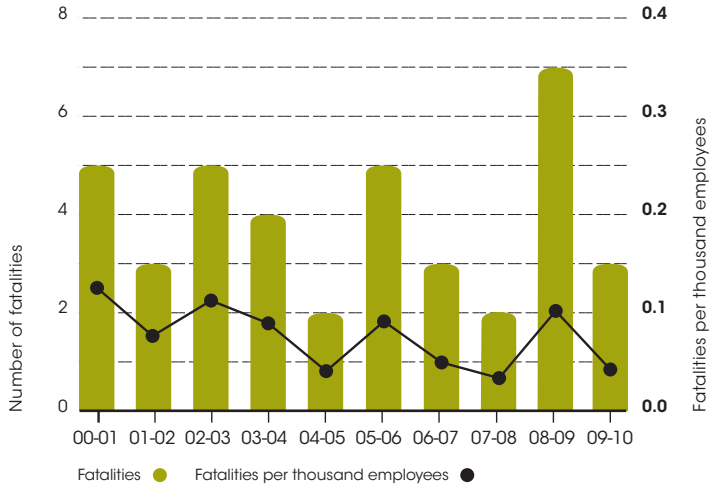
FATAL ACCIDENTS CONTINUED

Fatal injury incidence rate 2000–2001 to 2009–10

The fatal injury incidence rate for 2009–10 was 0.04, less than half the incidence rate for the previous year, when there were seven fatal accidents. Although the overall trend continues to decline, as shown in Figure 1, there is a year-by-year scatter of the incidence rate because of the low number of occurrences.

Resources Safety maintains the view that no fatal accident is acceptable, and a fatal injury incidence rate of zero is achievable and sustainable.

FIGURE 1 FATAL INJURY INCIDENCE RATE 2000-01 TO 2009-10



Fatal accidents by type of accident 2005–06 to 2009–10

Table 2 indicates the type of accidents for the 20 fatalities in the mining industry (excluding exploration) over the past five years, with eight underground and 12 at surface operations.

The most common types of underground fatal accident over the past five years were rockfall and vehicle or mobile equipment driving over the edge (two fatalities each).

The most common types of surface fatal accident over the past five years were vehicle or mobile equipment collision, struck by object, and fall from height (three fatalities each).

TABLE 2 NUMBER OF FATALITIES BY TYPE OF ACCIDENT 2005–06 TO 2009–10

Category		Number of fatalities
Underground	Rockfall	2
	Veh/mob over edge	2
	Veh/mob collision	1
	Fall from height	1
	Explosives detonation	1
	C/w electricity	1
Surface	Veh/mob collision	3
	S/by object	3
	Fall from height	3
	S/by veh/mob	2
	C/by between	1
Exploration	S/by object	1

SERIOUS INJURIES

Review of serious injuries during 2009–10

There were 340 serious injuries reported during 2009–10. Of these, 330 were in metalliferous mines and ten were in coal mines.

Typical serious injuries are described below.

A front-end loader driver descending the stairs of a Caterpillar 994 front-end loader sustained injuries to his head neck, back, arms and legs when he fell 2 metres to the bottom of the stairway.

A fitter's hand was injected with hydraulic oil while he was holding it over a leaking hydraulic hose on a drill rig. He had located the leak and asked for the rig to be shut down but the pressure increased as the rig shut down. He was wearing gloves.

A laboratory assistant, taking samples in a treatment plant, injured her shoulder opening and closing stiff valves, which required more effort than usual.

An electrician tore ligaments in his knee when he landed awkwardly after jumping from the tray of a light vehicle.

A mobile plant operator dislocated and fractured his ankle when he stepped back from a windrow and stumbled on a rock.

A contract driller, storing boxes of boosters in an explosives magazine, sustained a torn tendon in his shoulder when he lifted a box onto the top of a stack, which was 13 boxes high.

A mechanical coordinator sustained a fractured skull and crush injuries to his torso, and a fitter sustained a fractured scapula and crush injuries to his back and chest when they were pinned between an excavator counterweight and the wall of a run-of-mine (ROM) bin. The excavator had stopped while the crusher was inspected. After the workers had walked away from the bin, the excavator operator mounted the excavator and began slewing material out of the ROM bin to the side, unaware that the men had re-approached the bin.

A senior project geologist, driving between exploration sites, sustained a compressed fracture to a vertebra in his lower back when his vehicle's front tyre dropped into a rut. His head struck the cab roof and he fell back onto the seat.

A contract fitter, working from an elevated work platform, sustained head injuries while removing a roller door installed on a workshop. He was struck by a support bracket after he removed the final bolt from the bracket. He had not taken account of the stored energy in the internal spring, which rotated the bracket when the bolt was removed.

An underground service crew operator, removing a drill jumbo cable, sustained a fractured pelvis and shoulder injuries when he fell about 5 metres from the man cage of an integrated tool carrier. He was not wearing fall arrest equipment.

A high-pressure water jet operator sustained a laceration to his foot when a jet of high pressure water cut through his Kevlar boot cover and boot.

A haul truck operator, dumping a load on a waste dump, suffered neck strain when the truck tray dropped suddenly while he was looking up at the reversing camera and moving the truck forward on the ramp with the tray still raised.

A grade control field assistant sustained injuries to his ear when a can of spray paint he was shaking exploded. The can of spray paint had been in the back of a light vehicle in the sun.

A blasthole drill operator, cleaning the lights on his drill rig, suffered injuries to his chest, head and foot when he fell 1.5 metres from the drill rig, striking the drill platform on the way down. The strap he was holding for support failed.

A shotfirer sustained a fractured femur and lacerated knee when he was struck by a piece of fly rock from a blast he had just initiated. He was standing about 300 metres from the blast.

A boilermaker, changing an excavator bucket tooth, received a crush injury to his finger when it was struck by a sledgehammer being used by another employee to loosen a different bucket tooth. The boilermaker was holding the tooth while moving his body into a better position.

A treatment plant operator, driving a forklift back to the drying shed, sustained crush injuries and fractures to his pelvis when he was thrown from the forklift after it struck a bollard at the shed entrance and tipped onto its side. The crush injuries were caused by the top of the forklift's roll-over protection structure (ROPS).

A treatment plant operator, using a 36 mm open-ended spanner to tighten bolts on a dredge discharge hose, fractured his ribs when he fell backwards onto a pontoon inspection hatch pipe after the spanner slipped off a bolt.

A supervisor, attempting to seal a dump truck tyre that had just been installed on a rim, sustained eye injuries when he was struck in the face by tyre gel. The crew had used a lot of tyre gel but there was a slight air leak. When the supervisor struck the rim on the lock ring side with a sledgehammer, the bead popped and the tyre gel was ejected.

A shotcreter, hydroscaling an underground ventilation drive, suffered a fractured tibia and fibula when his legs were struck by rock that was ejected during a seismic event. The seismic event had caused a floor heave and rock to be ejected from the floor line to 0.5 metres up the drive wall.

A mobile plant operator, tramming a mobile overburden conveyor, fractured a lumbar vertebra when he jumped from a conveyor platform 8 metres to the ground after the conveyor started swaying and a section collapsed.

A cleaner strained her knee and back when she lost her balance and fell over after stepping on a loose slab at an ablution block.

SERIOUS INJURIES CONTINUED

A haultruck driver sustained neck and lower back injuries when the driver's seat of her truck "bottomed out" after the truck struck a depression.

A trades assistant strained his lower back while removing a bearing on a screen feeder. He had lifted and removed the covers, removed the bolts, then removed the bearing and stuffing box with no pain. He felt the pain as he stood up after completing the job.

A process technician, taking samples in a treatment plant, broke her finger when the sampling scoop she was using contacted the trommel and was pulled down, trapping her finger between a guard and handrail.

A drill rig operator, using an adjustable pipe wrench to break out a drill bit, sustained a crushed thumb when his hand was caught between the wrench and the collar. He was turning the wrench with his hand on the wrench jaws when the handle struck the drill rig fast lift lever. The trainee driller turned off the drill rig to release his hand.

A contractor, attempting to remove a submersible pump from a bore hole, sustained a compound fracture to his lower right leg after the steel lifting cable parted. As the pump fell back down the bore hole, it became entangled in the pump's electric cable, dragging his foot to the steel bore head where it lodged. The pump was still hanging from the electrical cable wrapped around his lower leg.

A service crew member, standing in the basket of an integrated tool carrier underground, sustained fractured vertebrae and fractured ribs and internal injuries when a 1000 litre water pod dislodged from the tynes of a forklift and struck him as it rolled into the basket. He had been standing in the lowered basket ready to fill a water supply drum used for grouting operations.

A gold room operator suffered hot caustic burns to his feet and shins when he walked into a bund filled with liquor. After noticing that a valve had been left open on the pregnant liquor tank and that the bund had filled with liquor, the operator had turned on the sump pump and then walked into the bund before realising that the liquor was above boot level. The liquor flowed into his boots causing partial and full thickness burns.

A trades assistant using a rivet buster on a treatment plant filter press suffered a shoulder injury when he lifted the rivet buster to pass it to another employee.

Serious injury incidence rate by mineral mined 2005–06 to 2009–10

Figure 2 is a chart of incidence rates for serious injuries for the past five years. The top of the chart shows the serious injury incidence rates for surface and underground operations. The lower part shows serious injury incidence rates by mineral mined.

The chart shows that the serious injury incidence rate for underground mining (7.7) was 51% higher than that for surface operations (5.1).

Of the major mining sectors, base metals had the highest five-year average serious injury incidence rate (11.1) whereas iron ore had the lowest (3.4). The mining sector referred to as "other", with a five-year average serious injury incidence rate of 11.1, contained 2% of the total number of employees spread over 16 commodity groups. Most of the mine sites in this sector had less than 50 employees.

Serious injury frequency rate 2005–06 to 2009–10

Figure 3 shows that the serious injury frequency rate rose for underground metalliferous operations, surface metalliferous operations and the coal sector, resulting in a 14% deterioration overall during 2009–10.

FIGURE 2 SERIOUS INJURY INCIDENCE RATE 2005-06 TO 2009-10

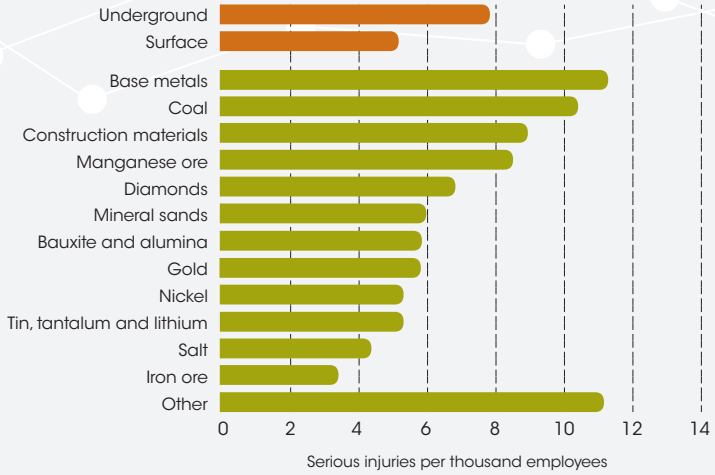
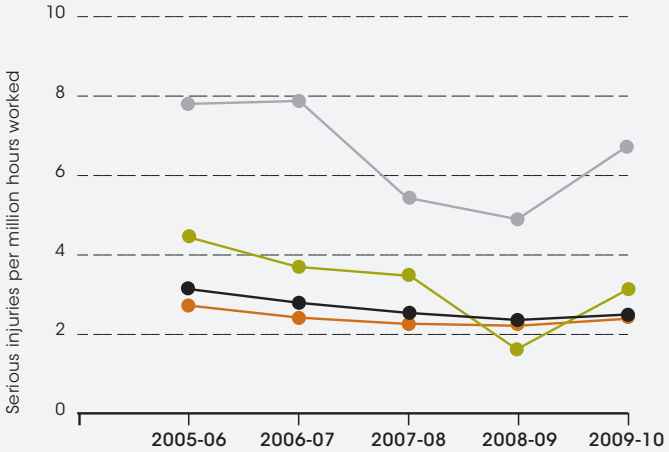


FIGURE 3 SERIOUS INJURY FREQUENCY RATE 2005-06 TO 2009-10



	2005-06	2006-07	2007-08	2008-09	2009-10
Metalliferous u/g	4.4	3.8	3.6	1.7	3.2
Metalliferous surface	2.9	2.6	2.3	2.2	2.4
Coal	7.9	7.9	5.5	4.9	6.8
Total	3.1	2.8	2.5	2.2	2.5

Serious injury percentage breakdown for 2009–10

Appendices B and C provide a percentage breakdown of the number of serious injuries by part of body, nature of injury, location of accident, and type of accident for underground and surface operations, respectively.

UNDERGROUND

- Injuries to legs accounted for the largest proportion of serious injuries at 18%, arm injuries accounted for 16%, followed by back and hand injuries both at 12%. Of the serious leg injuries, 78% were to knees and ankles. All of the serious arm injuries were to shoulders.
- Consistent with the high proportion of knee, ankle, shoulder and back injuries, sprain or strain represented the highest proportion by nature of injury (45%), followed by fracture at 18%, then crushing at 10%.
- The largest proportion of serious injuries underground was in production and development areas (71%), followed by access and haulage ways at 14% then workshops (6%).
- The most common accident type associated with serious injuries underground was over-exertion or strenuous movements at 22%, followed by struck by object at 16%, then slip or trip and stepping both at 12%.

SURFACE

- Injuries to arms accounted for the largest proportion of serious injuries at 25%, back injuries accounted for 21%, followed by leg injuries at 19%. Of the serious arm injuries, 59% were to shoulders while 22% were to elbows and wrists. Of the serious leg injuries, 63% were to knees and 19% were to ankles.
- Consistent with the high proportion of knee, ankle, back and shoulder injuries, sprain or strain represented the highest proportion by nature of injury (56%). Fracture was the next highest (12%), followed by bruise or contusion at 6%.
- The largest proportion of serious injuries on the surface occurred in treatment plants (38%), followed by open pits at 20% then workshops and surface general areas both at 14%.
- The most common accident types associated with serious injuries on the surface were over-exertion or strenuous movements (38%), slip or trip (14%), and caught by or between moving objects (9%).

LOST TIME INJURIES

Review of lost time injuries during 2009–10

In 2009–10, 18,863 days were lost through occupational injuries on mines in Western Australia. This figure is made up of the number of days lost from injuries occurring in 2009–10 (8,191), recurrences of injuries sustained before 2009–10 and in 2009–10 (2,240), and LTIs and recurrences carried over into 2009–10 from accidents before July 2009 (8,432). A breakdown of work days lost in coal and metalliferous mining is given in Table 3.

During 2009–10, there were 422 LTIs in the State's mining industry. Of those, 402 were in metalliferous mines and 20 in coal mines. A breakdown of these data with performance indicators is given in Tables 4 and 5.

In addition to the initial injuries, there were 57 recurrences of previous injuries, resulting in 2,240 work days lost during 2009–10. A breakdown of recurrent injuries by calendar year of initial injury is given in Table 6.

One hundred and nineteen people who were still off work from injuries received before July 2009 lost 8,432 work days in 2009–10. A breakdown of these carry-over injuries is given in Table 7.

TABLE 3 TIME LOST THROUGH INJURY DURING 2009–10

Mines	Initial injuries	Recurrent injuries	Carry-over injuries	Total injuries
	Days lost			
Metalliferous	7,787	2,137	7,775	17,699
Coal	404	103	657	1,164
Total mining	**8,191**	**2,240**	**8,432**	**18,863**

TABLE 4 INITIAL LOST TIME INJURIES DURING 2009–10

Sector	No. of employees	No. of LTIs	Incidence rate	Frequency rate	Duration rate	Injury index	Days lost
Metalliferous surface	60,637	347	5.7	2.9	18.0	53	6,234
Metalliferous underground	7,172	55	7.7	3.5	28.2	100	1,553
Metalliferous total	67,809	402	5.9	3.0	19.4	58	7,787
Coal total	969	20	20.6	13.5	20.2	273	404
Total mining	**68,778**	**422**	**6.1**	**3.1**	**19.4**	**61**	**8,191**
Exploration	2,807	38	13.5	6.7	15.5	103	588

TABLE 5 INJURIES BY MINERAL MINED DURING 2009–10

Mineral mined	No. of employees	No. of LTIs	Incidence rate	Frequency rate	Duration rate	Injury index	Days lost
Iron ore	25,438	80	3.1	1.5	18.9	29	1,512
Gold	16,913	102	6.0	3.1	25.9	81	2,646
Bauxite and alumina	8,820	77	8.7	4.4	15.8	70	1,213
Nickel	7,268	45	6.2	3.2	11.3	36	507
Base metals	1,929	28	14.5	8.4	31.3	263	875
Mineral sands	1,811	16	8.8	5.0	11.7	58	187
Diamonds	1,336	6	4.5	2.3	27.5	63	165
Salt	986	6	6.1	3.8	4.2	16	25
Coal	969	20	20.6	13.5	20.2	273	404
Manganese ore	780	5	6.4	3.4	13.8	47	69
Construction materials	578	6	10.4	5.1	21.5	110	129
Tin, tantalum and lithium	339	3	8.8	4.2	23.3	97	70
Other	1,611	28	17.4	10.9	13.9	151	389
Total mining	**68,778**	**422**	**6.1**	**3.1**	**19.4**	**61**	**8,191**

NOTE: Duration in Tables 4 and 5 does not take into consideration time lost after 30 June 2010 by persons still off work at the end of the fiscal year, time lost from recurrent injuries, or time lost by persons with carry-over injuries from before July 2009.

TABLE 6 RECURRENT INJURIES DURING 2009–10

Calendar year	No. of injuries	Days lost	No. of injuries	Days lost	No. of injuries	Days lost
	Metalliferous mines		Coal mines		Total mining	
2010*	9	209	—	—	9	209
2009	25	1,181	3	46	28	1,227
2008	9	311	—	—	9	311
2007	6	309	2	57	8	366
2006	1	62	—	—	1	62
2005	—	—	—	—	—	—
Pre-2005	2	65	—	—	2	65
Total	**52**	**2,137**	**5**	**103**	**57**	**2,240**

NOTE: Apart from the information shown in Tables 3, 6 and 7, analysis of recurrent and carry-over injuries has not been presented in this publication.

* Covers period from 1 January to 30 June 2010 calendar year

LOST TIME INJURIES CONTINUED

TABLE 7 CARRY-OVER INJURIES DURING 2009–10

Calendar year	No. of injuries	Days lost	No. of injuries	Days lost	No. of injuries	Days lost
	Metalliferous mines		Coal mines		Total mining	
2009*	66	3,701	3	112	69	3,813
2008	23	2,537	4	450	27	2,987
2007	8	685	2	95	10	780
2006	4	357	—	—	4	357
2005	2	155	—	—	2	155
Pre-2005	7	340	—	—	7	340
Total	**110**	**7,775**	**9**	**657**	**119**	**8,432**

* Covers period from 1 January to 30 June 2009

Review of lost time injuries during 2009–10 in accordance with Australian Standard AS 1885.1:1990

In June 1990, Standards Australia and Worksafe Australia released a joint standard for recording workplace injuries and diseases. The Australian Standard *AS 1885.1:1990 Measurement of occupational health and safety performance - Describing and reporting occupational injuries and disease* is designed to be used by individual workplaces. Tables 8 and 9 provide statistical information in accordance with AS 1885.1:1990.

There are two major differences between reporting for AS 1885.1:1990 and the AXTAT database.

The Australian Standard treats fatalities as LTIs with a penalty of 220 workdays lost for each, whereas in the AXTAT database fatalities are reported separately from other injury data.

The incidence rate reported in accordance with the Australian Standard definition is injuries per hundred employees, rather than injuries per thousand employees.

TABLE 8 INITIAL LOST TIME INJURIES DURING 2009–10 (AS 1885.1:1990)

Sector	No. of employees	No. of LTIs	Injuries per hundred	Frequency	Duration	Days lost
Metalliferous surface	60,637	348	0.6	3.0	18.5	6,464
Metalliferous underground	7,172	57	0.8	3.7	35.0	1,993
Metalliferous total	67,809	405	0.6	3.0	20.9	8,447
Coal total	969	20	2.1	13.5	20.2	404
Total mining	**68,778**	**425**	**0.6**	**3.2**	**20.8**	**8,851**
Exploration	2,807	38	1.4	6.7	15.5	588

NOTE: Duration in Tables 8 and 9 does not take into consideration time lost after 30 June 2010 by persons still off work at the end of the fiscal year, time lost from recurrent injuries, or time lost by persons with carry-over injuries from before July 2009.

TABLE 9 INJURIES BY MINERAL MINED DURING 2009–10 (AS 1885.1:1990)

Mineral mined	No. of employees	No. of LTIs	Injuries per hundred	Frequency rate	Duration rate	Days lost
Iron ore	25,438	80	0.3	1.5	18.9	1,512
Gold	16,913	103	0.6	3.2	27.8	2,866
Bauxite and alumina	8,820	78	0.9	4.5	18.4	1,433
Nickel	7,268	46	0.6	3.2	15.8	727
Base metals	1,929	28	1.5	8.4	31.3	875
Mineral sands	1,811	16	0.9	5.0	11.7	187
Diamonds	1,336	6	0.4	2.3	27.5	165
Salt	986	6	0.6	3.8	4.2	25
Coal	969	20	2.1	13.5	20.2	404
Manganese ore	780	5	0.6	3.4	13.8	69
Construction materials	578	6	1.0	5.1	21.5	129
Tin, tantalum and lithium	339	3	0.9	4.2	23.3	70
Other	1,611	28	1.7	10.9	13.9	389
Total mining	**68,778**	**425**	**0.6**	**3.2**	**20.8**	**8,851**

WORKERS' COMPENSATION

Premium rates for the Western Australian mineral industry

The workers' compensation recommended premium rates determined by the Premium Rates Committee are published in a dedicated Western Australian Government Gazette, and are effective from 30 June in the year of issue.

Figure 4 indicates trends in workers' compensation costs for selected mineral groups in the ten-year period since 2001–2002.

Over this period, the coal mining compensation rate decreased, by 34%, to 1.96% of payroll. The compensation rate for surface gold operations decreased, by 73%, to 0.88% of payroll, and that for iron ore operations decreased, by 60%, to 0.48% of payroll. The rate for underground gold operations decreased, by 8%, to 3.92% of payroll.

The average recommended premium rate for the Western Australian mining industry for 20010–11 is currently 1.61% of payroll, a 7% decrease on that for 2009–10 (1.73% of payroll).

Figure 5 shows the current recommended premium rates for 2010–11 for a variety of mineral groups and other industries.

Premium rates for mining industry groups compare favourably with other industry groups such as sheet metal product manufacturing and structural steel fabrication, which have current premium rates of 2.94% and 2.79% of payroll, respectively.

The recent trend of the traditionally higher risk mining sectors having lower premium rates than many manufacturing sectors has continued.

Although premium rates in isolation are not necessarily reliable indicators of risk, they do represent a cost to industry and, in part, reflect past safety performance.

FIGURE 4 MINE WORKERS' COMPENSATION RATE TRENDS 2001-02 TO 2010-11

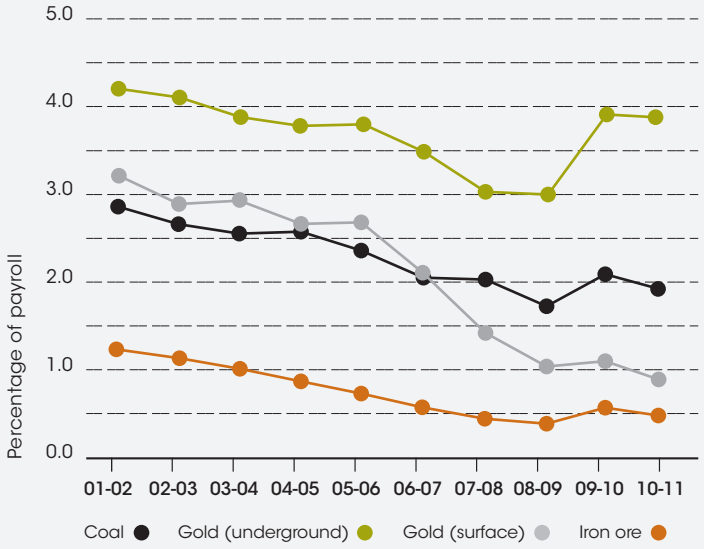
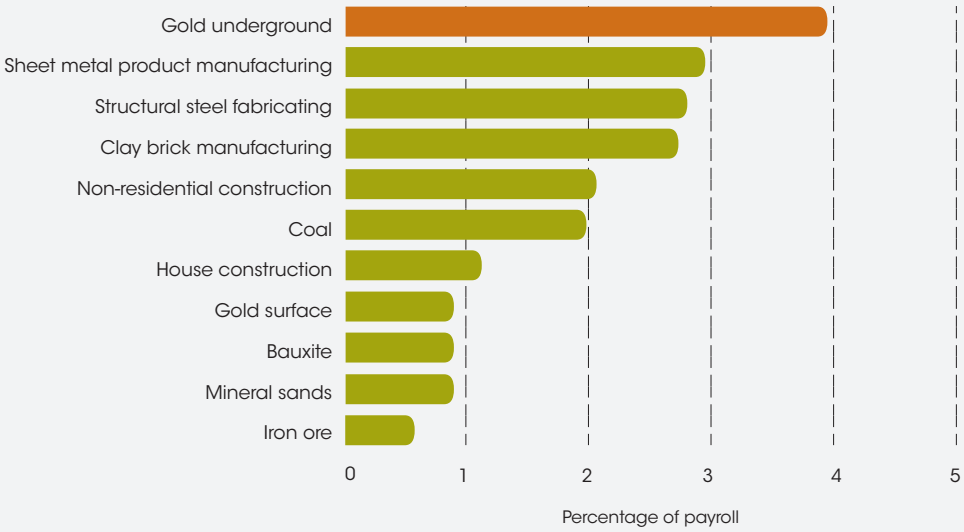


FIGURE 5 RECOMMENDED PREMIUM RATES 2010-11



INJURIES BY COMMODITIES

Metalliferous performance indicators

The performance indicators for the metalliferous mining sector show mixed results for 2009–10. Figures 6 to 9 depict the performance indicators of incidence, frequency, duration rates and injury index (see page 5 for definitions).

Some interesting trends noted in the performance indicators for metalliferous mines during 2009–10 include the following.

- The overall incidence rate deteriorated by 7%, rising from 5.5 to 5.9. The surface incidence rate deteriorated slightly by 2% (from 5.6 to 5.7) and the underground incidence rate deteriorated significantly by 67% (from 4.6 to 7.7).
- The overall frequency rate deteriorated by 11%, rising from 2.7 to 3.0. The surface frequency rate deteriorated by 4% (from 2.8 to 2.9) and the underground frequency rate deteriorated significantly by 67% (from 2.1 to 3.5).
- The overall duration rate improved by 11%, falling to 19.4. The surface duration rate improved by 17% (from 21.6 to 18.0) whereas the underground duration rate deteriorated by 14% (from 24.8 to 28.2).
- The rise in frequency rate was marginally less than the fall in duration rate resulting in an overall slight improvement of 2% to the injury index, down from 59 to 58. The surface injury index improved by 12% (from 60 to 53) whereas the underground injury index deteriorated significantly by 96% (from 51 to 100).

Metalliferous injury percentage breakdown for 2009–10

Appendices D and E provide a percentage breakdown of the number of injuries for part of body, nature of injury, location of accident, and type of accident for underground and surface operations, respectively.

Injuries by part of body

- Arm and leg injuries, both at 16%, accounted equally for the largest proportion of underground injuries. Arm and back injuries, both at 21%, accounted equally for the largest proportion of surface injuries. Of the underground arm injuries, 89% were to shoulders. Of the underground leg injuries, 78% were to knees and ankles. Of the surface arm injuries, 59% were to shoulders, and 23% were to elbows and wrists.
- Hand injuries accounted for the next largest proportion of injuries underground at 13%, followed by back injuries at 11%.
- Leg injuries accounted for the next largest proportion of surface injuries at 19%, followed by hand injuries at 18%. Of the leg injuries, 55% were to knees and 23% were to ankles.

Injuries by nature

- Sprain or strain was the highest ranking nature of injury for both underground and surface injuries at 44% and 52%, respectively.
- The second highest ranking nature of underground injury was fracture (16%), followed by bruise or contusion and crushing both at 9%.
- The second highest ranking nature of surface injury was also fracture (12%), followed by bruise or contusion at 6%.

Injuries by location

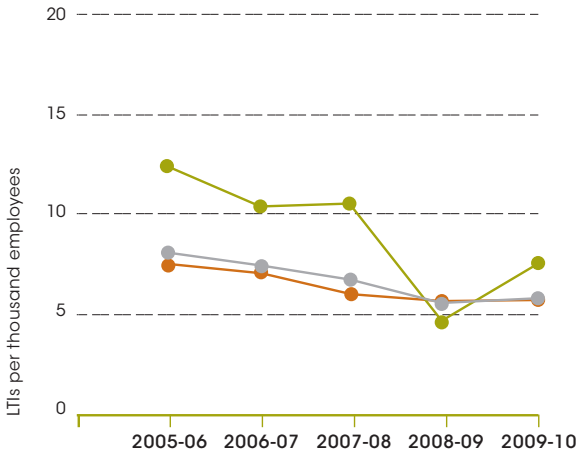
- The largest proportion of underground injuries occurred in production and development areas (65%), followed by access and haulage ways at 16% then workshops and dumping areas both at 5%.
- The largest proportion of surface injuries occurred in treatment plants (39%), followed by open pits at 20% then workshops at 15%.

Injuries by type of accident

- Over-exertion or strenuous movements was the most common accident type for underground injuries at 24%, followed by struck by object and slip or trip, both at 15%, then rockfall and stepping both at 11%.
- The most common accident type for surface injuries was also over-exertion or strenuous movements at 35%, followed by slip or trip at 14%, then caught by or between moving objects at 9%.

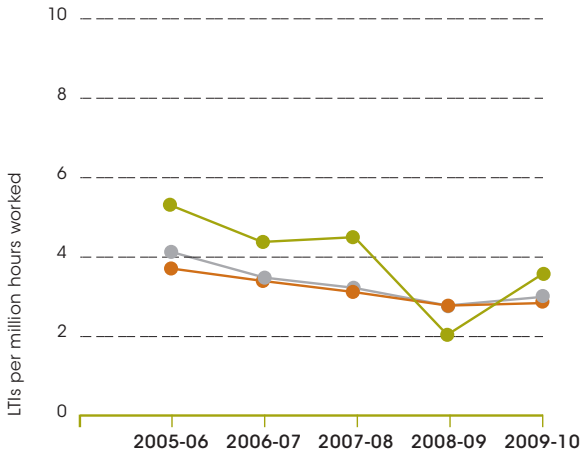
METALLIFEROUS PERFORMANCE INDICATORS 2005–06 TO 2009–10

FIGURE 6 INCIDENCE RATE



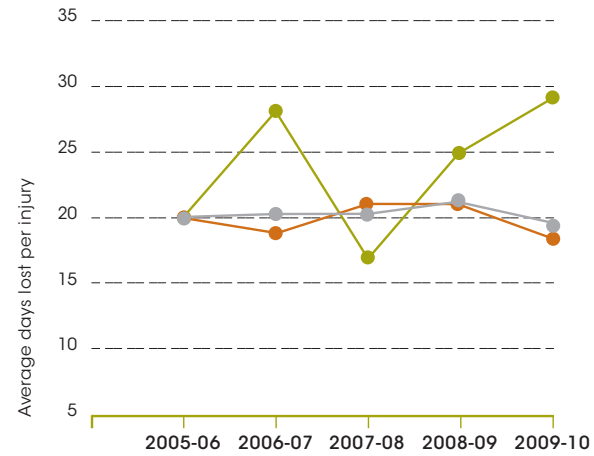
	2005-06	2006-07	2007-08	2008-09	2009-10
Underground	12.6	10.5	10.5	4.6	7.7
Surface	7.6	7.1	5.9	5.6	5.7
Total	8.1	7.5	6.5	5.5	5.9

FIGURE 7 FREQUENCY RATE



	2005-06	2006-07	2007-08	2008-09	2009-10
Underground	5.4	4.4	4.5	2.1	3.5
Surface	3.9	3.5	3.0	2.8	2.9
Total	4.1	3.6	3.2	2.7	3.0

FIGURE 8 DURATION RATE



	2005-06	2006-07	2007-08	2008-09	2009-10
Underground	20.4	28.1	17.0	24.8	28.2
Surface	20.1	19.2	21.2	21.6	18.0
Total	20.2	20.5	20.4	21.9	19.4

FIGURE 9 INJURY INDEX

	2005-06	2006-07	2007-08	2008-09	2009-10
Underground	111	124	77	51	100
Surface	79	67	63	60	53
Total	82	74	65	59	58

INJURIES BY COMMODITIES CONTINUED

Gold performance indicators

The performance indicators for the gold sector showed mixed results for 2009–10. Figures 10 to 13 depict the performance indicators of incidence, frequency and duration rates, and injury index.

Some interesting trends noted in the gold sector performance indicators during 2009–10 include the following.

- The overall incidence rate deteriorated significantly by 46%, rising from 4.1 to 6.0. The surface incidence rate deteriorated significantly by 40% (from 4.3 to 6.0) and the underground incidence rate deteriorated significantly by 72% (from 3.6 to 6.2).
- The overall frequency rate deteriorated significantly by 63%, rising from 1.9 to 3.1. The surface frequency rate deteriorated significantly by 65% (from 2.0 to 3.3) and the underground frequency rate deteriorated significantly by 75% (from 1.6 to 2.8).
- The overall duration rate improved slightly by 2%, falling to 25.9. The surface duration rate improved by 19% (from 27.3 to 22.2) whereas the underground duration rate deteriorated significantly by 51% (from 23.4 to 35.3).
- The rise in frequency rate was greater than the fall in duration rate resulting in a 59% overall significant deterioration in the injury index, rising from 51 to 81. The surface injury index deteriorated by 30% (from 56 to 73) and the underground injury index deteriorated significantly by 163% (from 38 to 100).

Gold injury percentage breakdown for 2009–10

Appendices F and G provide a percentage breakdown of the number of injuries for part of body, nature of injury, location of accident and type of accident for the underground and surface sectors, respectively.

Injuries by part of body

- Hand injuries at 17%, accounted for the largest proportion of underground injuries. Back injuries accounted for the largest proportion of surface injuries at 25%.
- Arm injuries accounted for the next largest proportion of injuries underground at 14%, followed by back, foot and toes, leg, multiple and trunk NOC injuries each at 10%. All of the arm injuries were to shoulders. All of the leg injuries were to knees and ankles.
- Hand injuries accounted for the second largest proportion of surface injuries at 23%, followed by leg injuries at 19%. Of the leg injuries, 64% were to knees.

Injuries by nature

- Sprain or strain was the highest ranking nature of injury for both underground and surface injuries at 28% and 48%, respectively.
- The second highest ranking natures of underground injury were fracture and crushing, both at 17%, followed by bruise or contusion at 14%.
- The second highest ranking nature of surface injury was also fracture at 16%, followed by crushing and laceration, both at 7%.

Injuries by location

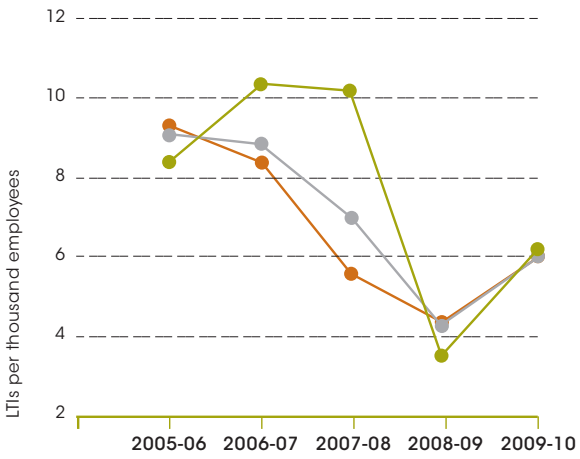
- The largest proportion of underground injuries occurred in production and development (72%) followed by access and haulage ways at 17% then dumping areas at 7%.
- The largest proportion of surface injuries occurred in treatment plants (33%), followed by open pits at 26% then workshops at 16%.

Injuries by type of accident

- Struck by object was the most common accident type for underground injuries at 21%, followed by slip or trip at 17% then over-exertion or strenuous movements at 14%.
- The most common accident type for surface injuries was over-exertion or strenuous movements at 30%, followed by slip or trip at 15% then caught by or between moving objects and struck by object, both at 11%.

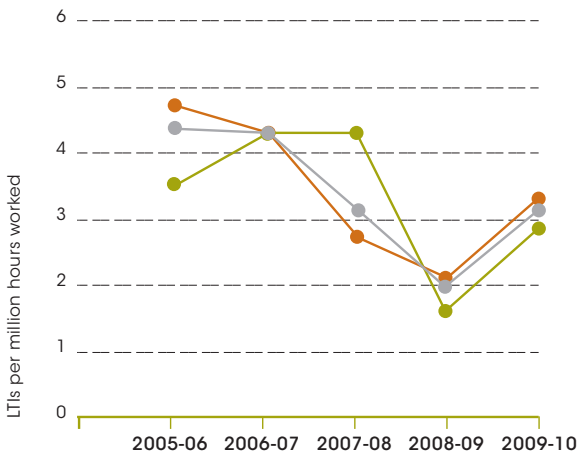
GOLD PERFORMANCE INDICATORS 2005–06 TO 2009–10

FIGURE 10 INCIDENCE RATE



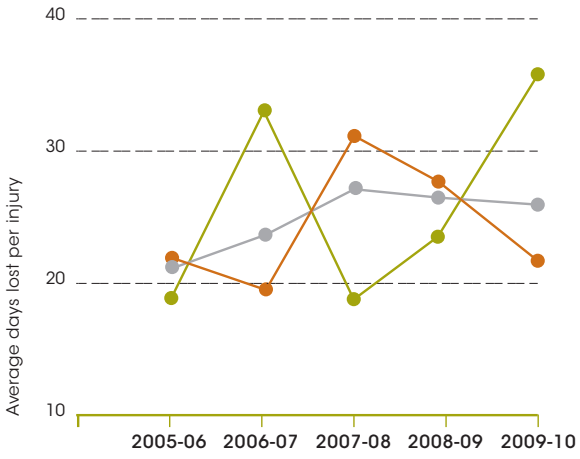
	2005-06	2006-07	2007-08	2008-09	2009-10
Underground	8.5	10.3	10.2	3.6	6.2
Surface	9.2	8.3	5.7	4.3	6.0
Total	9.0	8.8	6.8	4.1	6.0

FIGURE 11 FREQUENCY RATE



	2005-06	2006-07	2007-08	2008-09	2009-10
Underground	3.5	4.4	4.4	1.6	2.8
Surface	4.8	4.3	2.8	2.0	3.3
Total	4.4	4.3	3.2	1.9	3.1

FIGURE 12 DURATION RATE



	2005-06	2006-07	2007-08	2008-09	2009-10
Underground	19.3	33.1	18.9	23.4	35.3
Surface	21.5	19.4	31.0	27.3	22.2
Total	21.0	23.2	26.7	26.5	25.9

FIGURE 13 INJURY INDEX

	2005-06	2006-07	2007-08	2008-09	2009-10
Underground	68	144	83	38	100
Surface	102	83	86	56	73
Total	93	100	85	51	81

INJURIES BY COMMODITIES CONTINUED

Iron ore performance indicators

The performance indicators for the iron ore sector improved during 2009–10. Figures 14 to 17 depict the performance indicators of incidence, frequency and duration rates, and injury index.

Some interesting trends noted in the iron ore sector performance indicators during 2009–10 include the following.

- The incidence rate improved by 39%, falling from 5.1 to 3.1.
- The frequency rate improved by 40%, falling from 2.5 to 1.5.
- The duration rate improved by 20%, falling from 23.5 to 18.9.
- The fall in both duration rate and frequency rate resulted in a significant improvement of 51% in injury index (from 59 to 29).

Iron ore injury percentage breakdown for 2009–10

Appendix H provides a percentage breakdown of the number of injuries for part of body, nature of injury, location of accident, and type of accident.

Injuries by part of body

- Leg injuries, at 25%, accounted for the largest proportion of injuries. Of the leg injuries, 50% were to knees and 25% were to ankles.
- Back injuries accounted for the second largest proportion of injuries at 24%, followed by hand injuries at 21%.

Injuries by nature

- Sprain or strain was the highest ranking nature of injury at 48%.
- Fracture was the second highest ranking nature of injury at 15%, followed by laceration at 8%.

Injuries by location

- The largest proportion of injuries occurred in open pits, which accounted for 33%.
- The second largest proportion occurred in general surface areas at 19%, followed by workshops at 18%.

Injuries by type of accident

- Over-exertion or strenuous movements was the most common type of accident resulting in injury (29%).
- Slip or trip was the second most common type (14%), followed by caught by or between moving objects at 11%.

IRON ORE PERFORMANCE INDICATORS 2005–06 TO 2009–10

FIGURE 14 INCIDENCE RATE

FIGURE 15 FREQUENCY RATE

FIGURE 16 DURATION RATE

FIGURE 17 INJURY INDEX

INJURIES BY COMMODITIES CONTINUED

Bauxite and alumina performance indicators

The performance indicators for the bauxite and alumina sector showed mixed results for 2009–10. Figures 18 to 21 depict the performance indicators of incidence, frequency and duration rates, and injury index.

Some interesting trends noted in the bauxite and alumina sector performance indicators during 2009–10 include the following.

- The incidence rate deteriorated significantly by 58%, rising from 5.5 to 8.7.
- The frequency rate deteriorated significantly by 57%, rising from 2.8 to 4.4.
- The duration rate improved by 23%, falling from 20.6 to 15.8.
- The rise in frequency rate was greater than the fall in duration rate and resulted in a deterioration of 21% for the injury index, up from 58 to 70.

Bauxite and alumina injury percentage breakdown for 2009–10

Appendix I provides a percentage breakdown of the number of injuries for part of body, nature of injury, location of accident, and type of accident.

Injuries by part of body

- Arm injuries accounted for the largest proportion of injuries at 29%. Of the arm injuries, 64% were to shoulders and 18% were to elbows and wrists.
- Hand injuries accounted for the second largest proportion of injuries at 17%, followed by back injuries at 16%.

Injuries by nature

- Sprain or strain was the highest ranking nature of injury at 61%.
- Effects of chemicals or fumes was the second highest ranking nature of injury at 9%, followed by bruise or contusion at 8%.

Injuries by location

- The largest proportion of injuries occurred in treatment plants, which accounted for 73%.
- The second largest proportion occurred in open pits at 9%, followed by administration and workshops both at 5%.

Injuries by type of accident

- Over-exertion or strenuous movements was the most common type of accident resulting in injury (44%).
- Caught by or between moving objects and slip or trip were equally the second most common types (10%), followed by contact with chemicals or fumes 9%.

BAUXITE AND ALUMINA PERFORMANCE INDICATORS 2005–06 TO 2009–10

FIGURE 18 INCIDENCE RATE

FIGURE 19 FREQUENCY RATE

FIGURE 20 DURATION RATE

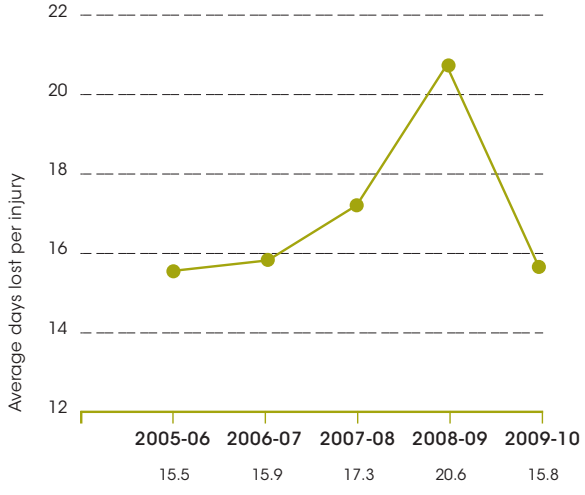
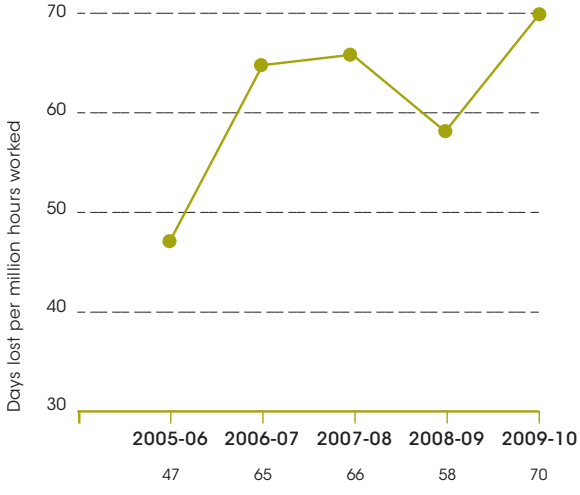


FIGURE 21 INJURY INDEX



INJURIES BY COMMODITIES CONTINUED

Nickel performance indicators

The performance indicators for the nickel sector showed mixed results for 2009–10. Figures 22 to 25 depict the performance indicators of incidence, frequency and duration rates, and injury index.

Some interesting trends noted in the nickel sector performance indicators during 2009–10 include the following.

- The overall incidence rate deteriorated by 27%, rising from 4.9 to 6.2. The surface incidence rate deteriorated by 20% (from 4.6 to 5.5) and the underground incidence rate deteriorated significantly by 49% (from 5.7 to 8.5).
- A similar trend was noted in the frequency rate for both surface and underground. The overall frequency rate deteriorated by 33%, rising from 2.4 to 3.2. The surface frequency rate deteriorated by 26% (from 2.3 to 2.9) and the underground frequency rate deteriorated significantly by 46% (from 2.6 to 3.8).
- The overall duration rate improved by 34%, falling to 11.3. The surface duration rate improved by 32% (from 17.9 to 12.1) and the underground duration rate improved by 38% (from 15.3 to 9.5).
- The fall in duration rate was greater than the rise in frequency rate resulting in an overall improvement of 12% in the injury index, falling from 41 to 36. The surface injury index improved by 15% (from 41 to 35) and the underground injury index improved by 10% (from 40 to 36).

Nickel injury percentage breakdown for 2009–10

Appendices J and K provide a percentage breakdown of the number of injuries for part of body, nature of injury, location of accident, and type of accident for the underground and surface sectors, respectively.

Injuries by part of body

- Arm injuries accounted for the largest proportion of underground injuries at 29%. Of the underground arm injuries, 75% were to shoulders. Arm injuries also accounted for the largest proportion of surface injuries at 39%. Of the surface arm injuries, 83% were to shoulders and 17% were to elbows and wrists.
- Leg injuries at 21%, accounted for the second largest proportion of injuries underground, followed by back injuries, foot and toe injuries and trunk not otherwise classified injuries, each at 14%. Of the leg injuries, 33% were to knees.
- Back injuries accounted for the second highest proportion of surface injuries at 19%, followed by leg injuries at 13%. Of the leg injuries 75% were to knees.

Injuries by nature

- Sprain or strain was the highest ranking nature of injury for both underground and surface injuries at 71% and 61% respectively.
- The second highest ranking nature of underground injury was fracture at 21%, followed by bruise or contusion at 7%.
- The second highest ranking natures of surface injury were bruise or contusion and fracture both at 10%, followed by pain at 6%.

Injuries by location

- The largest proportion of underground injuries occurred in production and development areas (57%), followed by access and haulage ways and workshops both at 14%, then dumping areas and underground not otherwise classified both at 7%.
- The largest proportions of surface injuries occurred in treatment plants and workshops both at 29%, followed by open pits at 16%, then surface general areas at 13%.

Injuries by type of accident

- Over-exertion or strenuous movements was the most common accident type for underground injuries at 43%, followed by rockfall, slip or trip and stepping each at 14%, then struck by object and struck by vehicle or mobile equipment both at 7%.
- The most common accident type for surface injuries was also over-exertion or strenuous movements at 42%, followed by slip or trip at 16%, then vehicle or mobile equipment jolting or jarring at 13%.

NICKEL PERFORMANCE INDICATORS 2005–06 TO 2009–10

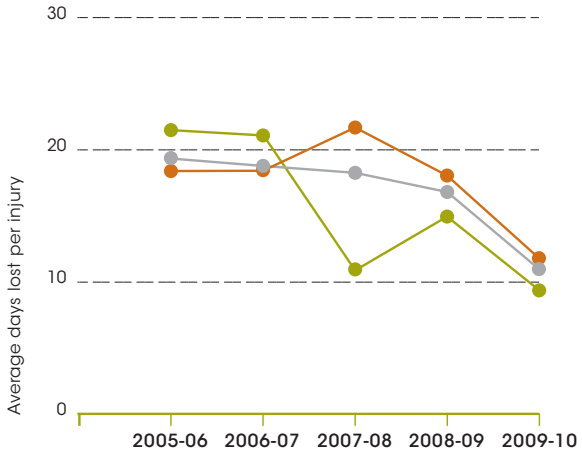
FIGURE 22 INCIDENCE RATE

	2005-06	2006-07	2007-08	2008-09	2009-10
Underground	23.2	9.5	8.2	5.7	8.5
Surface	9.0	4.2	3.6	4.6	5.5
Total	11.5	5.1	4.5	4.9	6.2

FIGURE 23 FREQUENCY RATE

	2005-06	2006-07	2007-08	2008-09	2009-10
Underground	10.2	4.1	3.7	2.6	3.8
Surface	4.8	2.1	1.9	2.3	2.9
Total	5.9	2.5	2.3	2.4	3.2

FIGURE 24 DURATION RATE



	2005-06	2006-07	2007-08	2008-09	2009-10
Underground	21.8	21.1	11.0	15.3	9.5
Surface	18.3	18.4	22.4	17.9	12.1
Total	19.5	19.3	18.4	17.2	11.3

FIGURE 25 INJURY INDEX

	2005-06	2006-07	2007-08	2008-09	2009-10
Underground	222	87	40	40	36
Surface	88	38	43	41	35
Total	116	48	42	41	36

DISABLING INJURIES

Review of disabling injuries during 2009–10

In addition to the 422 LTIs during 2009–10, there were 673 disabling injuries (DIs) reported (655 in metalliferous mines and 18 in coal mines), bringing the total number of reportable injuries to 1,095. A breakdown of these data with performance indicators is shown in Tables 10 and 11.

Of the disabling injuries, 455 resulted in the injured person being disabled for two weeks or more.

TABLE 10 DISABLING INJURIES 2009–10

Sector	No. of employees	Disabling injuries			Reportable injuries (DIs and LTIs)		
		No. of injuries	Incidence rate	Frequency rate	No. of injuries	Incidence rate	Frequency rate
Metalliferous surface	60,637	526	8.7	4.5	873	14.4	7.4
Metalliferous underground	7,172	129	18.0	8.3	184	25.7	11.9
Metalliferous total	67,809	655	9.7	4.9	1,057	15.6	7.9
Coal total	969	18	18.6	12.2	38	39.2	25.7
Total mining	**68,778**	**673**	**9.8**	**5.0**	**1,095**	**15.9**	**8.1**
Exploration	2,807	19	6.8	3.3	57	20.3	10.0

TABLE 11 DISABLING INJURIES BY MINERAL MINED 2009–10

Mineral mined	No. of employees	Disabling injuries			Reportable injuries (DIs and LTIs)		
		No. of injuries	Incidence rate	Frequency rate	No. of injuries	Incidence rate	Frequency rate
Iron ore	25,438	188	7.4	3.6	268	10.5	5.1
Gold	16,913	188	11.1	5.8	290	17.1	8.9
Bauxite and alumina	8,820	129	14.6	7.4	206	23.4	11.8
Nickel	7,268	108	14.9	7.6	153	21.1	10.7
Base metals	1,929	13	6.7	3.9	41	21.3	12.3
Mineral sands	1,811	8	4.4	2.5	24	13.3	7.5
Diamonds	1,336	3	2.2	1.2	9	6.7	3.5
Salt	986	1	1.0	0.6	7	7.1	4.4
Coal	969	18	18.6	12.2	38	39.2	25.7
Manganese ore	780	3	3.8	2.0	8	10.3	5.4
Construction materials	578	3	5.2	2.6	9	15.6	7.7
Tin, tantalum and lithium	339	1	2.9	1.4	4	11.8	5.6
Other	1.611	10	6.2	3.9	38	23.6	14.8
Total mining	**68,778**	**673**	**9.8**	**5.0**	**1,095**	**15.9**	**8.1**

NOTE: Disabling injury includes where the injured person:

- is placed in a different occupation or job, whether on full or restricted work hours
- remains in his or her normal occupation or job, but is not able to perform the full range of work duties
- remains in his or her normal occupation or job, but on restricted hours.

DISABLING INJURIES CONTINUED

Disabling injury performance indicators

The disabling injury performance indicators for the mining sector deteriorated during 2009–10. Figures 26 to 29 depict the performance indicators of incidence rate, frequency rate, days off per injury and days off per million hours worked.

Some interesting trends noted in the disabling injury performance indicators for all mines during 2009–10 include the following.

- The overall incidence rate deteriorated by 14%, rising from 8.6 to 9.8. The surface incidence rate deteriorated by 10% (from 8.0 to 8.8) and the underground incidence rate deteriorated by 28% (from 14.1 to 18.0).
- A similar trend was noted in the frequency rate for both surface and underground. The overall frequency rate deteriorated by 16%, rising from 4.3 to 5.0. The surface frequency rate deteriorated by 15% (from 4.0 to 4.6) and the underground frequency rate deteriorated by 34% (from 6.2 to 8.3).
- The overall days off per disabling injury deteriorated slightly by 4%, rising to 36.7. The days off per surface disabling injury deteriorated slightly by 1% (from 36.0 to 36.2) and the days off per underground disabling injury deteriorated by 19% (from 32.5 to 38.6).
- The rise in frequency rate and in days off per disabling injury resulted in a deterioration of 22% to the overall days off per million hours worked, up from 150 to 183. The days off per surface million hours worked deteriorated by 15% (from 144 to 165) and the days off per underground million hours worked deteriorated significantly by 58% (from 203 to 321).

Disabling injury percentage breakdown for 2009–10

Appendices L and M provide a percentage breakdown of the number of injuries for part of body, nature of injury, location of accident and type of accident for the underground and surface sectors, respectively.

Injuries by part of body

- Arm injuries and back injuries, both at 24%, accounted equally for the largest proportion of underground injuries. Arm injuries also accounted for the largest proportion of surface injuries at 28%. Of the underground arm injuries, 52% were to shoulders, 19% were to wrists and 16% were to elbows. Of the surface arm injuries, 59% were to shoulders, 17% were to elbows and 17% were to wrists.
- Leg injuries accounted for the next largest proportion of injuries underground at 16%, followed by hand injuries at 12%. Of the leg injuries, 50% were to ankles and 30% were to knees.
- Back injuries accounted for the second largest proportion of surface injuries at 21%, followed by hand injuries at 20%.

Injuries by nature

- Sprain or strain was the highest ranking nature of injury for both underground and surface injuries at 60% and 62%, respectively.
- The second highest ranking nature of underground injury was laceration (9%), followed by bruise or contusion at 8%.
- The second highest ranking nature of surface injury was crushing at 8%, followed by laceration and bruise or contusion, both at 7%.

Injuries by location

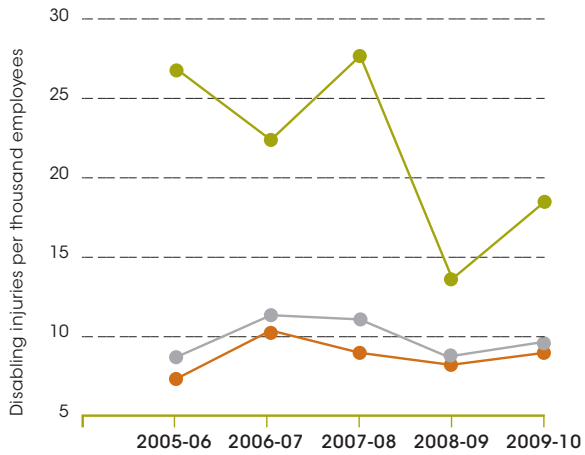
- The largest proportion of underground injuries occurred in production and development areas (57%), followed by access and haulage ways at 24% then underground not otherwise classified at 8%.
- The largest proportion of surface injuries occurred in treatment plants (31%), followed by open pits at 22% then workshops at 17%.

Injuries by type

- Over-exertion or strenuous movements, at 40%, was the most common accident type for underground injuries, followed by slip or trip and stepping both at 9% then rockfall at 6%.
- The most common accident type for surface injuries was also over-exertion or strenuous movements at 45%, followed by caught by or between moving objects at 9% then slip or trip and vehicle or mobile equipment jolting or jarring both at 7%.

DISABLING INJURY PERFORMANCE INDICATORS 2005–06 TO 2009–10

FIGURE 26 INCIDENCE RATE

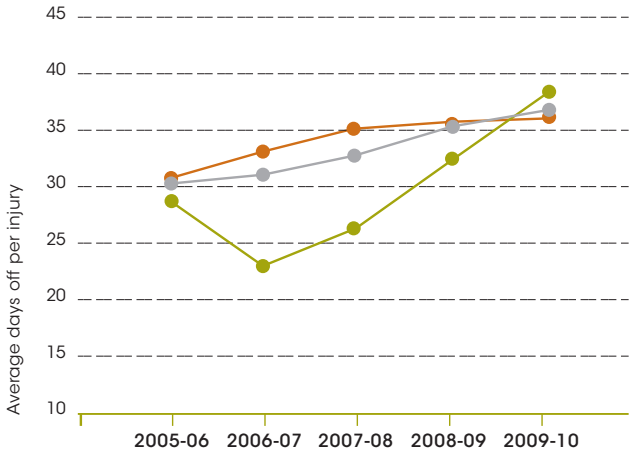


	2005-06	2006-07	2007-08	2008-09	2009-10
Underground	26.8	22.2	27.6	14.1	18.0
Surface	7.1	10.4	9.0	8.0	8.8
Total	9.0	11.6	11.0	8.6	9.8

FIGURE 27 FREQUENCY RATE

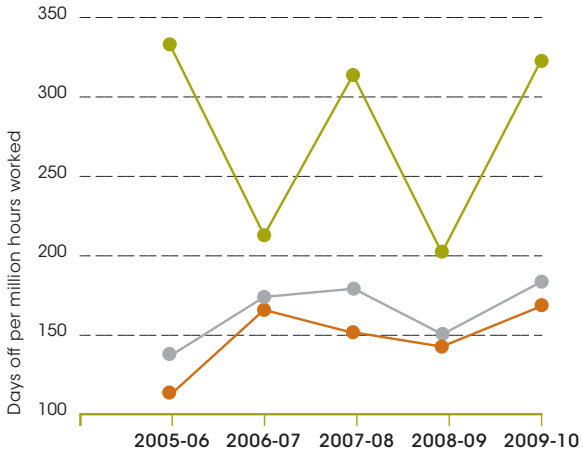
	2005-06	2006-07	2007-08	2008-09	2009-10
Underground	11.5	9.4	11.9	6.2	8.3
Surface	3.7	5.1	4.5	4.0	4.6
Total	4.5	5.6	5.5	4.3	5.0

FIGURE 28 AVERAGE DAYS OFF PER INJURY



	2005-06	2006-07	2007-08	2008-09	2009-10
Underground	28.9	22.8	26.5	32.5	38.6
Surface	30.8	32.9	35.2	36.0	36.2
Total	30.3	30.9	32.8	35.4	36.7

FIGURE 29 DAYS OFF PER MILLION HOURS WORKED



	2005-06	2006-07	2007-08	2008-09	2009-10
Underground	333	214	316	203	321
Surface	113	168	158	144	165
Total	137	174	179	150	183

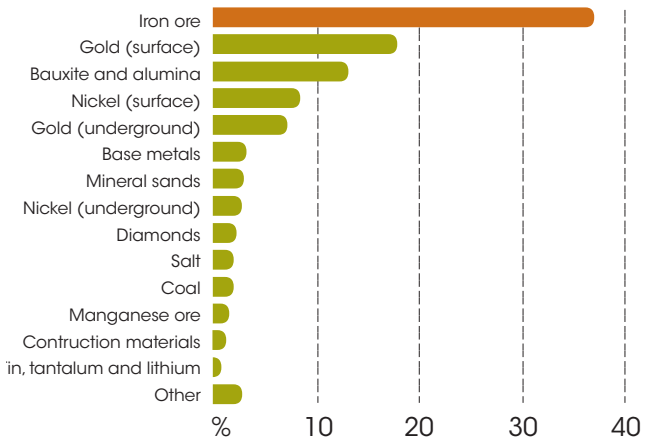
APPENDICES

APPENDIX A

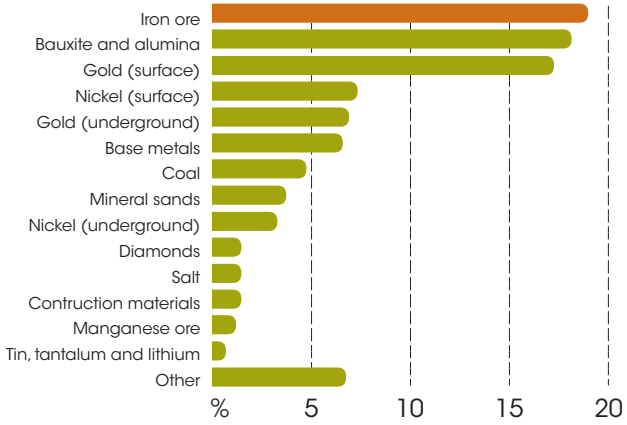
WESTERN AUSTRALIAN MINES 2009–10

422 injuries

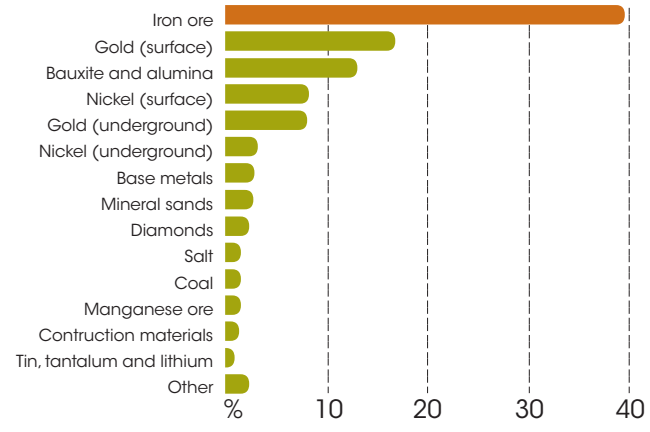
PERCENTAGE OF EMPLOYEES



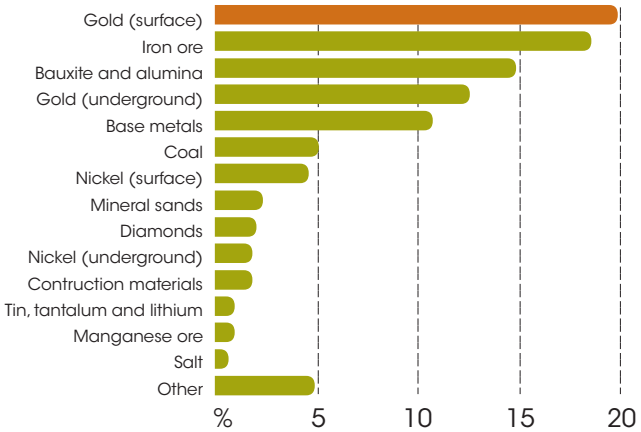
PERCENTAGE OF INJURIES



PERCENTAGE OF MILLION HOURS WORKED



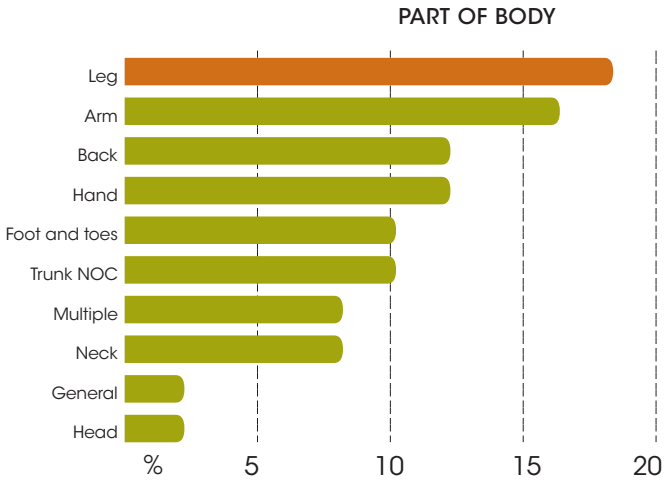
PERCENTAGE OF WORK DAYS LOST

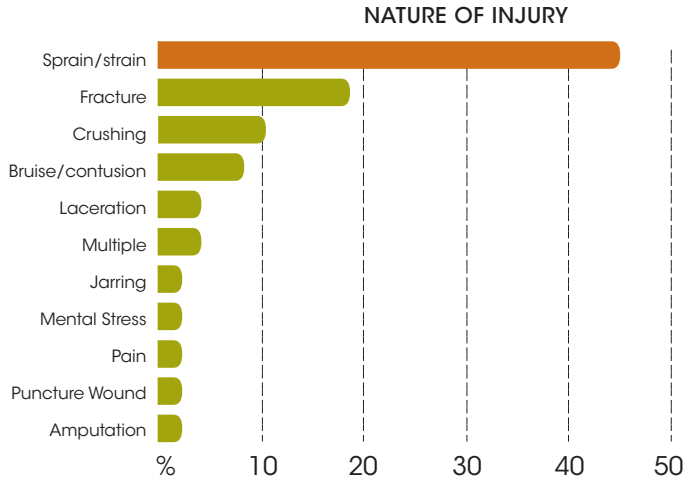


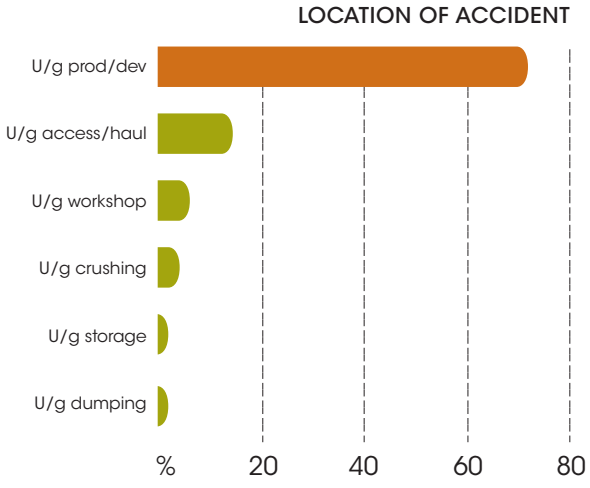
APPENDIX B

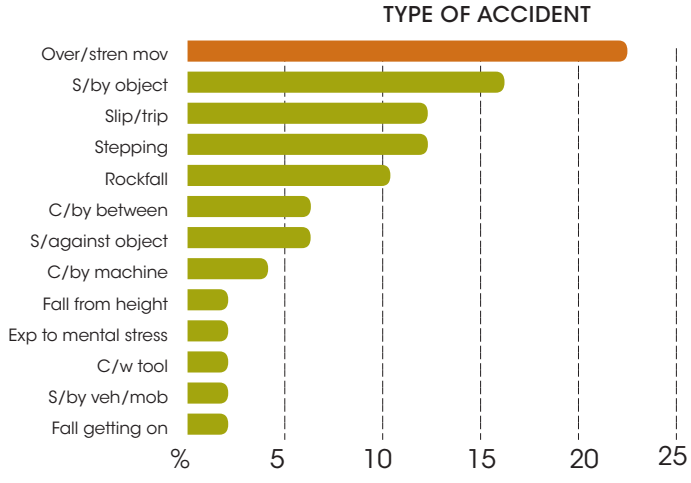
SERIOUS INJURIES UNDERGROUND 2009–10

49 injuries







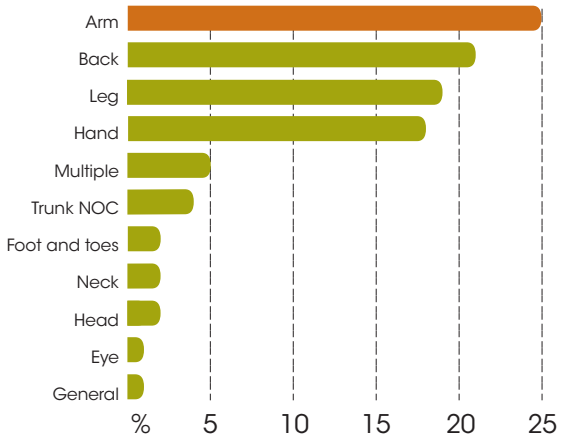


APPENDIX C

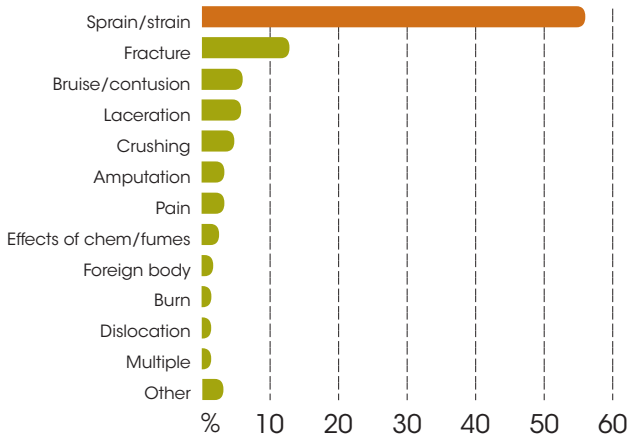
SERIOUS INJURIES SURFACE 2009–10

291 injuries

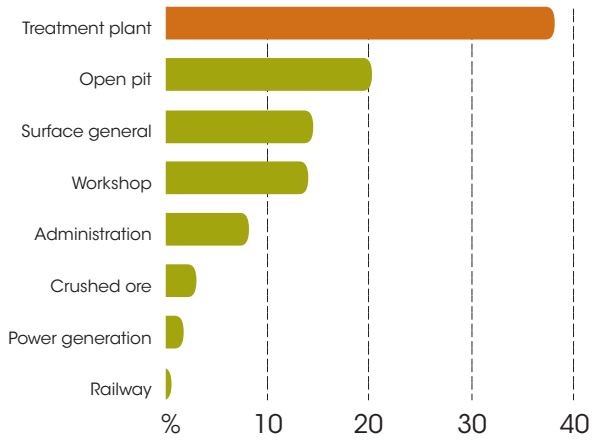
PART OF BODY



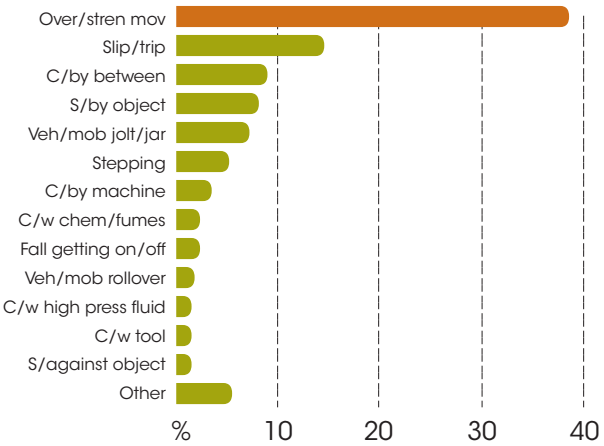
NATURE OF INJURY



LOCATION OF ACCIDENT



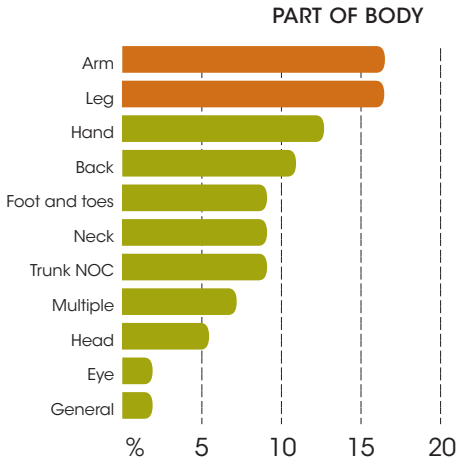
TYPE OF ACCIDENT

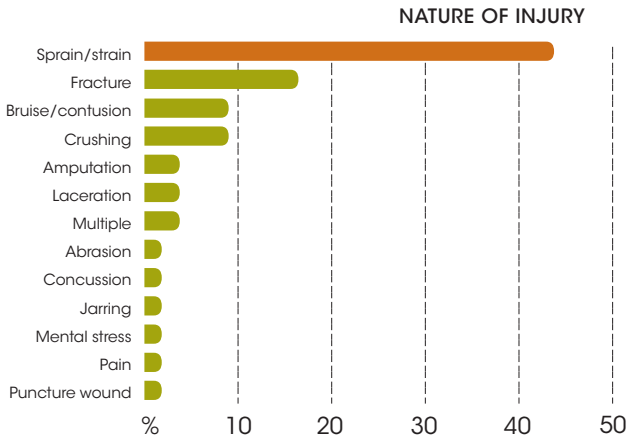


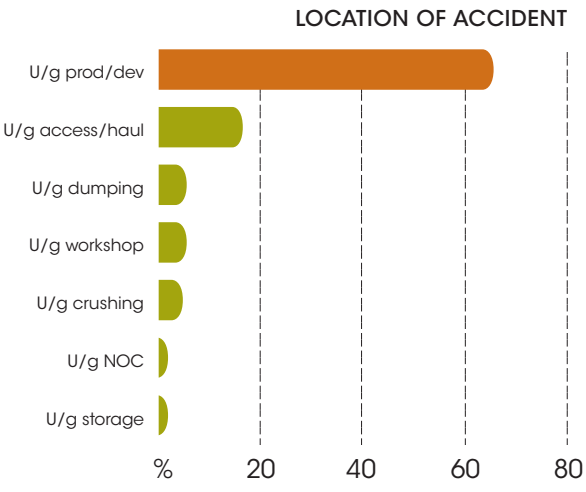
APPENDIX D

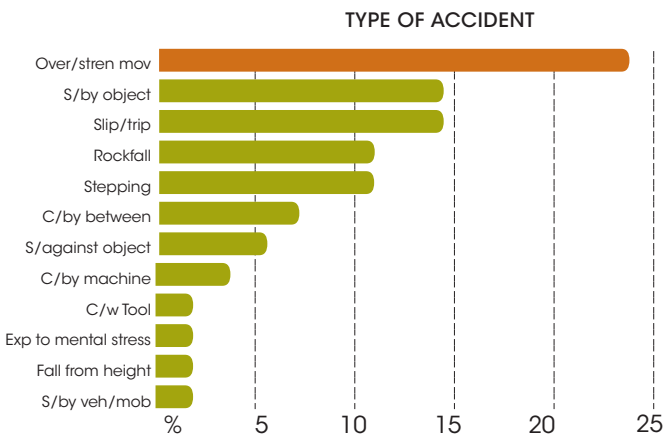
METALLIFEROUS UNDERGROUND INJURIES 2009–10

55 injuries







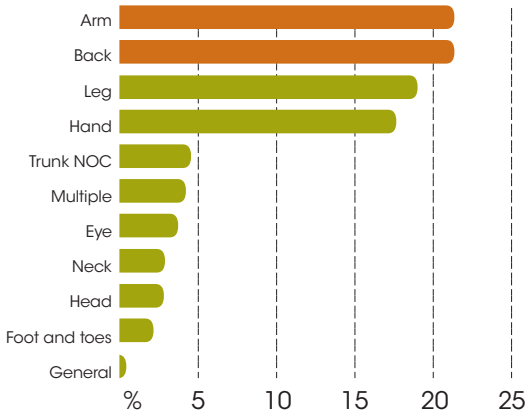


APPENDIX E

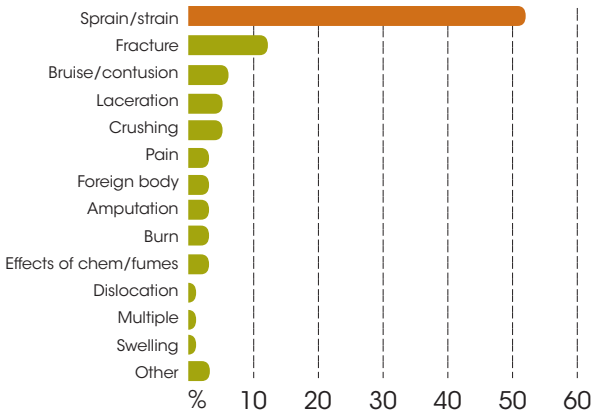
METALLIFEROUS SURFACE INJURIES 2009–10

347 injuries

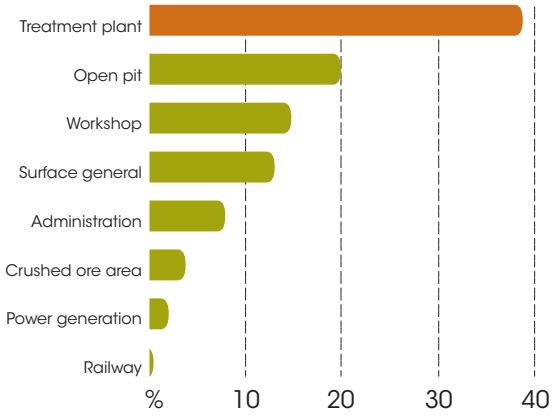
PART OF BODY



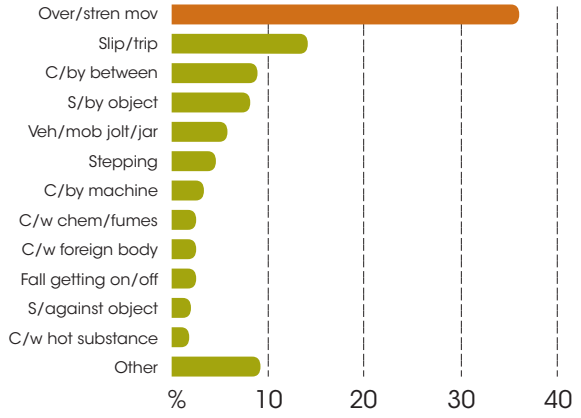
NATURE OF INJURY



LOCATION OF ACCIDENT



TYPE OF ACCIDENT

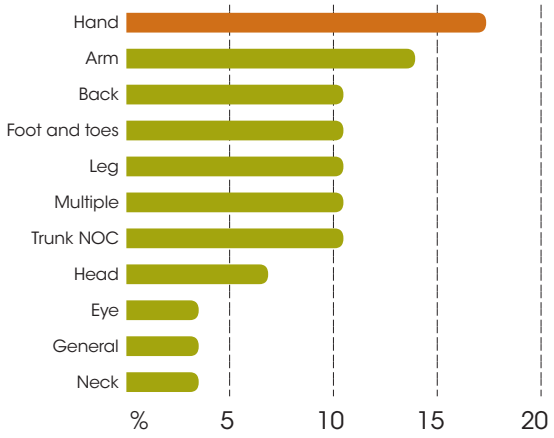


APPENDIX F

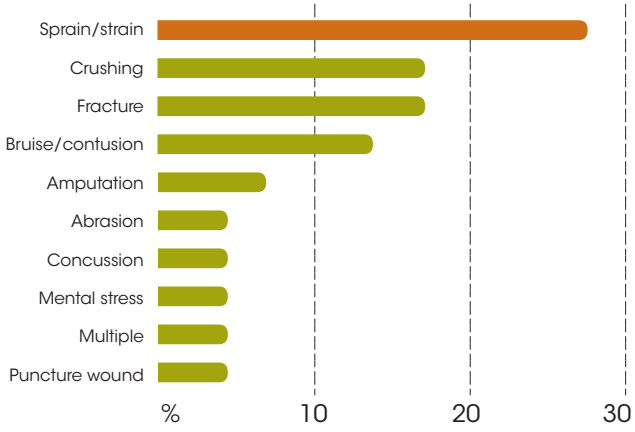
GOLD UNDERGROUND INJURIES 2009–10

29 injuries

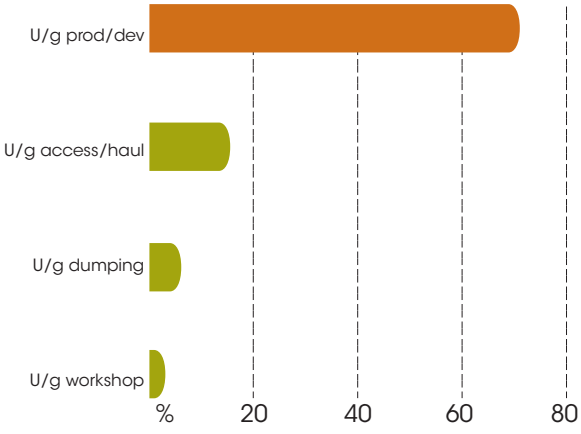
PART OF BODY



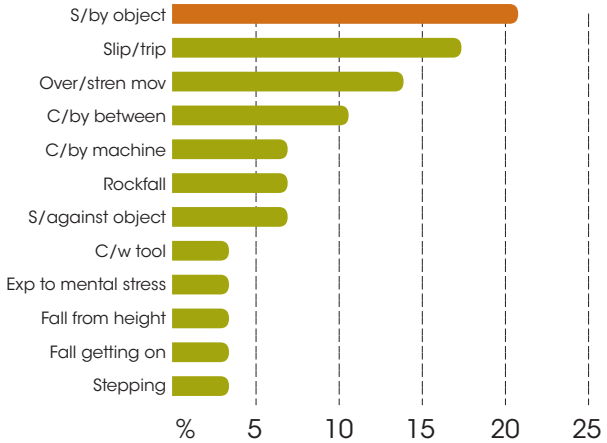
NATURE OF INJURY



LOCATION OF ACCIDENT



TYPE OF ACCIDENT

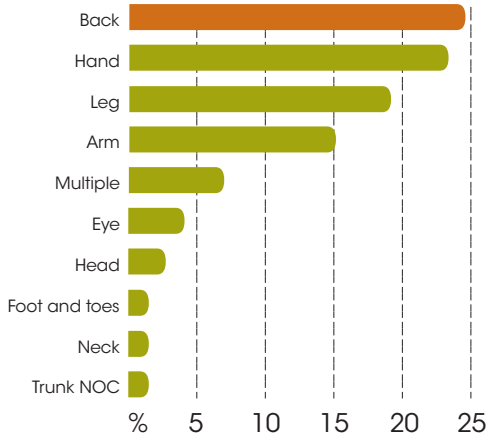


APPENDIX G

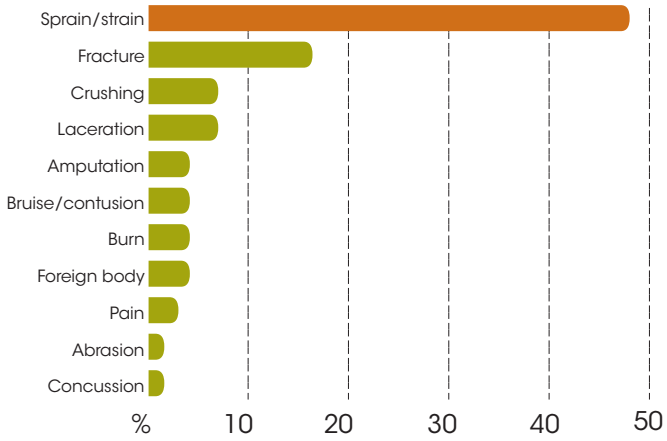
GOLD SURFACE INJURIES 2009–10

73 injuries

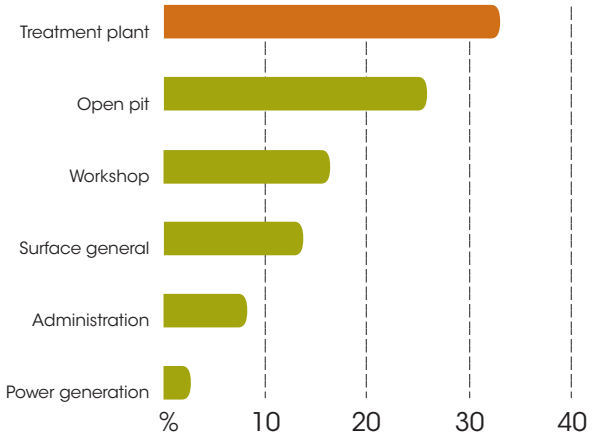
PART OF BODY



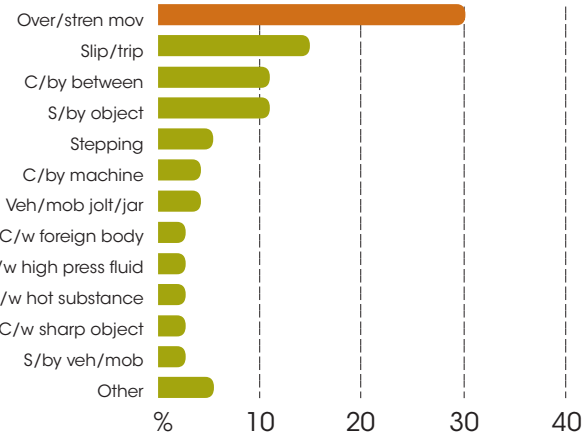
NATURE OF INJURY



LOCATION OF ACCIDENT



TYPE OF ACCIDENT

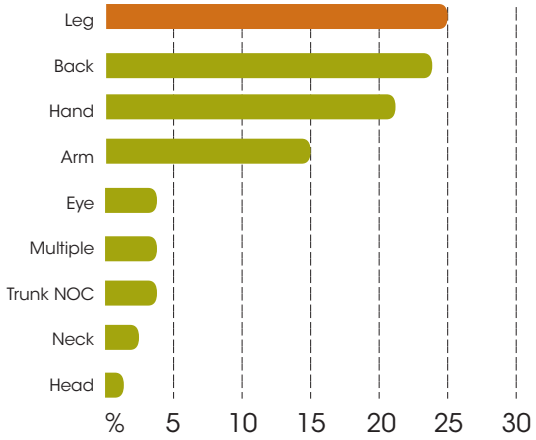


APPENDIX H

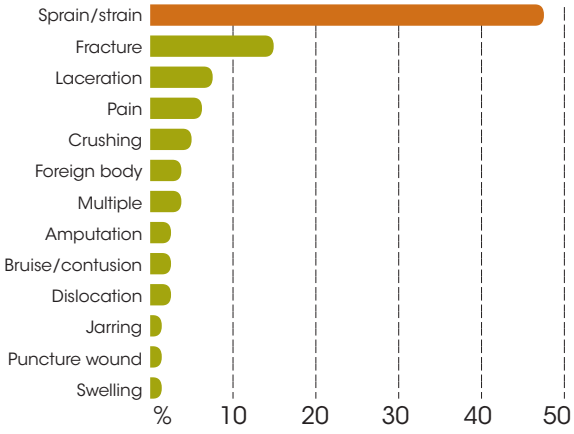
IRON ORE INJURIES 2009–10

80 injuries

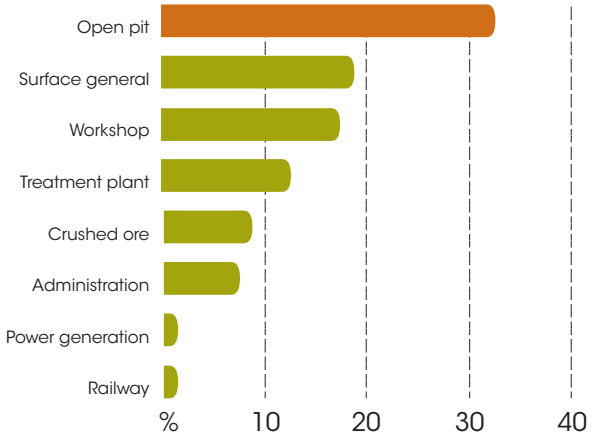
PART OF BODY



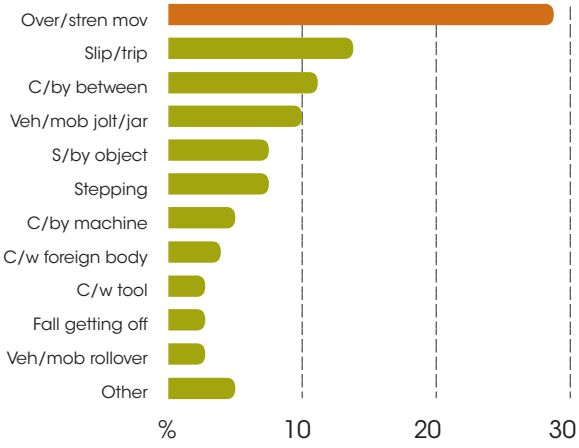
NATURE OF INJURY



LOCATION OF ACCIDENT



TYPE OF ACCIDENT

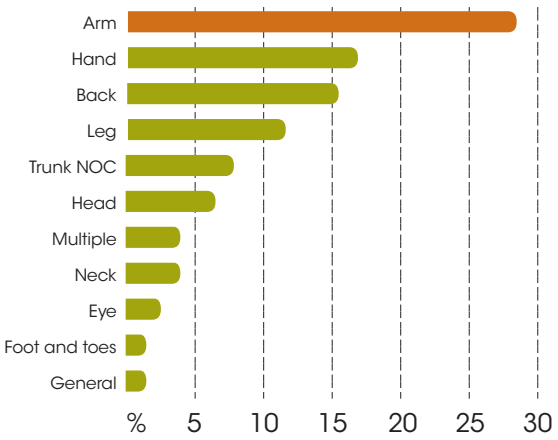


APPENDIX 1

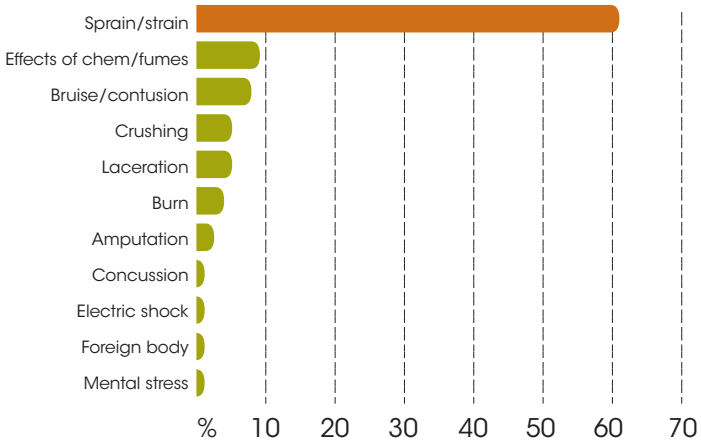
BAUXITE AND ALUMINA INJURIES 2009–10

77 injuries

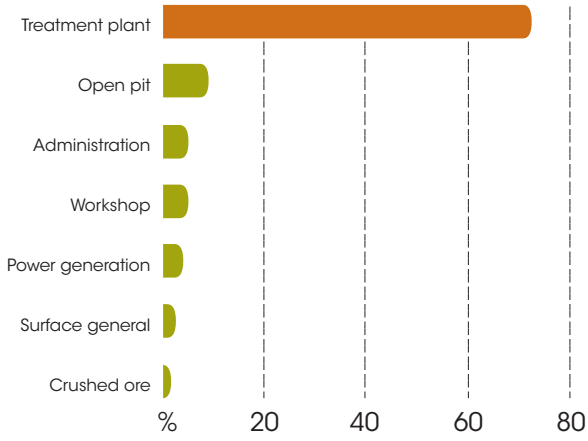
PART OF BODY



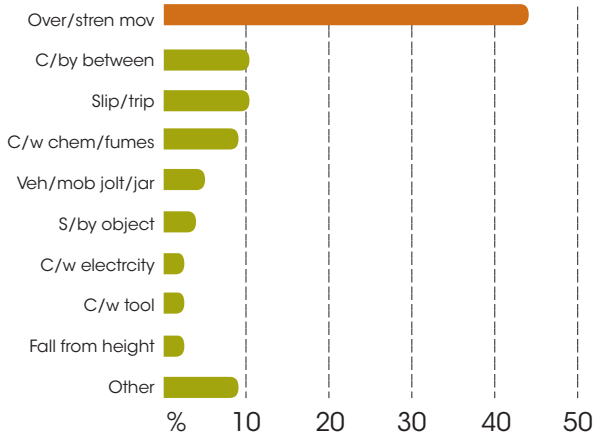
NATURE OF INJURY



LOCATION OF ACCIDENT



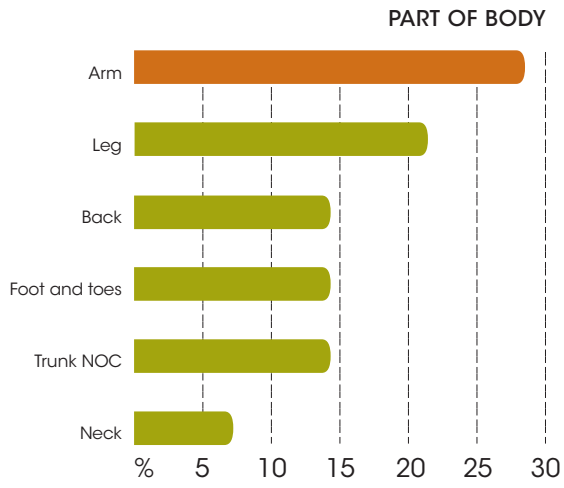
TYPE OF ACCIDENT

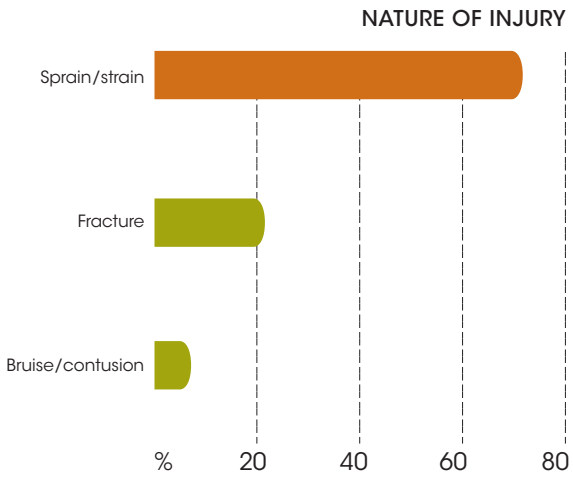


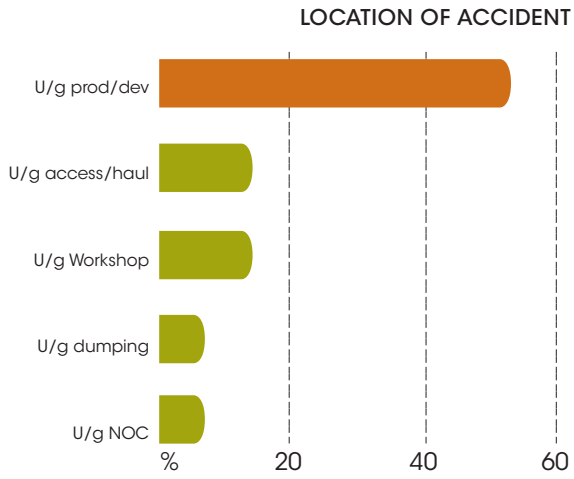
APPENDIX J

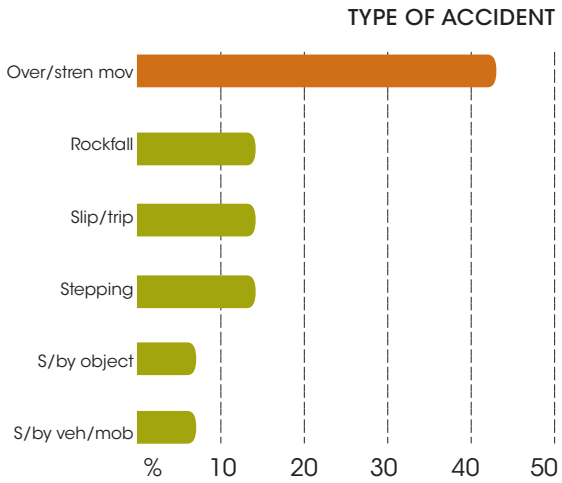
NICKEL UNDERGROUND INJURIES 2009–10

14 injuries







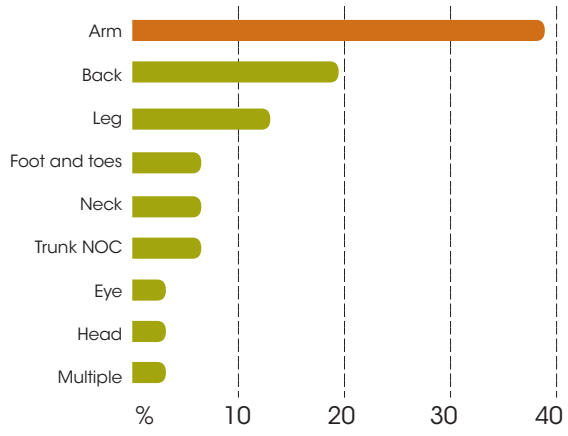


APPENDIX K

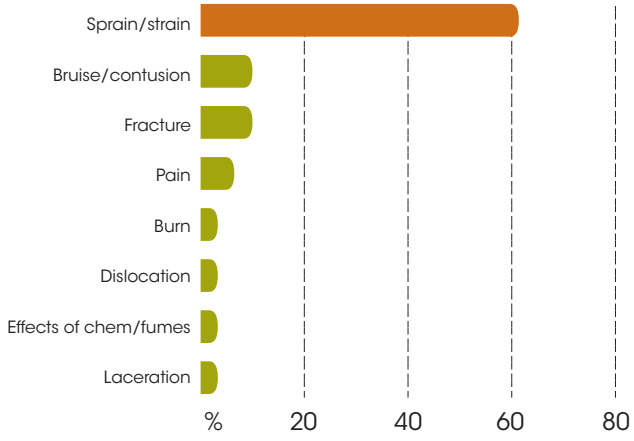
NICKEL SURFACE INJURIES 2009–10

31 injuries

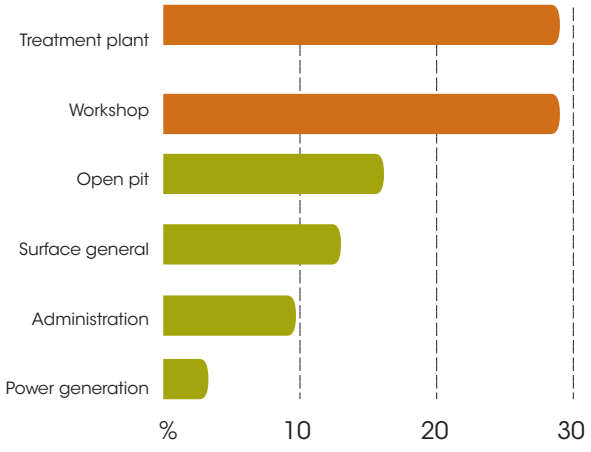
PART OF BODY



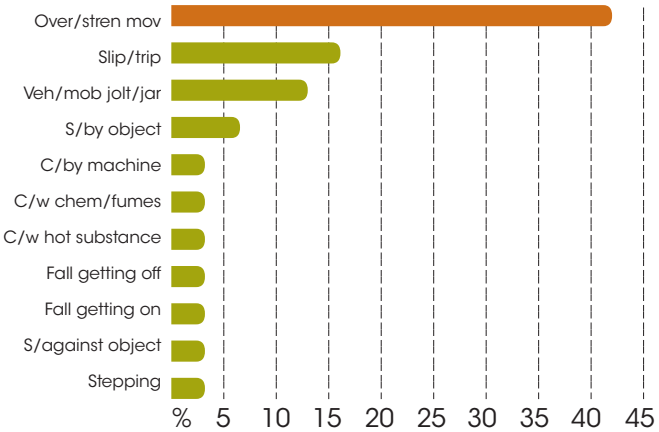
NATURE OF INJURY



LOCATION OF ACCIDENT



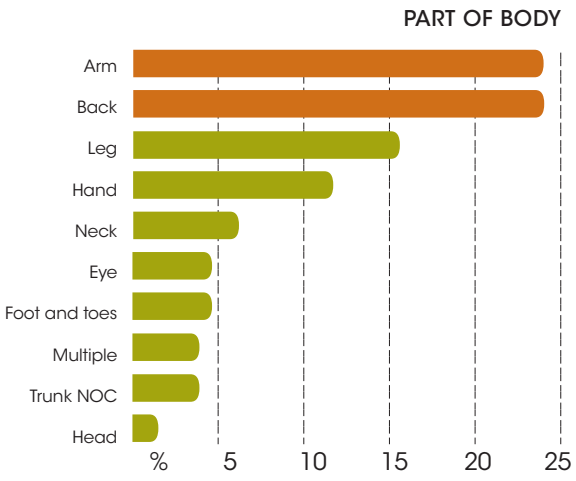
TYPE OF ACCIDENT

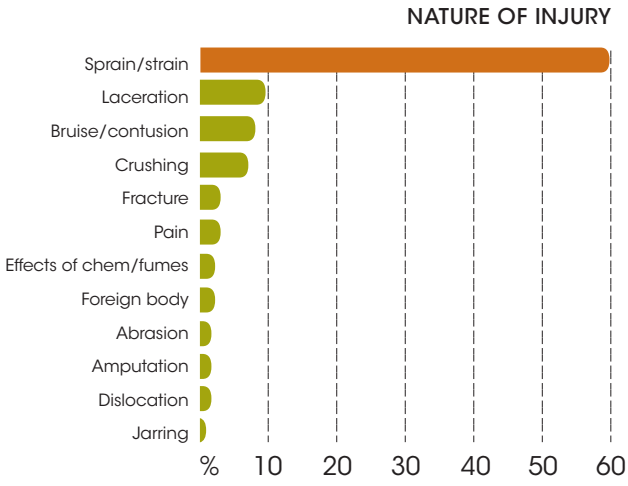


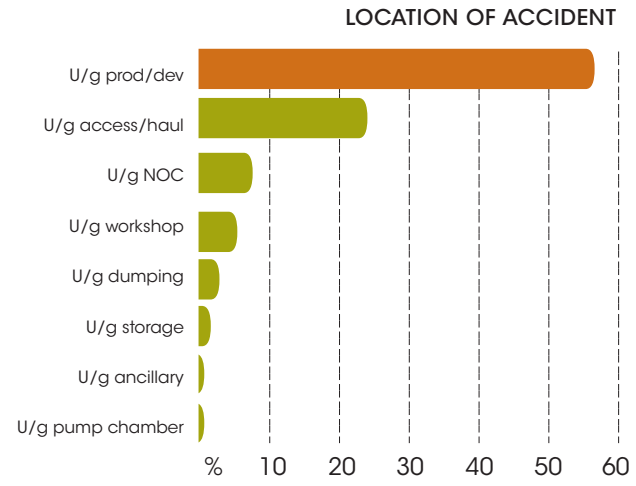
APPENDIX L

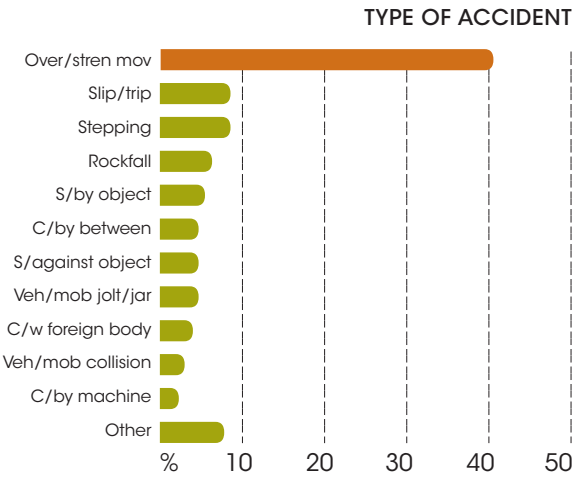
DISABLING INJURIES UNDERGROUND 2009–10

129 injuries





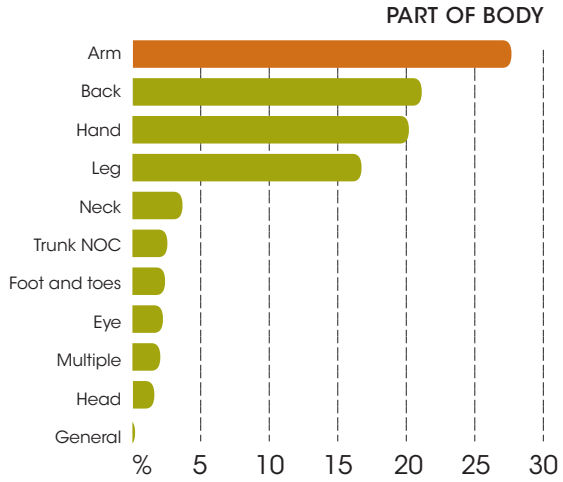


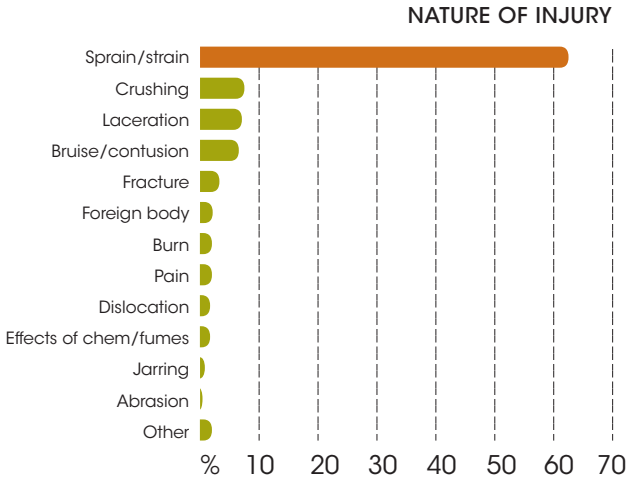


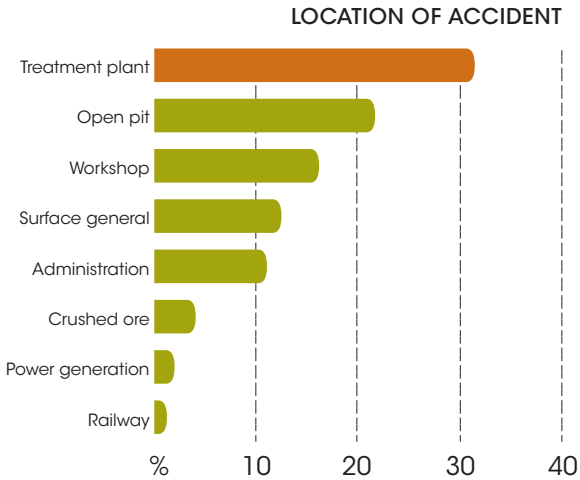
APPENDIX M

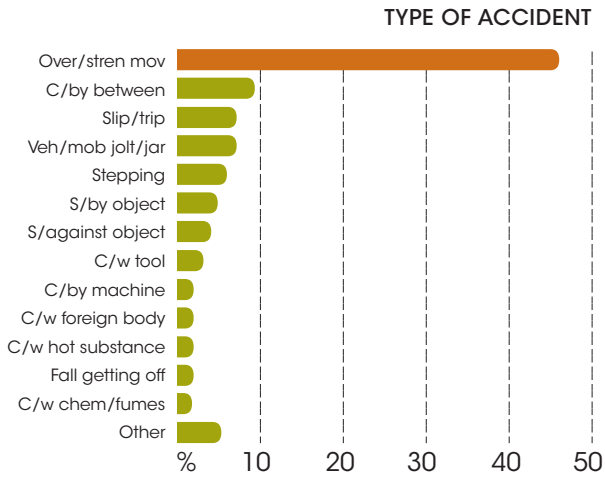
DISABLING INJURIES SURFACE 2009–10

544 injuries







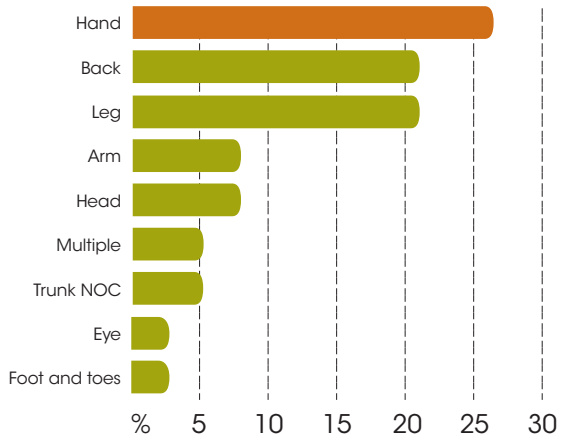


APPENDIX N

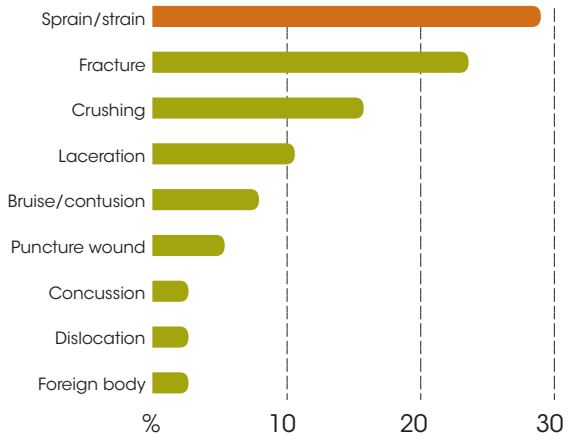
EXPLORATION INJURIES 2009–10

38 injuries

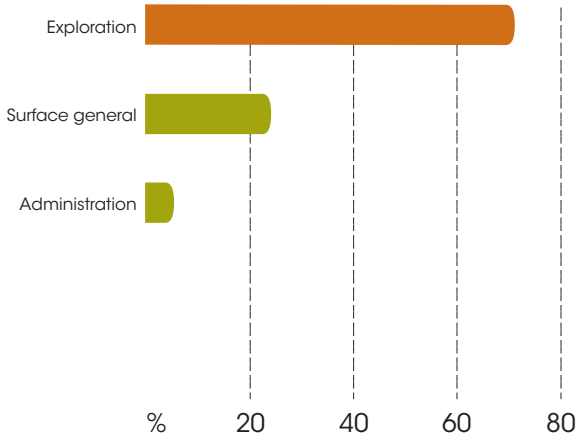
PART OF BODY



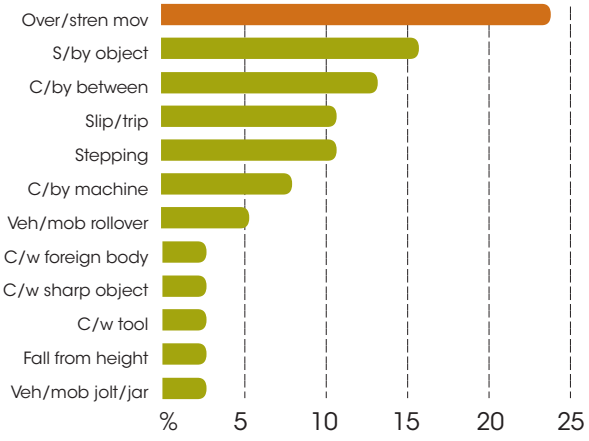
NATURE OF INJURY



LOCATION OF ACCIDENT



TYPE OF ACCIDENT



APPENDIX 0

SELECTED TERMS USED FOR REPORTING ACCIDENT TYPE

Fall from height – fall from height equal to or greater than 0.5 metres; includes falls from vehicles or mobile equipment but does not include falls while getting on or off the vehicle or mobile equipment

Slip/trip – other falls not from height or while getting on or off vehicles or mobile equipment; includes falls on stairs, falls on slippery or uneven ground, falls over loose or fixed objects, and falls handling equipment

Fall getting on/off – falls getting on or off vehicles or mobile equipment but does not include falls stepping on uneven ground while disembarking from a vehicle or mobile equipment

Rockfall – falls of rock usually from the face, walls and backs of underground excavations or from the face and walls of surface excavations

S/by object – includes being struck by falling, flying, sliding, or moving objects but does not include rockfalls or being struck by persons, vehicles or mobile equipment

S/against object – struck against stationary or moving objects (e.g. hitting head on low structure while walking)

S/by veh/mob – struck by a vehicle or mobile equipment

C/by between – caught by or between still or moving objects (e.g. finger caught between two pipes while attempting to move one of them) but does not include getting caught between parts of an operating machine

C/by machine – caught between parts of an operating machine

Veh/mob collision – vehicle or mobile equipment collision; includes colliding with stationary objects or walls

Veh/mob rollover – vehicle or mobile equipment rollovers; includes partial rollovers

Veh/mob jolt/jar – vehicle or mobile equipment jolting or jarring (e.g. jolting or jarring while driving over an uneven surface, sitting in a truck being loaded with large material, bogging a face, ripping with a bulldozer)

Stepping – stepping on object, loose rock, uneven surface or to a higher or lower level; includes stepping on uneven ground while disembarking from a vehicle or mobile equipment; usually results in a sprain or strain to the ankle or knee

Over/sten mov – over-exertion or strenuous movements; usually associated with lifting, carrying, pulling, pushing and moving objects; also includes strenuous movements, repetitive movements with no specific event, and working in a confined area or while in an awkward posture

Exp to heat – exposure to environmental heat; usually results in heat stress related injuries

C/w hot substance – contact with hot solid, liquid, gas or steam, molten metal or naked flame; usually results in burns

C/w tool – contact with a handheld manual or power tool

C/w sharp object – contact with sharp object but does not include objects such as sharp tools or operating machines

C/w chem/fumes – inhalation, absorption or ingestion of chemicals or fumes including smoke, blast fumes, acids, caustic substances and industrial solvents

Other – a grouping of accident types that individually contain a smaller proportion of injuries than the smallest individual type shown on a chart (typically less than two per cent)

Note: For clarity, most bar charts in this publication are restricted to 14 or fewer categories

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