Explanatory notes

Introduction

The statistics published in this report relate to accidents between 1 July 2004 and 30 June 2005 (2004–05) 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 2004–05 has three components:

i) **Initial injuries** — days lost in 2004–05 from injuries that occurred in 2004–05

ii) **Recurrent injuries** — days lost in 2004–05 through recurrences of injuries that occurred in 2004–05 and previous years

iii) **Carry-over injuries** — days lost in 2004–05 by persons continuously off work from injuries that occurred before 1 July 2004.

Note: Appendix L contains statistics on disabling injuries.

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. Exploration activities, although now included in the definition of mining operations, are not covered by this report, nor are oil and gas industry injuries.

Metalliferous mines

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

Fatal accidents

Work days lost have not been allocated to this type of accident, 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, as are the number of persons employed (including contractor employees) and hours worked during the month.

During the twelve months covered here, an average of 199 mines or groups of mines reported to the AXTAT system.

Journey accidents

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

Definitions

Lost time injury — a work injury that results in an absence from work of at least one full day or shift any time after the day or shift on which the injury occurred.

Serious injury — a lost time injury that results in the injured person being disabled for a period of two weeks or more.

Incidence rate — the number of injuries per 1,000 employees for a 12 month period.

Frequency rate — the number of injuries per million hours worked.

Duration rate — the average number of work days lost per injury.

Injury index — the number of work days lost per million hours worked (frequency rate x duration rate).

Fatal incidence rate — the number of fatalities per 1,000 employees for a 12 month period.

Fatal frequency rate — the number of fatalities per million hours worked.

Serious incidence rate — the number of serious injuries per 1,000 employees for a 12 month period.

Serious frequency rate — the number of serious injuries per million hours worked.

Abbreviations

BRUISE/CONTUSION	– bruise or contusion
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
SPRAIN/STRAIN	– sprain or strain
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 2004–05

There were two fatal accidents in the Western Australian mineral industry during 2004–05:

- A prospector died on a small gold mine after falling 12.5 m down a mine shaft. He had been travelling up the shaft on top of a full kibble, and had just reached the surface when the rear guy rope of the headframe detached from its anchor point. This caused the headframe to detach and resulted in the fall.
- The driver of a road train engaged in transporting iron ore was fatally injured when his empty road train was struck by the third (rear) trailer of a loaded road train travelling in the opposite direction. The driver of the loaded vehicle lost control of the trailer, which overturned and was dragged into the path of the deceased's vehicle.

Fatal incidence rate by mineral mined 2000–01 to 2004–05

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

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

The high fatal incidence rate for the dimension stone sector was the result of two fatal accidents in a relatively small workforce, one in 2000–01 and the other in 2003–04.

Table 1 Fatal incidence rate by mineral mined 2000-01 to 2004-05

Category		Fatalities per thousand employees
Mineral	Dimension stone	3.64
	Base metals	0.19
	Diamonds	0.17
	Nickel	0.13
	Iron ore	0.11
	Gold	0.08
Underground		0.19
Surface		0.07

Fatal incidence rate 1995–96 to 2004–05

The fatal incidence rate for 2004–05 was 0.04 and is still a concern to Resources Safety. 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 incidence rate of zero is achievable and sustainable.

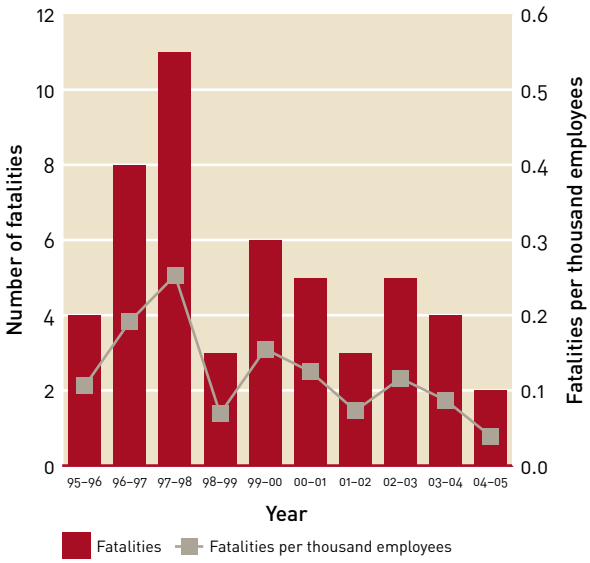


Figure 1 Fatal incidence rate 1995–96 to 2004–05

Fatal accidents continued

Fatal accidents by type 2000–01 to 2004–05

Table 2 indicates the type of accidents for the 19 fatalities in the mining industry (excluding exploration) over the past five years, with four underground and 15 at surface operations.

Each underground fatal accident was of a different type.

The most common type of surface fatal accident was vehicle or mobile equipment roll over, which resulted in four fatalities, followed by vehicle or mobile equipment collision and caught by or between operating machine, which resulted in two fatalities each.

Table 2 Number of fatalities 2000-02 to 2004-05

Category		No. of fatalities
Underground	C/w electricity	1
	Veh/mob collision	1
	Rockfall	1
	Fall from height	1
Surface	Veh/mob rollover	4
	Veh/mob collision	2
	C/by machine	2
	Rockfall	1
	Fall from height	1
	Exp to env NOC	1
	C/w tool	1
	Contact with flame	1
	Compressed air explosion	1
	C/w electricity	1

Serious injuries

Review of serious injuries during 2004–05

There were 316 serious injuries reported in the mineral industry during 2004–05 (272 in 2003–04). Of these, 306 were in metalliferous mines and ten were in coal mines.

Typical serious injuries include:

A process technician, cleaning material from the top of a rougher cell, sustained a torn knee cartilage when he fell sideways after the metal surface he was standing on gave way.

A trades assistant, using a torque wrench on a truck wheel, strained his shoulder when he jerked the torque wrench in an attempt to remove the socket from a nut.

A trades assistant, changing the air filter on a forklift, dislocated his shoulder when he fell from the rear of the forklift to the ground.

An electrician dislocated his shoulder cutting electrical cables with parrot nose pliers.

A fitter suffered a crush injury to his foot when a hydraulic ram fell onto his foot after the supporting chains slipped while the ram was being lifted by a crane.

A crane operator, walking around the operator platform of a 50 t crane, sustained crushed vertebrae when he fell 1.6 m and hit his head on the ground.

A haul truck operator, sitting in his vehicle while it was being loaded, sustained a strained neck when the truck was jolted by rocks that were being loaded into the truck with a face shovel.

A fitter, inspecting a leaking inspection door on a drier in a processing plant, suffered burns to his upper body when struck by a gust of hot air after the drier door blew open. The door seal had failed.

A process technician strained his shoulder while removing a rock bolt that was caught between a magnet and a conveyor transfer chute.

A mechanical maintenance technician, cutting a piece of 3 mm steel plate with an angle grinder, received a severe laceration to the back of his right hand when the grinder recoiled.

A soil technician received multiple injuries, including a puncture wound to his abdomen, when a trench collapsed and buried him. He remained buried for some minutes before he could be uncovered.

An underground haul truck driver, returning after tipping a load at the ROM pad, suffered whiplash injuries to his neck and back when he drove into the underground portal with the truck's tray still raised.

A fitter, looking for an electrical fault in the fuse box of a water cart, received burns to his upper body when a short circuit in the fuse box ignited contact cleaner he had sprayed into the fuse box causing a fire ball.

A utility worker, using a high pressure water gun alone in a tank at a processing plant, sustained lacerations to his back and arm when he slipped and lost control of the water gun. The water gun flicked around as it was powering down.

A serviceman, checking the radiator coolant level on a bulldozer, received burns to his face and forearm when the radiator cap blew off spraying him with boiling water. He had loosened the cap three times and thought all the pressure had been relieved.

A fitter strained his shoulder after using a hammer and impact wrench over a period of time.

A treatment plant superintendent received an electric shock, burns and cuts when the 400 W mercury vapour light globe he was changing broke and he touched the element.

A fitter, removing a fan from a truck's radiator assembly with an overhead crane, sustained a fractured foot when the radiator fell onto his foot. The fan had hooked up in the assembly and had lifted the radiator a few inches.

A truck driver, sitting in a light vehicle parked in front of a haul truck, received multiple contusions and fractured ribs when the haul truck ran over the light vehicle.

A liner technician, driving a light vehicle back to camp, sustained multiple injuries when the vehicle left the road and rolled over after he lost control of the vehicle at a sweeping corner.

A haul truck operator, turning her truck on the ROM pad, sprained her wrist when the steering wheel spun after the truck's front wheel struck a rock.

Serious injuries continued

An underground front end loader (bogger) operator, displaced a disc in his back when the bogger he was operating ran over a series of pot holes. His hardhat struck the cabin roof as the seat bounced up and he landed awkwardly when the seat bottomed out.

A bogger operator, standing next to his machine, sustained a crushed arm when the bogger articulated as he reached into the cabin to operate the steering controls. The bogger was already articulated to the left and he was attempting to move it slightly so he could enter the cabin.

A forklift operator, reaching forward through the forklift frame to remove a wooden glut, sustained a crushed finger when it was caught after his knee struck the "down" lever.

A fitter, using a pair of 18" wrenches (stilsons) to undo a hose end, sustained a hernia to his abdomen when he pulled up on the stilsons.

A driller's offsider, leaning with his right hand on the drill mast as the rotary head was travelling down, sustained two crushed fingers when they were caught.

A process operator, opening the tap hole of a furnace after a repack, suffered burns to his face when hot furnace gases and botting particles blew from the tap hole through the sight of the tapping shotgun.

A trades assistant, hitting reclaimer chains into position with a sledge hammer, received a puncture wound when a metal fragment pierced his chest and lodged near his aorta.

A diesel fitter, fault finding on the alternator of a grader, had part of his thumb amputated when it touched the blade of the radiator fan while it was still operating.

An excavator operator sustained a lower back strain when he jumped off the back of a hydraulic excavavator. He had just activated a dry chemical powder extinguisher to put out a fire on the excavator and could not breathe in the cloud of powder.

A front end loader operator, attempting to climb up to the swingstock of a jaw crusher, sustained bruising to his lower back when he slipped and fell backwards onto an electric motor.

Serious injury incidence rate by mineral mined 2000–01 to 2004–05

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, and the lower part of the chart shows serious injury incidence rates by mineral mined.

The chart shows that the underground mining serious injury incidence rate (11.6) was almost twice the serious injury incidence rate at surface operations (5.9).

Of the major mining sectors, diamonds and coal had the highest five-year average serious incidence rate (12.4) whereas salt had the lowest (3.2). The mining sector referred to as 'other', with a five-year average serious incidence rate of 9.7, contained 4% of the total number of employees spread over 15 commodity groups. Most of the mine sites in this sector had less than 50 employees.

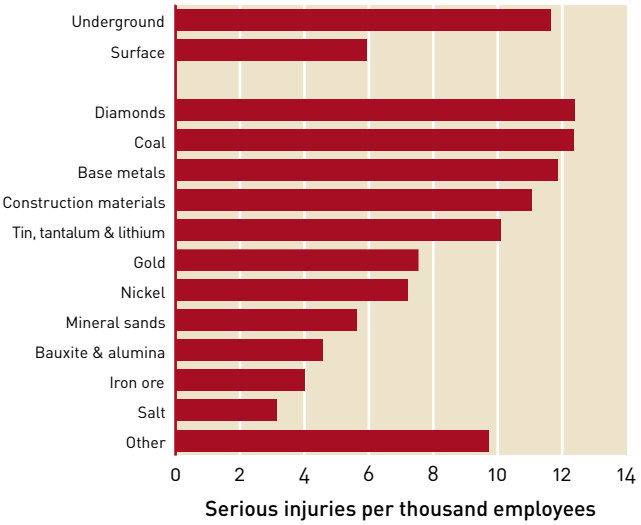
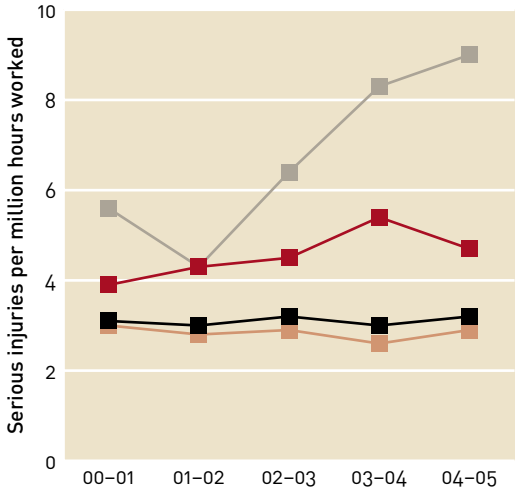


Figure 2 Serious injury incidence rate 2000–01 to 2004–05

Serious injury frequency rate 2000–01 to 2004–05

Figure 3 shows that the serious injury frequency rate decreased for underground metalliferous operations but increased for surface metalliferous operations and the coal sector, resulting in a 7% deterioration overall during 2004–05.



	00–01	01–02	02–03	03–04	04–05
Metalliferous u/g	3.9	4.3	4.5	5.4	4.7
Metalliferous surface	3.0	2.8	2.9	2.6	2.9
Coal	5.6	4.3	6.4	8.3	9.0
Total	3.1	3.0	3.2	3.0	3.2

Figure 3 Serious injury frequency rate 2000–01 to 2004–05

Serious injury percentage breakdown for 2004–05

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 25%, and back injuries accounted for 23% followed by hand injuries at 21%. Of the serious leg injuries, 92% were to knees and ankles.
- Consistent with the high proportion of knee, ankle and back injuries, sprain or strain represented the highest proportion by nature of injury (51%), followed by fracture at 11% then dislocation and laceration each at 8%.
- The majority of serious injuries underground were in production and development areas (53%), followed by access and haulage ways at 26% and workshops at 9%.
- The most common accident types associated with serious injuries underground were over-exertion or strenuous movements (30%), followed by stepping (11%) and then caught by or between moving objects, caught by operating machine, fall from height, and slip or trip at 8% each.

Surface

- Injuries to backs accounted for the largest proportion of serious injuries at 22%, and arm injuries accounted for 21% followed by injuries to legs at 19%. Of the serious arm injuries, 70% were to shoulders and wrists. Of the serious leg injuries, 67% were to knees and ankles.
- Consistent with the high proportion of back, shoulder, wrist, knee, and ankle injuries, sprain or strain represented the highest proportion by nature of injury (44%). Fracture was the next highest (13%) followed by laceration at 8%.
- The majority of serious injuries on the surface occurred in treatment plants (39%), followed by open pits at 26% and workshops at 12%.
- The most common accident types associated with serious injuries in surface operations were over-exertion or strenuous movements (30%), slip or trip (10%) and then vehicle or mobile equipment jolting and jarring, and struck by object both at 8%.

Lost time injuries

Review of lost time injuries during 2004–05

In 2004–05, 19,539 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 2004–05 (8,247), recurrences of injuries that occurred before 2004–05 and in 2004–05 (1,240), and LTIs and recurrences carried over into 2004–05 from accidents that occurred before July 2004 (10,052). A breakdown of work days lost in coal and metalliferous mining is given in Table 3.

During 2004–05, there were 425 LTIs in the State's mining industry: 410 in metalliferous mines and 15 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 39 recurrences of previous injuries, resulting in 1,240 work days lost during 2004–05. A breakdown of recurrent injuries by calendar year of initial injury is given in Table 6.

Ninety six persons who were still off work from injuries received before July 2004 lost 10,052 work days in 2004–05. A breakdown of these carry-over injuries is given in Table 7.

Table 3 Time lost through injury during 2004–05

Mining	Days lost			
	Initial injuries	Recurrent injuries	Carry-over injuries	TOTAL
Metalliferous	8,127	1,131	10,031	19,289
Coal	120	109	21	250
TOTAL MINING	**8,247**	**1,240**	**10,052**	**19,539**

Table 4 Initial lost time injuries during 2004–05

Mines	No. of employees	No. of LTIs	Incidence	Frequency	Duration	Injury index	Days lost
Metalliferous surface	45,697	332	7.3	3.8	21.1	80	7,001
Metalliferous underground	4,828	78	16.2	6.9	14.4	99	1,126
Metalliferous total	50,525	410	8.1	4.1	19.8	82	8,127
Coal total	682	15	22.0	13.5	8.0	108	120
TOTAL MINING	**51,207**	**425**	**8.3**	**4.2**	**19.4**	**82**	**8,247**

Table 5 Injuries by mineral mined during 2004–05

Mineral mined	No. of employees	No. of LTIs	Incidence	Frequency	Duration	Injury index	Days lost
Gold	12,512	100	8.0	3.9	25.4	98	2,536
Iron ore	12,459	54	4.3	2.2	20.6	45	1,114
Bauxite and alumina	8,463	39	4.6	2.5	17.0	42	663
Nickel	8,369	109	13.0	7.0	19.0	132	2,067
Mineral sands	2,603	13	5.0	2.9	19.1	56	248
Diamonds	1,484	17	11.5	5.0	23.9	120	406
Base metals	1,112	20	18.0	7.3	13.6	99	272
Salt	768	3	3.9	2.4	49.0	118	147
Coal	682	15	22.0	13.5	8.0	108	120
Tin, tantalum and lithium	525	9	17.1	6.4	10.2	66	92
Construction materials	321	10	31.2	14.9	12.8	191	128
Other	1,909	36	18.9	10.9	12.6	138	454
TOTAL MINING	**51,207**	**425**	**8.3**	**4.2**	**19.4**	**82**	**8,247**

NOTE: Duration in Tables 4 and 5 does not take into consideration time lost after 30 June 2005 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 2004.

Table 6 Recurrent injuries during 2004–05

Calendar year	Metalliferous mining		Coal mining		Total mining	
	No. of injuries	Days lost	No. of injuries	Days lost	No. of injuries	Days lost
2005*	4	69	–	–	4	69
2004	21	778	4	66	25	844
2003	3	70	1	21	4	91
2002	1	32	–	–	1	32
2001	1	51	–	–	1	51
2000	–	–	–	–	–	–
Pre-2000	2	131	2	22	4	153
TOTAL	**32**	**1,131**	**7**	**109**	**39**	**1,240**

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 2005.*

Table 7 Carry-over injuries during 2004–05

Calendar year	Metalliferous mining		Coal mining		Total mining	
	No. of injuries	Days lost	No. of injuries	Days lost	No. of injuries	Days lost
2004*	53	4,576	4	19	57	4,595
2003	23	3,076	1	2	24	3,078
2002	8	1,127	–	–	8	1,127
2001	2	502	–	–	2	502
2000	2	267	–	–	2	267
Pre-2000	3	483	–	–	3	483
TOTAL	**91**	**10,031**	**5**	**21**	**96**	**10,052**

** Covers period from 1 January to 30 June 2004.*

Lost time injuries continued

Review of lost time injuries during 2004–05 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 standard (AS 1885.1:1990 'Workplace Injury and Disease Recording Standard') is designed to be used by individual workplaces. There are two major differences between reporting for the AXTAT database and this standard.

The Australian Standard treats fatalities as LTIs with a penalty of 220 workdays lost for each, whereas in the AXTAT database they are kept separate with no penalty. Also, incidence per thousand employees is calculated from the AXTAT data in contrast to the Australian Standard's definition of injuries per hundred employees.

Tables 8 and 9 provide statistical information in accordance with the Australian Standard.

Table 8 Initial lost time injuries during 2004–05 (AS 1885.1:1990)

Mines	No. of employees	No. of LTIs	Injuries per hundred	Frequency	Duration	Days lost
Metalliferous surface	45,697	333	0.7	3.8	21.7	7,221
Metalliferous underground	4,828	79	1.6	7.0	17.0	1,346
Metalliferous total	50,525	412	0.8	4.2	20.8	8,567
Coal total	682	15	2.2	13.5	8.0	120
TOTAL MINING	**51,207**	**427**	**0.8**	**4.3**	**20.3**	**8,687**

NOTE : Duration in Tables 8 and 9 does not take into consideration time lost after 30 June 2005 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 2004 .

Table 9 Injuries by mineral mined during 2004–05 (AS 1885.1:1990)

Mines	No. of employees	No. of LTIs	Injuries per hundred	Frequency	Duration	Days lost
Gold	12,512	101	0.8	3.9	27.3	2,756
Iron ore	12,459	55	0.4	2.2	24.3	1,334
Bauxite and alumina	8,463	39	0.5	2.5	17.0	663
Nickel	8,369	109	1.3	7.0	19.0	2,067
Mineral sands	2,603	13	0.5	2.9	19.1	248
Diamonds	1,484	17	1.1	5.0	23.9	406
Base metals	1,112	20	1.8	7.3	13.6	272
Salt	768	3	0.4	2.4	49.0	147
Coal	682	15	2.2	13.5	8.0	120
Tin, tantalum and lithium	525	9	1.7	6.4	10.2	92
Construction materials	321	10	3.1	14.9	12.8	128
Other	1,909	36	1.9	10.9	12.6	454
TOTAL MINING	**51,207**	**427**	**0.8**	**4.3**	**20.3**	**8,687**

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 1996–97.

Over this period, the coal mining compensation rate decreased by 58% to 2.35% of payroll. The compensation rate for iron ore operations also decreased, by 13%, to 0.81% of payroll. The rate for underground gold operations increased by 13% during this period to 3.82% of payroll. The rate for surface gold operations also increased, by 2%, to 2.69% of payroll.

The average recommended premium rate for the Western Australian mining industry for 2005–06 is currently 2.25% of payroll, a 3% reduction on that for 2004–05 (2.31% of payroll).

Figure 5 shows the current recommended premium rates for 2005–06 for a variety of mineral groups and other industries.

Premium rates for mining industry groups compare favourably with other industry groups such as clay brick manufacturing and structural steel fabrication, which have current premium rates of 5.22 and 5.92% 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.

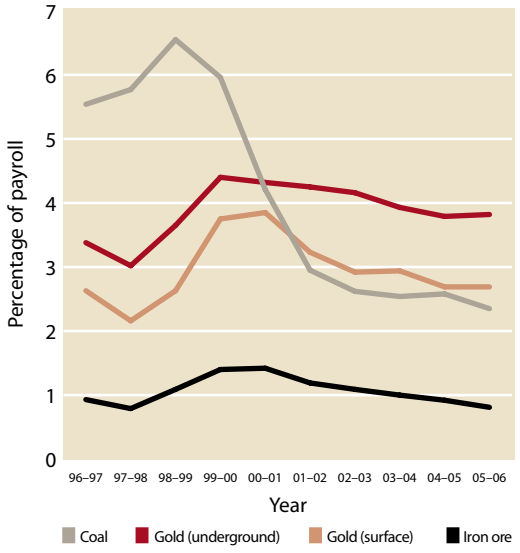


Figure 4 Mine workers' compensation rate trends 1996–97 to 2005–06

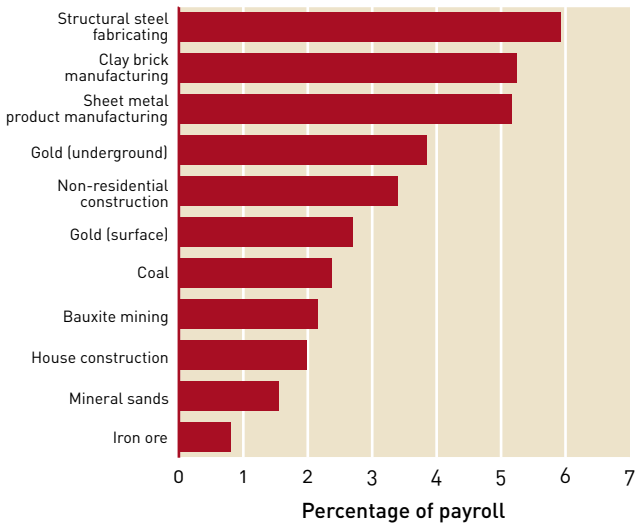


Figure 5 Recommended premium rates 2005–06

Injuries by commodity

Metalliferous performance indicators

The performance indicators for the metalliferous mining sector show mixed results for 2004–05. Figures 6 to 9 depict the performance indicators of incidence, frequency, duration rates, and injury index (see Explanatory notes on page 3 for definitions).

Some interesting trends noted in the performance indicators for metalliferous mines during 2004–05 include the following:

- The overall incidence rate improved slightly by 4%, falling from 8.4 to 8.1. The surface incidence rate also improved by 4% (from 7.6 to 7.3) whereas the underground incidence rate deteriorated by 1% (from 16.0 to 16.2).
- The overall frequency rate improved by 2%, falling from 4.2 to 4.1. The surface frequency rate remained the same at 3.8 whereas the underground frequency rate deteriorated by 5% (from 6.6 to 6.9).

  Note: Rounding to one decimal place has caused inconsistencies in the frequency trends.
- The overall duration rate improved by 10%, falling to 19.8. The surface duration rate deteriorated by 7% (from 19.7 to 21.1) whereas the underground duration rate improved significantly by 55% (from 31.9 to 14.4).
- The fall in frequency rate and duration rate, resulted in a 10% overall improvement in the injury index, which fell from 91 to 82. The surface injury index deteriorated by 7% (from 75 to 80) whereas the underground injury index improved significantly by 53% (from 211 to 99).

Metalliferous injury percentage breakdown for 2004–05

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

- Back injuries accounted for the largest proportion of underground injuries at 29%. Back injuries also accounted for the largest proportion of surface injuries at 21%.
- Leg injuries accounted for the second largest proportion of injuries underground at 22%, followed by hand injuries at 18%. Of the underground leg injuries, 76% were to knees and ankles.
- Arm injuries and hand injuries accounted for the second largest proportion of surface injuries (both at 18%), followed by leg injuries at 17%. Of the arm injuries, 67% were to shoulders and wrists. Of the leg injuries, 71% were to knees and ankles.

Injuries by nature

- Sprain or strain was the highest ranking nature of injury for both underground and surface injuries at 51% and 42% respectively.
- The second highest ranking nature of underground injury was fracture (9%), followed by laceration at 8%.
- The second highest ranking nature of surface injury was also fracture (11%), followed by bruise or contusion at 9%.

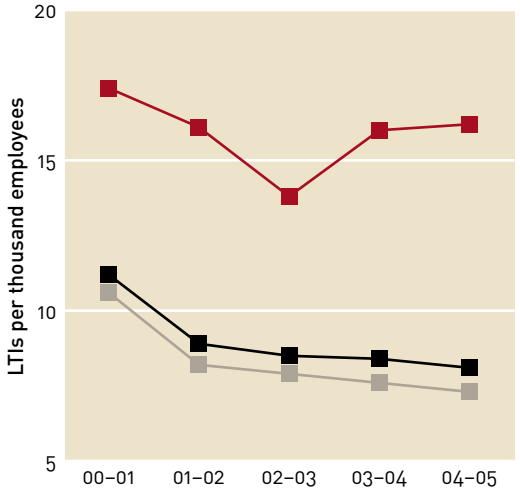
Injuries by location

- Most underground injuries occurred in production and development areas (54%), followed by access and haulage ways at 29% and workshops at 8%.
- The majority of surface injuries occurred in treatment plants (41%), followed by open pits at 23% and workshops at 13%.

Injuries by type

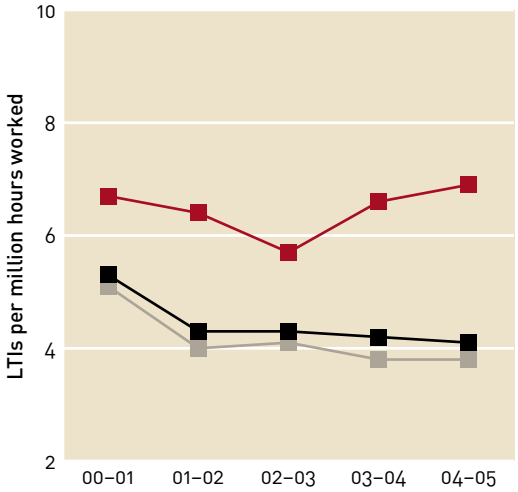
- Over-exertion or strenuous movements was the most common accident type for underground injuries at 31%, followed by slip or trip at 9%, and struck by object and stepping both at 8%.
- The most common accident type for surface injuries was also over-exertion or strenuous movements at 27%, followed by slip or trip at 11%, and struck by object at 10%.

Metalliferous performance indicators
2000–01 to 2004–05



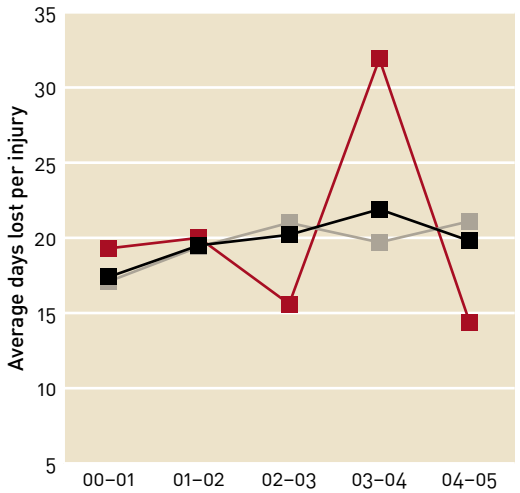
	00–01	01–02	02–03	03–04	04–05
Underground	17.4	16.1	13.8	16.0	16.2
Surface	10.6	8.2	7.9	7.6	7.3
Total	11.2	8.9	8.5	8.4	8.1

Figure 6 Incidence rate



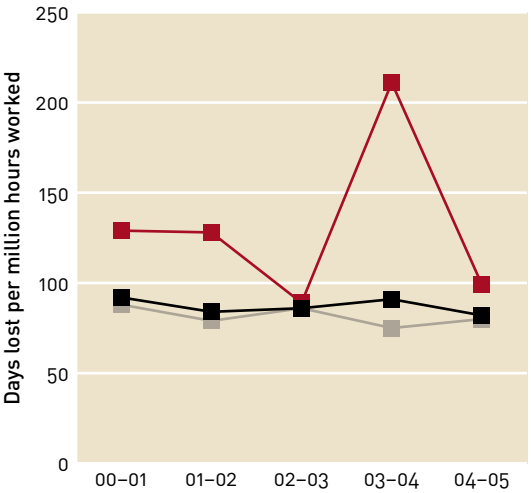
	00–01	01–02	02–03	03–04	04–05
Underground	6.7	6.4	5.7	6.6	6.9
Surface	5.1	4.0	4.1	3.8	3.8
Total	5.3	4.3	4.3	4.2	4.1

Figure 7 Frequency rate



	00–01	01–02	02–03	03–04	04–05
Underground	19.3	20.0	15.6	31.9	14.4
Surface	17.1	19.4	21.0	19.7	21.1
Total	17.4	19.5	20.2	21.9	19.8

Figure 8 Duration rate



	00–01	01–02	02–03	03–04	04–05
Underground	129	128	89	211	99
Surface	88	79	86	75	80
Total	92	84	86	91	82

Figure 9 Injury index

Injuries by commodity continued

Gold performance indicators

The performance indicators for the gold sector showed mixed results for 2004–05. 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 2004–05 include the following:

- The overall incidence rate improved by 11%, falling from 9.0 to 8.0. The surface incidence rate deteriorated by 10% (from 7.3 to 8.0) whereas the underground incidence rate improved significantly by 46% (from 15.1 to 8.1).
- A similar trend was noted in the frequency rate for both surface and underground. The overall frequency rate improved by 9% falling from 4.3 to 3.9. The surface frequency rate deteriorated by 8% (from 3.7 to 4.0) whereas the underground frequency rate improved significantly by 44% (from 6.2 to 3.5).
- The overall duration improved by 16%, falling to 25.4. The surface duration rate deteriorated by 12% (from 24.9 to 28.0) and the underground duration rate improved significantly by 58% (from 39.6 to 16.5).
- The fall in duration rate and frequency rate resulted in a 24% overall improvement in the injury index, falling from 129 to 98. The surface injury index deteriorated by 23% (from 92 to 113) whereas the underground injury index improved significantly by 77% (from 244 to 57).

Gold injury percentage breakdown for 2004–05

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

- Back injuries accounted for the largest proportion of underground injuries, at 39%. Back injuries also accounted for the largest proportion of surface injuries at 23%.
- Hand injuries accounted for the second largest proportion of injuries underground at 22%, followed by arm injuries at 17%. Of the arm injuries, 75% were to shoulders and wrists.
- Leg injuries accounted for the second largest proportion of surface injuries at 18%, followed by arm injuries at 17%. Of the leg injuries, 71% were to knees and ankles. Of the arm injuries, 69% were to shoulders and wrists.

Injuries by nature

- Sprain or strain was the highest ranking nature of injury for both underground and surface injuries at 43% and 42% respectively.
- The second highest ranking nature of underground injury was dislocation at 22%, followed by fracture at 13%.
- The second highest ranking nature of surface injury was fracture (14%), followed by dislocation at 8%.

Injuries by location

- Most underground injuries occurred in access and haulage ways (43%), followed by production and development areas at 35% and workshops at 9%.
- The majority of surface injuries occurred in open pits (30%), followed by treatment plants at 29% and workshops at 14%.

Injuries by type

- Over-exertion or strenuous movements was the most common accident type for underground injuries at 35%, followed by caught by or between moving objects at 13% and struck by object at 9%.
- The most common accident type for surface injuries was also over-exertion or strenuous movements at 31%, followed by struck by object, slip or trip, and stepping each at 12%, then vehicle or mobile equipment jolting and jarring at 5%.

Gold performance indicators
2000–01 to 2004–05

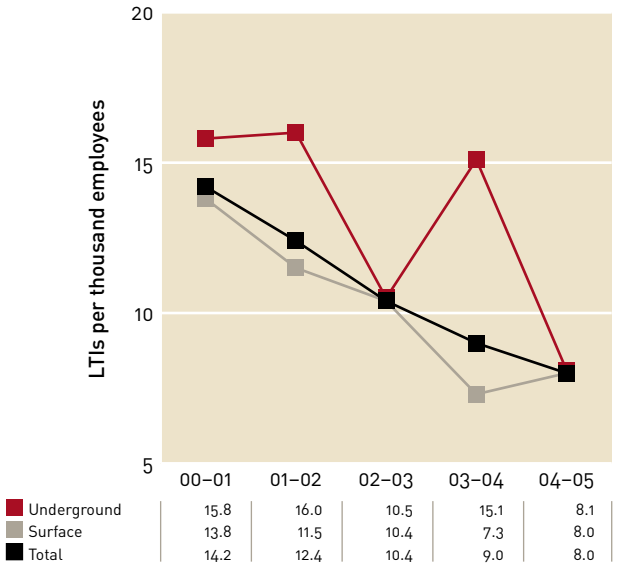


Figure 10 Incidence rate

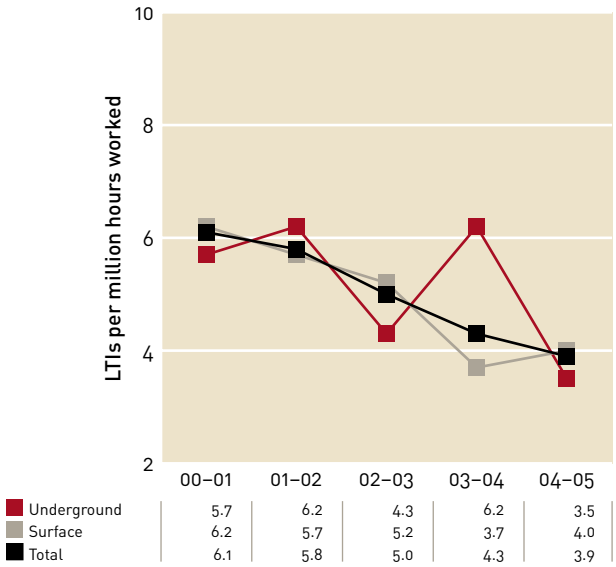


Figure 11 Frequency rate

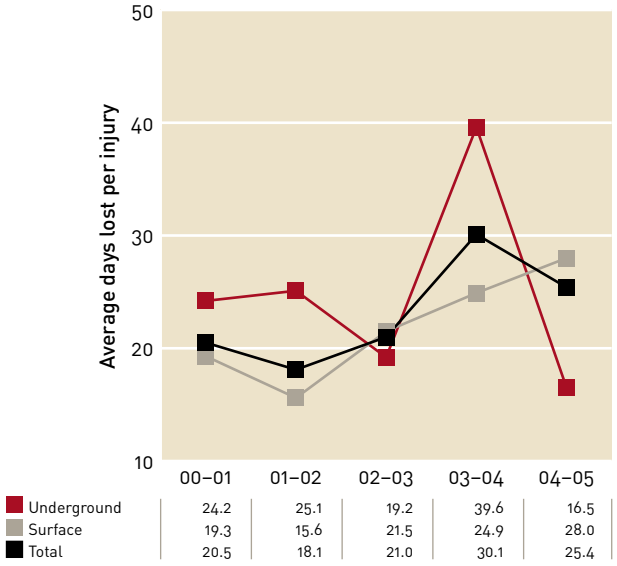


Figure 12 Duration rate

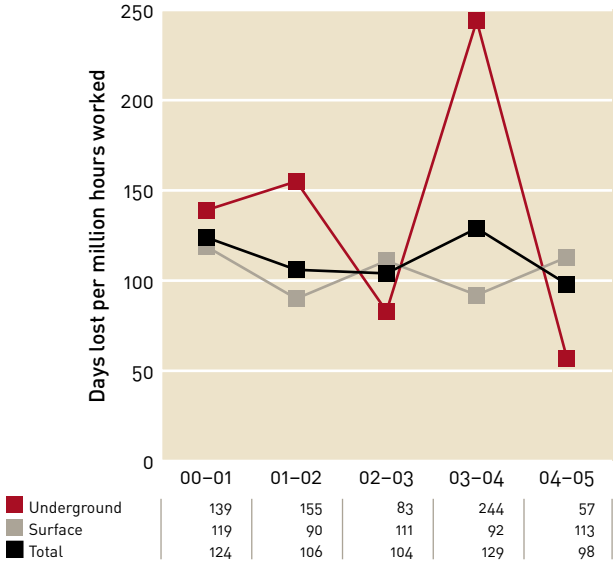


Figure 13 Injury index

Injuries by commodity cont.

Iron ore performance indicators

The performance indicators for the iron ore sector improved during 2004–05. 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 2004–05 include the following:

- The incidence rate improved significantly by 34%, falling from 6.5 to 4.3.
- The frequency rate improved significantly by 33%, falling from 3.3 to 2.2.
- The duration rate improved by 9%, falling from 22.6 to 20.6.
- The fall in the duration rate and the frequency rate resulted in an overall 39% improvement in injury index (from 74 to 45).

Iron ore injury percentage breakdown for 2004–05

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

- Back injuries accounted for the largest proportion of injuries at 24%.
- Hand injuries accounted for the second largest proportion of injuries at 22%, followed by arm injuries at 13%. Of the arm injuries, 71% were to shoulders and wrists.

Injuries by nature

- Sprain or strain was the highest ranking nature of injury at 28%.
- Fracture was the second highest ranking nature of injury at 20%, followed by bruise or contusion at 15%.

Injuries by location

- The majority of injuries occurred in treatment plants, which accounted for 26%.
- The next largest proportion occurred in open pits and workshops both at 22%, followed by surface general at 15%.

Injuries by type

- Over-exertion or strenuous movements was the most common type of accident resulting in injury (22%).
- Caught by or between moving objects was the second most common type (15%), followed by struck by object at 13%.

Iron ore performance indicators
2000–01 to 2004–05

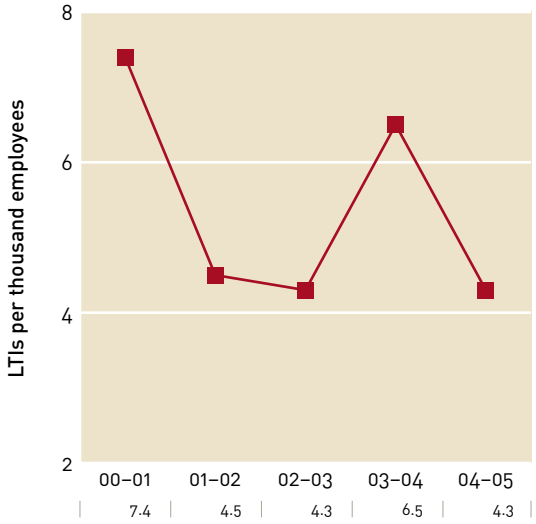


Figure 14 Incidence rate

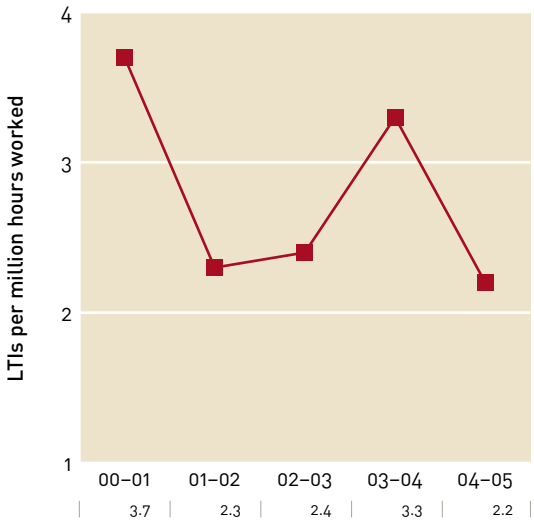


Figure 15 Frequency rate

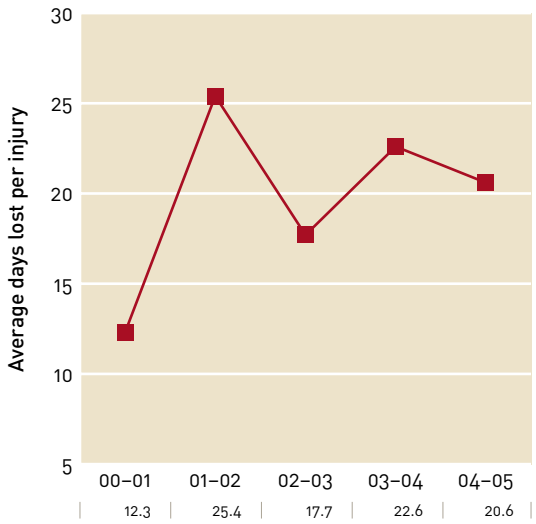


Figure 16 Duration rate

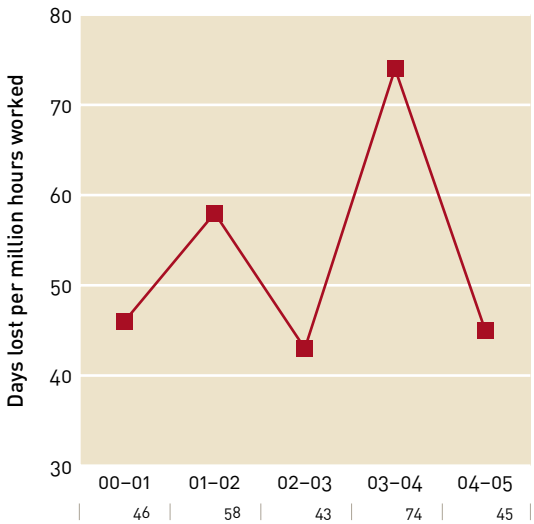


Figure 17 Injury index

Injuries by commodity cont.

Bauxite and alumina performance indicators

There were mixed results in the performance indicators for the bauxite and alumina sector during 2004–05. 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 2004–05 include the following:

- The incidence rate improved by 12%, falling from 5.2 to 4.6.
- The frequency rate improved by 11%, falling from 2.8 to 2.5.
- The duration rate deteriorated by 25%, rising from 13.6 to 17.0.
- The rise in duration rate was greater than the fall in frequency rate, resulting in a deterioration of 11% to the injury index, up from 38 to 42.

Bauxite and alumina injury percentage breakdown for 2004–05

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 26%. Of the arm injuries, 60% were to shoulders.
- Leg injuries accounted for the second largest proportion of injuries at 23%, followed by back injuries at 18%. Of the leg injuries, 89% were to knees and ankles.

Injuries by nature

- Sprain or strain was the highest ranking nature of injury at 49%.
- Bruise or contusion and laceration were equal second highest ranking nature of injury both at 13%, followed by pain at 8%.

Injuries by location

- The majority of injuries occurred in treatment plants, which accounted for 51%.
- The next largest proportion occurred in open pits (23%), followed by workshops at 10%.

Injuries by type

- Over-exertion or strenuous movements was the most common type of accident resulting in injury (36%).
- Slip or trip was the second most common type (18%), followed by stepping at 10%.

Bauxite and alumina performance indicators
2000–01 to 2004–05

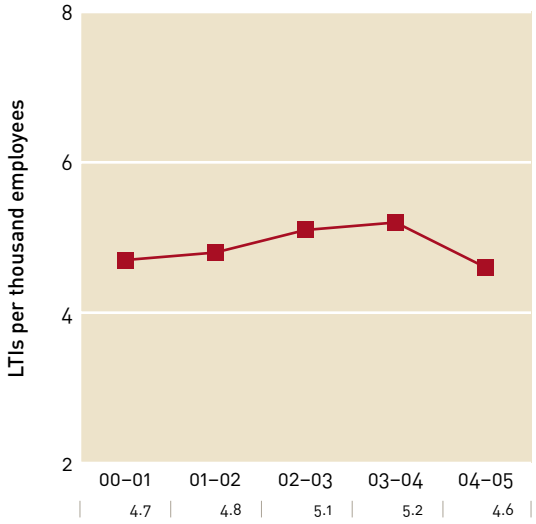


Figure 18 Incidence rate

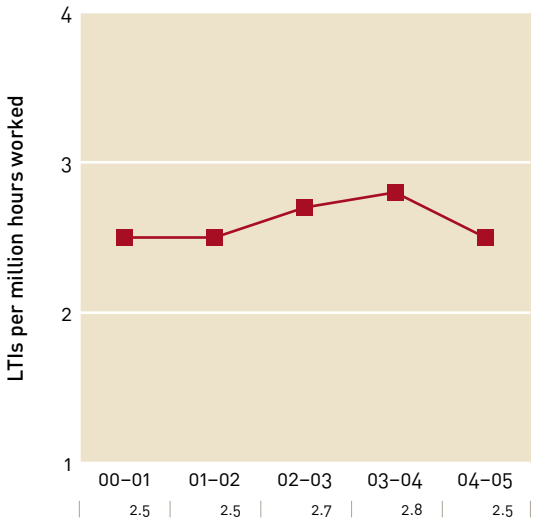


Figure 19 Frequency rate

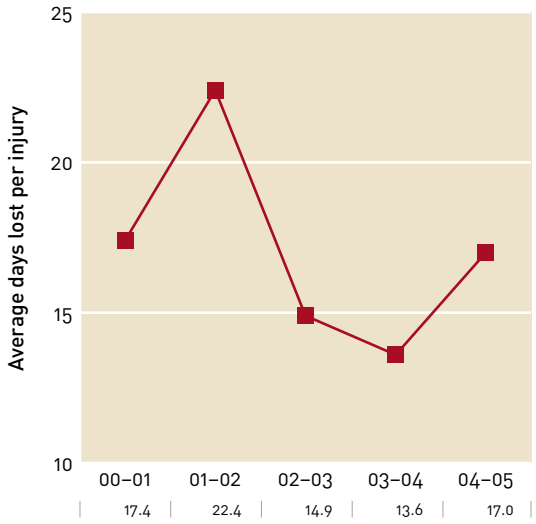


Figure 20 Duration rate

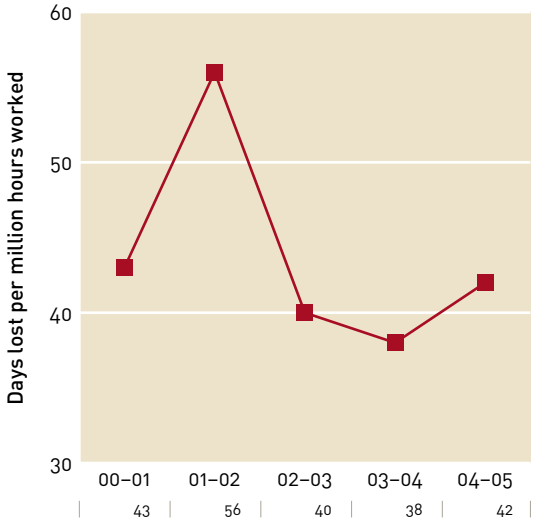


Figure 21 Injury index

Injuries by commodity cont.

Nickel performance indicators

The performance indicators for the nickel sector showed mixed results during 2004–05. 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 2004–05 include the following:

- The overall incidence rate deteriorated significantly by 57%, rising from 8.3 to 13.0. The surface incidence rate deteriorated significantly by 82% (from 5.5 to 10.0) and the underground incidence rate deteriorated significantly by 38% (from 19.4 to 26.7).
- A similar trend was noted in the frequency rate for both surface and underground. The overall frequency rate deteriorated significantly by 79% rising from 3.9 to 7.0. The surface frequency rate deteriorated significantly by 107% (from 2.7 to 5.6) and the underground frequency rate deteriorated significantly by 41% (from 8.3 to 11.7).
- The overall duration deteriorated by 13%, rising to 19.0. The surface duration rate deteriorated significantly by 59% (from 14.2 to 22.6) and the underground duration rate improved significantly by 34% (from 19.8 to 13.0).
- The rise in duration rate and frequency rate resulted in a 100% overall significant deterioration in the injury index, rising from 66 to 132. The surface injury index deteriorated significantly by 232% (from 38 to 126) whereas the underground injury index improved by 8% (from 165 to 152).

Nickel injury percentage breakdown for 2004–05

Appendix 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

- Back injuries accounted for the largest proportion of underground injuries, at 32%. Arm injuries accounted for the largest proportion of surface injuries at 19%. Of the arm injuries, 69% were to shoulders and wrists.
- Leg injuries accounted for the second largest proportion of injuries underground at 20%, followed by hand injuries at 17%. Of the leg injuries, 88% were to knees and ankles.
- Back, hand and leg injuries accounted equally for the second largest proportion of surface injuries each at 16%, followed by trunk "not otherwise classified" (NOC) injuries at 13%. Of the leg injuries, 82% were to knees and ankles.

Injuries by nature

- Sprain or strain was the highest ranking nature of injury for both underground and surface injuries at 56% and 49% respectively.
- The second highest ranking nature of underground injury was laceration at 10%, followed by crushing and fracture both at 7%.
- The second highest ranking natures of surface injury were dislocation, effects of chemicals or fumes and fracture each at 9%, followed by crushing at 7%.

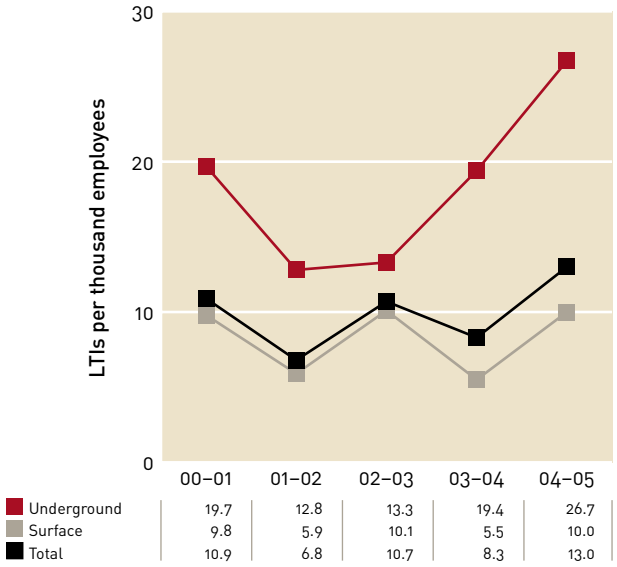
Injuries by location

- Most underground injuries occurred in production and development areas (63%), followed by access and haulage ways at 24% and storage areas and workshops both at 5%.
- The majority of surface injuries occurred in treatment plants (51%), followed by open pits at 21% and administration areas and workshops both at 10%.

Injuries by type

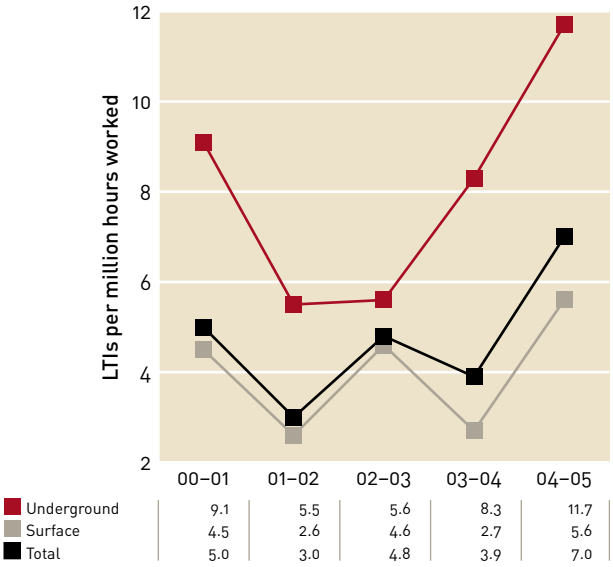
- Over-exertion or strenuous movements was the most common accident type for underground injuries at 32%, followed by slip or trip at 12% and rockfall at 10%.
- The most common accident type for surface injuries was also over-exertion or strenuous movements at 32%, followed by slip or trip at 15%, then contact with chemicals or fumes at 9%.

Nickel performance indicators
2000–01 to 2004–05



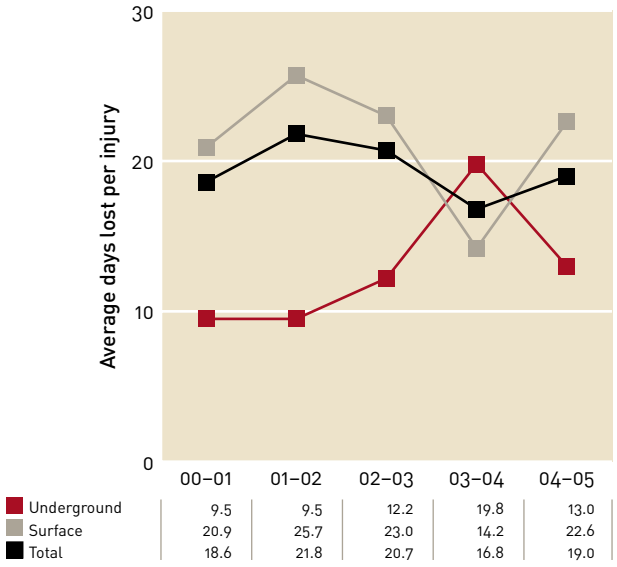
	00–01	01–02	02–03	03–04	04–05
Underground	19.7	12.8	13.3	19.4	26.7
Surface	9.8	5.9	10.1	5.5	10.0
Total	10.9	6.8	10.7	8.3	13.0

Figure 22 Incidence rate



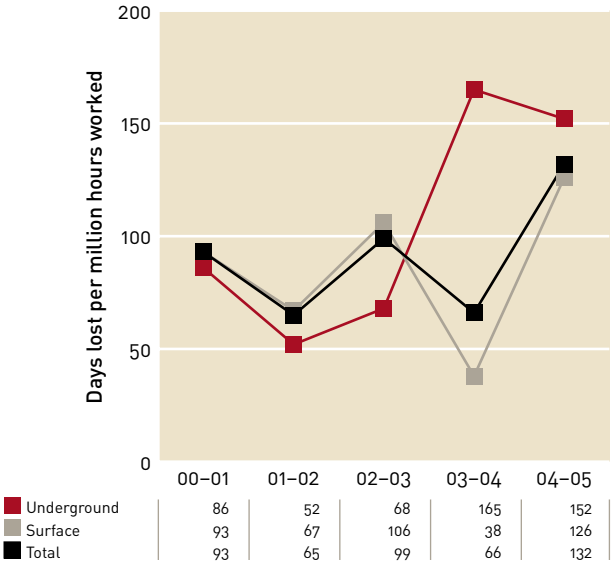
	00–01	01–02	02–03	03–04	04–05
Underground	9.1	5.5	5.6	8.3	11.7
Surface	4.5	2.6	4.6	2.7	5.6
Total	5.0	3.0	4.8	3.9	7.0

Figure 23 Frequency rate



	00–01	01–02	02–03	03–04	04–05
Underground	9.5	9.5	12.2	19.8	13.0
Surface	20.9	25.7	23.0	14.2	22.6
Total	18.6	21.8	20.7	16.8	19.0

Figure 24 Duration rate



	00–01	01–02	02–03	03–04	04–05
Underground	86	52	68	165	152
Surface	93	67	106	38	126
Total	93	65	99	66	132

Figure 25 Injury index