Explanatory Notes

Introduction

The statistics published in this report relate to accidents between 1 July 2003 and 30 June 2004 (2003–04) 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 2003–04 has three components:

i) Initial injuries — days lost in 2003–04 from injuries that occurred in 2003–04

ii) Recurrent injuries — days lost in 2003–04 through recurrences of injuries that occurred in 2003–04 and previous years

iii) Carry-over injuries — days lost in 2003–04 by persons continuously off work from injuries that occurred before 1 July 2003.

Note: Appendix K 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, have not been included. In addition, oil and gas industry injuries are not included in the statistics of this report.

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 the tables on page 14 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 DoIR 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 181 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 1000 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 1000 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 1000 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 FILL INRUSH	– caught by fill inrush
C/BY MACHINE	– caught by or between operating machine
CONST. MAT.	– construction materials
C/W CHEM	– contact with chemicals or fumes
C/W ELECTRICITY	– contact with electric current
C/W FOREIGN BODY	– contact with foreign body
C/W HEAT	– contact with heat
C/W TOOL/EQUIP	– contact with tool or equipment
DI	– disabling injury
EFF CHEM	– effects of chemicals or fumes
EXP ENVIRONMENT	– exposure to environment
EXP MENTAL STRESS	– exposure to mental stress
LTI	– lost time injury
MOTOR COLLISION	– motor vehicle collision
MOTOR VEH ROLL	– motor vehicle roll over
NOC	– not otherwise classified
OVER/STREN MOV	– over-exertion or strenuous movements
S/AGAINST OBJECT	– struck against object
S/BY OBJECT	– struck by object
S/BY VEH/MOBILE	– struck by vehicle or mobile plant
SLIP/TRIP	– slip or trip
SPRAIN/STRAIN	– sprain or strain
TIN TANT. LITHIUM	– tin, tantalum and lithium
U/G	– underground
U/G ACCESS/HAUL	– underground access, travelling and haulage ways
U/G DUMPING	– underground dumping
U/G PROD/DEV	– underground production and development areas
VEH/EQUIP JOLT	– vehicle or equipment jolting

Review of fatal accidents during 2003–04

There were four fatal accidents in the Western Australian mineral industry during 2003–04, all on the surface at iron ore operations.

- A demolition contractor's labourer, who was cutting a conveyor structure using oxy-acetylene, died after he was struck on the head by an electric cable and fell 11 m from the conveyor structure. An adjacent section of the structure had started to collapse, pulling the cable with it.
- A fitter died after being struck on the head by the splitter gate in a transfer chute at a transport and processing facility. The chute door had been changed from one position to another (to divert the ore stream), using the compressed air-powered cylinder attached to it for the purpose, but the door would not relocate properly due to a blockage in the chute. It appears that the deceased had his head inside the chute and was attempting to clear the blockage. When the blockage was freed, the door or gate moved, due to the air pressure in the system.
- An apprentice fitter received a fatal head injury when he was struck on the head by a torque wrench while tightening a suspension strut on a haul truck using a ratchet-type torque wrench and torque multiplier.
- A maintenance coordinator, working outside a large open reactor vessel used to reduce oxide iron ore into iron, received fatal burns when a fireball or jet flame or both was emitted from within the vessel while it was being cleaned. He was one of eight employees injured in the incident.

Fatal incidence rate by mineral mined 1999–2000 to 2003–04

Figure 1 is a chart of fatal incidence by mineral mined (excluding exploration) for the past five years. The grouped information for all surface and underground mines is given at the top of the chart.

Figure 1 shows that the underground fatal incidence rate of 0.37 is much higher than the surface operations fatal incidence rate of 0.08. This is reflected in the gold (fatal incidence rate 0.15), nickel (0.15) and base metal (0.18) sectors where the majority of the State's underground mining occurs. The high fatal incidence rate of 4.00 for the dimension stone sector was the result of two fatal accidents in a relatively small workforce, with one fatal accident during 2000–01 and the other during 2002–03.

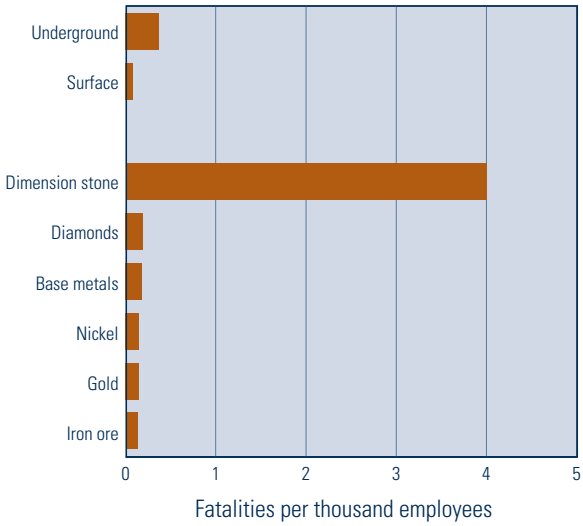


Figure 1 Fatal incidence rate by mineral mined 1999–2000 to 2003–04

Fatal Accidents cont.

Fatal incidence rate 1994–95 to 2003–04

The fatal incidence rate for 2003–04, as indicated in Figure 2, was 0.09 (0.12 in 2002–03) and is still a concern to DoIR. Although the overall trend continues to decline, there is a year-by-year scatter of the incidence rate, which is typical for fatalities because of the low number of occurrences.

The Department maintains the view that no fatal accident is acceptable, and a fatal incidence rate of zero is achievable and sustainable.

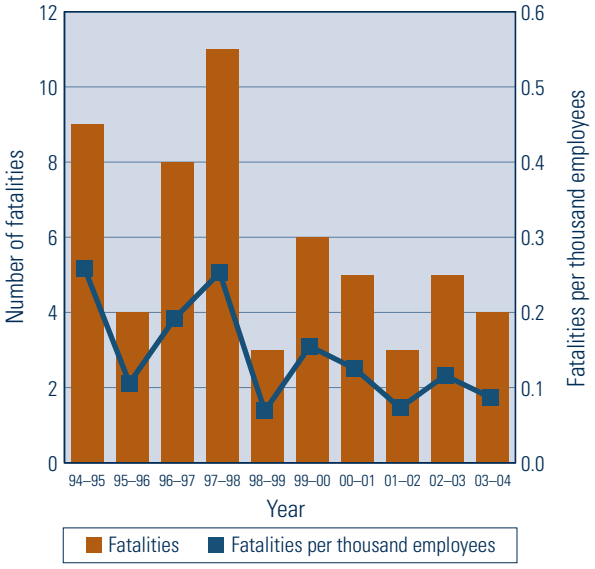


Figure 2 Fatal incidence rate by mineral mined 1999–2000 to 2003–04

Fatal accidents by type 1999–2000 to 2003–04

Figures 3 and 4 show the type of accidents (excluding exploration) for the 23 fatalities in the mining industry over the past five years. Of these fatalities, seven occurred underground and 16 were in surface operations.

The most common type of underground fatal accident was being caught by or between objects (three fatalities during a fill inrush).

The most common type of surface fatal accident was vehicle roll over, which resulted in five fatalities.

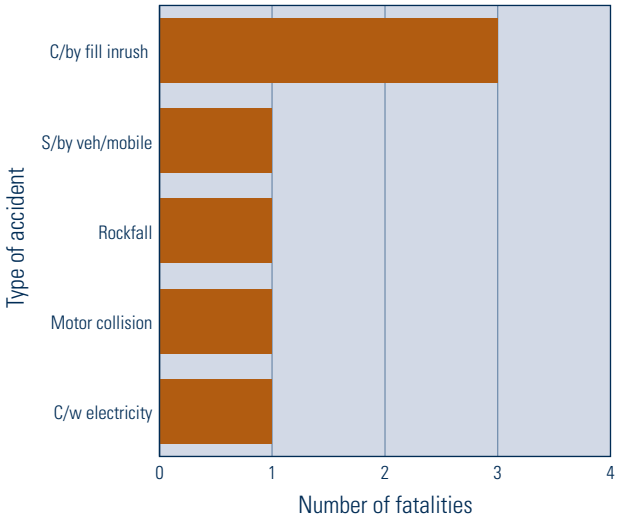


Figure 3 Underground fatalities 1999–2000 to 2003–04

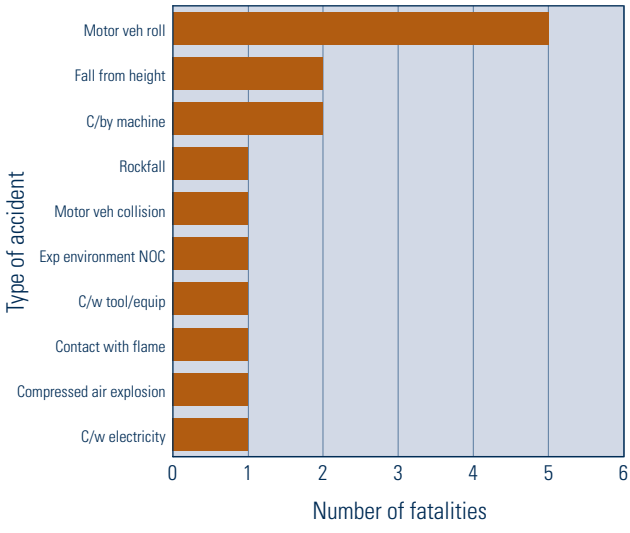


Figure 4 Surface fatalities 1999–2000 to 2003–04

Review of serious injuries during 2003–04

There were 272 serious injuries in the mineral industry during 2003–04 (271 in 2002–03). Of these, 263 were in metalliferous mines and nine were in coal mines. Descriptions of selected serious incidents that occurred during the year follow:

A leading hand fitter, attempting to refit an elevation chain to a scraper, sustained a laceration to the back of his head and a broken thumb when he fell from the top of the scraper.

A serviceman using a large spanner to tighten a hose fitting tore a tendon in his shoulder.

A rail transport technician, closing dust screens on a locomotive, fractured his arm when he fell to the ground.

A road train driver received lacerations and partial amputation of two fingers when a fitter started the engine of a truck while the driver was checking the tension on the fanbelt.

A supervisor, checking conditions on the ROM pad after night shift, received multiple injuries including fractured ribs and a collapsed lung when a front-end loader reversed into his light vehicle, turning it over.

A pit technician, using an automatic core saw, sustained crushed fingers when they were caught between the core holder and machine guard after she grabbed the core holder to prevent it jamming. It took 15 minutes to free her fingers because the machine automatically shut down and could not be reversed.

A process operator who was checking drain pumps suffered fractured ribs and a bruised kidney when he slipped on oil in a containment tray and fell onto his right side.

A diesel fitter received burns to his hands when he reached into a bath of liquid nitrogen to retrieve a pin that had slipped and fallen back in while he was lifting a piece of equipment out of the bath. He was wearing insulated gauntlets at the time, but the liquid nitrogen seeped into the gloves through the seams between the fingers.

A driller received a fractured lower arm when he was struck by a breakout bar. He had positioned himself with one hand on the breakout bar, and was using the controls to lower the drill string when he inadvertently engaged the rotation.

A casual pump fitter, working at the pump house, received a fractured femur when he was struck by a steel pipe. The fitter had been warned that the outlet pipework balanced on the tank was loose and not to get too close until the pipe could be tied back. He was too close when the pipe swung around and struck him.

A rigger, engaged in removing a section of track from a face shovel, sustained fractures to his right arm and wrist when his arm was caught between a crane and the load. The load had swung unexpectedly and he had positioned himself between the crane and the load in an attempt to control its movement.

A drill jumbo operator received a fractured shoulder when he was struck by a 5 kg rock that fell from the backs and struck him while he was at the front of the rig tightening a bolt.

A fitter received bruising and a laceration to his face while he was removing the dust cap from a tyre valve extension. The tyre valve extension came undone instead of the dust cap, releasing the full tyre pressure and causing the valve extension tube to whip around, striking and cracking the lower edge of his safety glasses.

A belt splicer, performing roller inspections on a conveyor, suffered a severe laceration to his upper arm after he attempted to remove mud from a conveyor roller with a hammer and became entangled between the roller and the moving conveyor belt. He managed to free himself after being trapped for an undetermined period of time.

A crusher operator, moving fines away from rocks following a blockage in a jaw crusher, received crushed and lacerated fingers when his hand became caught between rocks. The crusher jaws had not completely stopped moving. The top third of his finger was surgically amputated at hospital.

A geologist, spotting for an excavator, sustained a laceration to his thigh when he was struck by a rock that had been ejected forcefully from under the excavator track.

A front-end loader operator and a leading hand were bogging under a raise drill borehole underground when they were struck by a rush of water that came suddenly from the raise. The loader driver received lacerations and a dislocated finger when he was carried 40 m down the decline. The leading hand received lacerations and a fractured leg after being flung against the loader.

Serious Injuries cont.

An electrician, stretched out under a conveyor helping to move an underspeed frame switch into position, sustained a torn shoulder muscle.

A maintenance planner, inspecting a SAG mill feed chute, stepped sideways to look at the back of the chute and fell over a hose, fracturing his upper left arm.

A process plant operator, changing a dust injection spool piece, strained his lower back while working in an awkward position.

An electrician, assisting an airleg miner by carrying explosives up a ladder rise, received multiple injuries when he fell 14 m after a piece of rock struck him on the chest.

An underground shift supervisor, driving a light vehicle down the decline, suffered a strained neck when he hit his head on the roof of the cab as his vehicle drove over a rock.

A charge-up machine operator, working at the rear of his rig, received a crushed foot and toes when the shift coordinator lowered the rig's jacking legs onto the operator's foot.

An electrician sustained general bruising and two fractured ribs when he fell about 4 m from a ladder in a workshop.

A driller and a driller's offsider were pulling drill rods from a hole when they received multiple burns from a fireball after an air delivery hose failed and sprayed a mist of oil and air around the rig. The driller's offsider received burns to 40% of his body, and will require skin grafts.

A truck driver suffered a fractured pelvis and ruptured bladder when his truck ran him over. He had left his truck to move a rock in the decline when the truck rolled forward.

A process operator, carrying out an inspection on the level of solids in a filtrate tank, received burns to both legs and his groin when he opened the tank lid and was sprayed with hot condensate.

A fitter, servicing a watercart, sustained fractures to both forearms and a lacerated leg when he fell from the engine bay bonnet of the watercart.

A miner, scaling an underground development face from the basket of a charge-up machine, suffered fractures to two cervical vertebrae when he was struck on the safety helmet and shoulder by a slab of rock. He and another employee had scaled the top 2 m of the face and had been lowered in the basket to continue with the next section when the rock fell from the face.

Serious injury incidence rate by mineral mined 1999–2000 to 2003–04

Figure 5 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 underground mining had a significantly higher serious injury incidence rate (12.1) than surface mining (6.3).

Of the major mining sectors, diamonds had the highest five-year average serious incidence rate (15.7) whereas bauxite and alumina had the lowest (4.2). The mining sector referred to as "other", with a five-year average serious incidence rate of 11.2, 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.

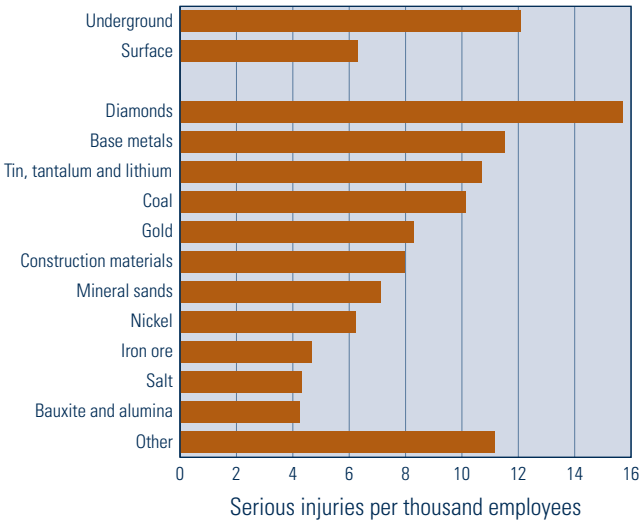


Figure 5 Serious injury incidence rate 1999–2000 to 2003–04

Serious injury frequency rate 1999–2000 to 2003–04

Figure 6 shows that the serious injury frequency rate increased for underground metalliferous operations and the coal sector but decreased for surface metalliferous operations, resulting in a 6% improvement overall during 2003–04.

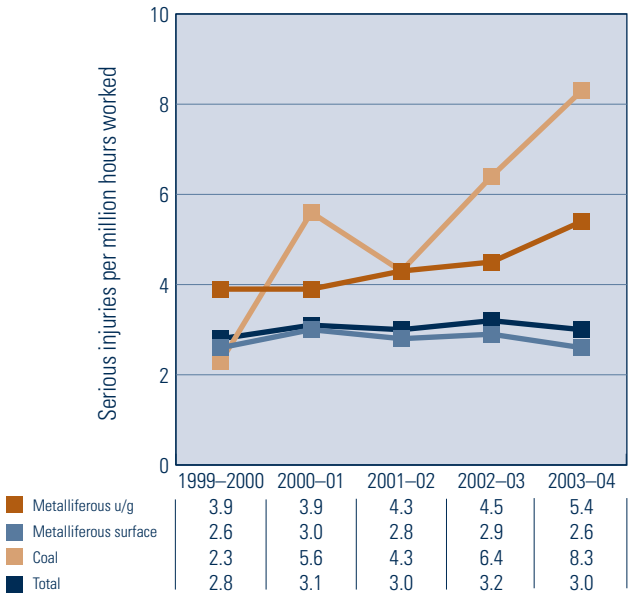


Figure 6 Serious injury frequency rate 1999–2000 to 2003–04

Serious injury percentage breakdown for 2003–04

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 26%, and hand injuries accounted for 21% followed by back injuries at 14%. Of the serious leg injuries, 67% 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 (33%), followed by fracture at 21% then crushing and multiple each at 9%.
- The majority of serious injuries underground were in production and development areas (63%), and in access and haulage ways (32%).
- The most common accident types associated with serious injuries underground were rockfall and over-exertion or strenuous movements, both at 16%, followed by struck by object (14%) and then caught by operating machine (9%).

Surface

- Injuries to backs accounted for the largest proportion of serious injuries at 22%, and leg injuries accounted for 20% followed by injuries to hands and arms each at 16%. Of the serious leg injuries, 69% 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 (42%). Fracture was the next highest (17%) followed by laceration at 7%.
- The majority of serious injuries on the surface occurred in treatment plants (43%), open pits (24%) and surface general (13%).
- The most common accident types associated with serious injuries in surface operations were over-exertion or strenuous movements (30%), slip or trip (11%) and then struck by object (8%).

Lost Time Injuries

Review of lost time injuries during 2003–04

In 2003–04, 18 487 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 2003–04 (8478), recurrences of injuries that occurred before 2003–04 and in 2003–04 (976), and LTIs and recurrences carried over into 2003–04 from accidents that occurred before July 2003 (9033). A breakdown of work days lost in coal and metalliferous mining is given in Table 1.

During 2003–04, there were 394 LTIs in the State's mining industry: 378 in metalliferous mines and 16 in coal mines. A breakdown of these data with performance indicators is given in Tables 2 and 3.

In addition to the initial injuries there were 39 recurrences of previous injuries, resulting in 976 work days lost during 2003–04. A breakdown of recurrent injuries by year of initial injury is given in Table 4.

One hundred persons who were still off work from injuries received before July 2003 lost 9033 work days in 2003–04. A breakdown of these carry-over injuries is given in Table 5.

Table 1 Time lost through injury during 2003–04

Mining	Days lost			
	Initial injuries	Recurrent injuries	Carry-over injuries	TOTAL
Metalliferous	8280	744	8885	17 909
Coal	198	232	148	578
TOTAL MINING	**8478**	**976**	**9033**	**18 487**

Table 2 Initial lost time injuries during 2003–04

Mines	No. of employees	No. of LTIs	Incidence	Frequency	Duration	Injury index	Days lost
Metalliferous surface	40 811	309	7.6	3.8	19.7	75	6077
Metalliferous underground	4319	69	16.0	6.6	31.9	211	2203
Metalliferous total	45 130	378	8.4	4.2	21.9	91	8280
Coal total	641	16	25.0	14.8	12.4	183	198
TOTAL MINING	**45 771**	**394**	**8.6**	**4.3**	**21.5**	**92**	**8478**

Table 3 Injuries by mineral mined during 2003–04

Mineral mined	No. of employees	No. of LTIs	Incidence	Frequency	Duration	Injury index	Days lost
Gold	13 150	118	9.0	4.3	30.1	129	3552
Iron ore	11 629	76	6.5	3.3	22.6	74	1717
Bauxite and alumina	6955	36	5.2	2.8	13.6	38	491
Nickel	5886	49	8.3	3.9	16.8	66	825
Mineral sands	2345	27	11.5	5.9	23.4	139	632
Diamonds	1213	25	20.6	9.7	13.2	128	329
Base metals	915	10	10.9	4.4	10.6	47	106
Salt	658	2	3.0	1.8	3.0	5	6
Coal	641	16	25.0	14.8	12.4	183	198
Tin, tantalum and lithium	479	5	10.4	3.9	12.0	47	60
Construction materials	289	2	6.9	3.6	2.5	9	5
Other	1611	28	17.4	10.3	19.9	205	557
TOTAL MINING	**45 771**	**394**	**8.6**	**4.3**	**21.5**	**92**	**8478**

NOTE: Duration in Tables 2 and 3 does not take into consideration time lost after 30 June 2004 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 2003.

Table 4 Recurrent injuries during 2003–04

Year	Metalliferous mining		Coal mining		Total mining	
	No. of injuries	Days lost	No. of injuries	Days lost	No. of injuries	Days lost
2004	3	19	–	–	3	19
2003	20	486	1	57	21	543
2002	4	73	2	29	6	102
2001	1	112	2	64	3	176
2000	1	2	–	–	1	2
1999	1	15	–	–	1	15
Pre-1999	1	37	3	82	4	119
TOTAL	**31**	**744**	**8**	**232**	**39**	**976**

NOTE: Apart from the information shown in Tables 1, 4 and 5 analysis of recurrent and carry-over injuries has not been presented in this publication.

Table 5 Carry-over injuries during 2003–04

Year	Metalliferous mining		Coal mining		Total mining	
	No. of injuries	Days lost	No. of injuries	Days lost	No. of injuries	Days lost
2003	47	2509	1	4	48	2513
2002	34	3475	2	144	36	3619
2001	11	1619	–	–	11	1619
2000	3	772	–	–	3	772
1999	1	262	–	–	1	262
Pre-1999	1	248	–	–	1	248
TOTAL	**97**	**8885**	**3**	**148**	**100**	**9033**

Lost Time Injuries cont.

Review of lost time injuries during 2003–04 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 AXTAT and this standard.

The Australian Standard treats fatalities as LTIs with a penalty of 220 workdays lost for each, whereas AXTAT keeps them separate with no penalty. Also, AXTAT calculates incidence per thousand employees, in contrast to the Standard's definition of injuries per hundred employees.

Tables 6 and 7 provide statistical information in accordance with the Australian Standard.

Table 6 Initial lost time injuries during 2003–04 (AS 1885.1 – 1990)

Mines	No. of employees	No. of LTIs	Injuries per hundred	Frequency	Duration	Days lost
Metalliferous surface	40 811	313	0.8	3.9	22.2	6957
Metalliferous underground	4319	69	1.6	6.6	31.9	2203
Metalliferous total	45 130	382	0.8	4.2	24.0	9160
Coal total	641	16	2.5	14.8	12.4	198
TOTAL MINING	**45 771**	**398**	**0.9**	**4.3**	**23.5**	**9358**

NOTE : Duration in Tables 6 and 7 does not take into consideration time lost after 30 June 2004 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 2003.

Table 7 Injuries by mineral mined during 2003–04 (AS 1885.1 – 1990)

Mineral mined	No. of employees	No. of LTIs	Injuries per hundred	Frequency	Duration	Days lost
Gold	13 150	118	0.9	4.3	30.1	3552
Iron ore	11 629	80	0.7	3.5	32.5	2597
Bauxite and alumina	6955	36	0.5	2.8	13.6	491
Nickel	5886	49	0.8	3.9	16.8	825
Mineral sands	2345	27	1.2	5.9	23.4	632
Diamonds	1213	25	2.1	9.7	13.2	329
Base metals	915	10	1.1	4.4	10.6	106
Salt	658	2	0.3	1.8	3.0	6
Coal	641	16	2.5	14.8	12.4	198
Tin, tantalum and lithium	479	5	1.0	3.9	12.0	60
Construction materials	289	2	0.7	3.6	2.5	5
Other	1611	28	1.7	10.3	19.9	557
TOTAL MINING	**45 771**	**398**	**0.9**	**4.3**	**23.5**	**9358**

Premium rates for the Western Australian mineral industry

The workers' compensation 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 7 indicates trends in workers' compensation costs for selected mineral groups in the ten-year period since 1995–96.

Over this period, the coal mining compensation rate decreased by 56% to 2.58% of payroll. The compensation rate for iron ore operations also decreased, by 3%, to 0.92% of payroll. The rate for underground gold operations increased by 23% during this period to 3.79% of payroll. The rate for open pit gold operations also increased, by 18%, to 2.69% of payroll.

The average premium rate for the Western Australian mining industry for 2004–05 is currently 2.31% of payroll, a 5% reduction on that for 2003–04 (2.43% of payroll).

Figure 8 shows the current recommended premium rates for 2004–05 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 4.92 and 6.46% 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.

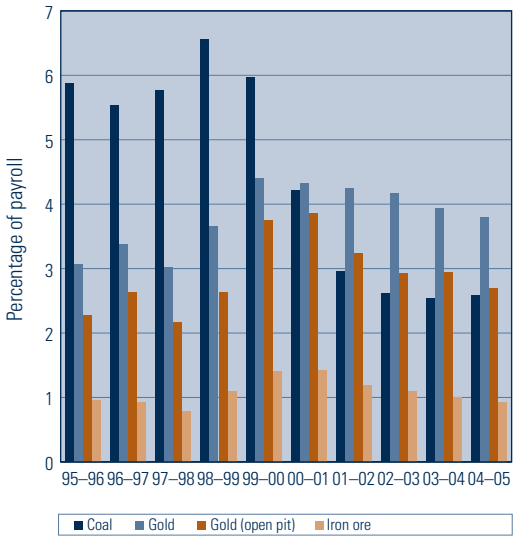


Figure 7 Mine workers' compensation rate trends 1995–96 to 2004–05

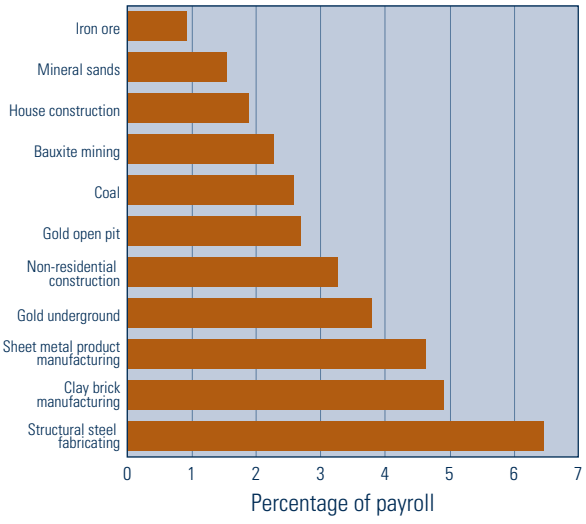


Figure 8 Recommended premium rates 2004–05

Injuries by Commodity

Metalliferous performance indicators

The performance indicators for the metalliferous mining sector show mixed results for 2003–04. Figures 9 to 12 depict the performance indicators of incidence, frequency, duration and rates, and injury index (see Explanatory Notes on page 3 for definitions).

Some interesting trends noted in the performance indicators for metalliferous mines during 2003–04 include the following:

- The overall incidence rate improved slightly by 1%, falling from 8.5 to 8.4. The surface incidence rate improved by 4% (from 7.9 to 7.6) whereas the underground incidence rate deteriorated by 16% (from 13.8 to 16.0).
- The overall frequency rate improved by 2%, falling from 4.3 to 4.2. The surface frequency rate improved by 7% (from 4.1 to 3.8) whereas the underground frequency rate deteriorated by 16% (from 5.7 to 6.6).
- The overall duration rate deteriorated by 8%, rising to 21.9. The surface duration rate improved by 6% (from 21.0 to 19.7) whereas the underground duration rate deteriorated significantly by 104% (from 15.6 to 31.9). The large increase in the underground duration rate is mainly attributable to a number of serious injuries in the underground gold sector.
- The fall in frequency rate was less than the rise in duration rate, resulting in a 6% overall deterioration in the injury index, which rose from 86 to 91. The surface injury index improved by 13% (from 86 to 75) whereas the underground injury index deteriorated significantly by 137% (from 89 to 211).

Metalliferous injury percentage breakdown for 2003–04

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

- Leg injuries accounted for the largest proportion of underground injuries at 23%. Of the underground leg injuries, 63% were to knees and ankles. Back injuries accounted for the largest proportion of surface injuries at 22%.
- Hand injuries accounted for the second largest proportion of injuries underground at 20%, followed by back injuries at 13%.
- Leg injuries accounted for the second largest proportion of surface injuries (19%), followed by hand injuries at 15%. Of the leg injuries, 63% 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 33% and 39% respectively.
- The second highest ranking nature of underground injury was fracture (19%), followed by laceration, multiple and crushing at 7% each.
- The second highest ranking nature of surface injury was fracture (13%), followed by laceration at 7%.

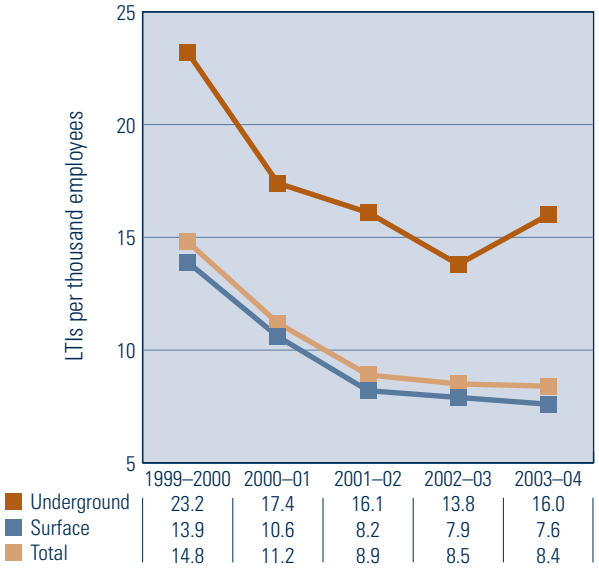
Injuries by location

- Most underground injuries occurred in production and development areas (67%), followed by access and haulage ways at 29%.
- The majority of surface injuries occurred in treatment plants (46%), followed by open pits at 21% and surface general at 13%.

Injuries by type

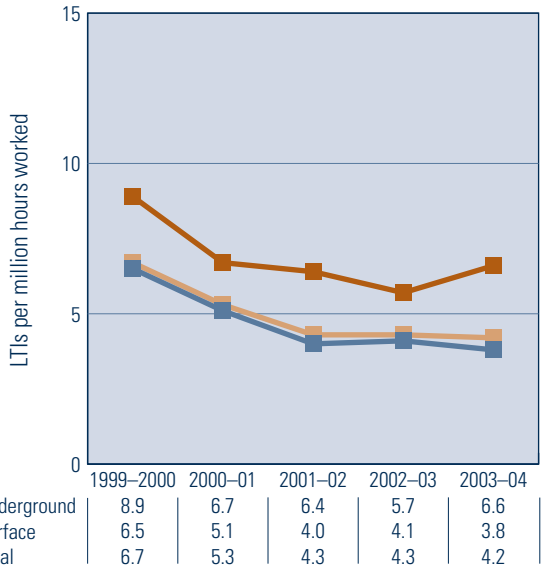
- Over-exertion or strenuous movements was the most common accident type for underground injuries at 17%, followed by rockfall and struck by object, both at 13%, and caught by machine at 9%.
- The most common accident type for surface injuries was over-exertion or strenuous movements at 28%, followed by slip or trip and struck by object, both at 10%.

Metalliferous performance indicators
1999–2000 to 2003–04



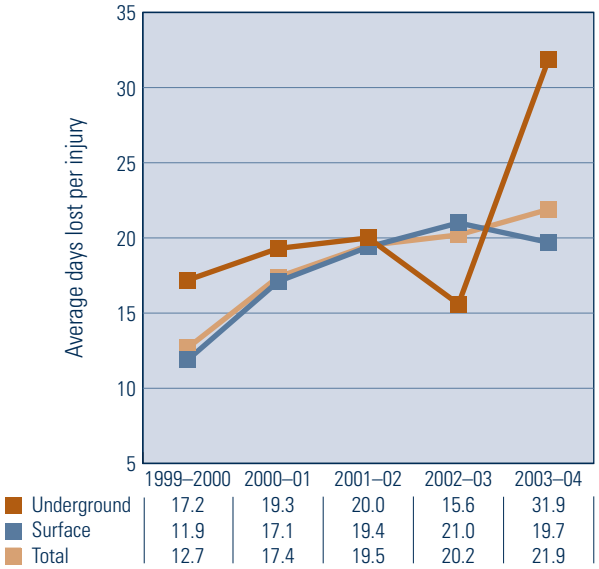
	1999–2000	2000–01	2001–02	2002–03	2003–04
Underground	23.2	17.4	16.1	13.8	16.0
Surface	13.9	10.6	8.2	7.9	7.6
Total	14.8	11.2	8.9	8.5	8.4

Figure 9 Incidence rate



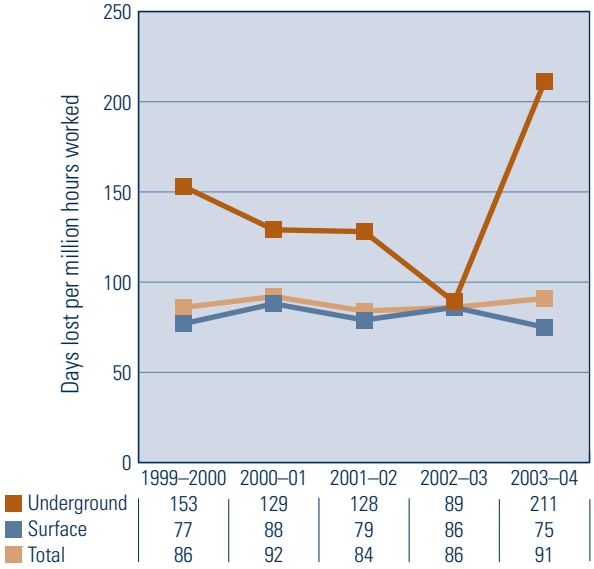
	1999–2000	2000–01	2001–02	2002–03	2003–04
Underground	8.9	6.7	6.4	5.7	6.6
Surface	6.5	5.1	4.0	4.1	3.8
Total	6.7	5.3	4.3	4.3	4.2

Figure 10 Frequency rate



	1999–2000	2000–01	2001–02	2002–03	2003–04
Underground	17.2	19.3	20.0	15.6	31.9
Surface	11.9	17.1	19.4	21.0	19.7
Total	12.7	17.4	19.5	20.2	21.9

Figure 11 Duration rate



	1999–2000	2000–01	2001–02	2002–03	2003–04
Underground	153	129	128	89	211
Surface	77	88	79	86	75
Total	86	92	84	86	91

Figure 12 Injury index

Injuries by Commodity cont.

Gold performance indicators

The performance indicators for the gold sector showed mixed results for 2003–04. Figures 13 to 16 depict the performance indicators of incidence, frequency and duration rates, and injury index.

Some interesting trends noted in the gold sector performance indicators during 2003–04 include the following:

- The overall incidence rate improved by 13%, falling from 10.4 to 9.0. The surface incidence rate improved significantly by 30% (from 10.4 to 7.3) whereas the underground incidence rate deteriorated significantly by 44% (from 10.5 to 15.1).
- A similar trend was noted in the frequency rate for both surface and underground. The overall frequency rate improved by 14% falling from 5.0 to 4.3. The surface frequency rate improved by 29% (from 5.2 to 3.7) whereas the underground frequency rate deteriorated significantly by 44% (from 4.3 to 6.2).
- The overall duration deteriorated significantly by 43%, rising to 30.1. The surface duration rate deteriorated by 16% (from 21.5 to 24.9) and the underground duration rate deteriorated significantly by 106% (from 19.2 to 39.6). The large increase in the underground duration rate was the result of six serious LTIs, each with over 100 days lost, accumulating a total of 896 days of lost time during 2003–04.
- The rise in duration rate was greater than the fall in frequency rate and resulted in a 24% overall deterioration in the injury index, increasing from 104 to 129. The surface injury index improved by 17% (from 111 to 92) whereas the underground injury index deteriorated significantly by 194% (from 83 to 244).

Gold injury percentage breakdown for 2003–04

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

- Leg injuries accounted for the largest proportion of underground injuries, at 29%. Of the leg injuries, 67% were to knees and ankles. Back injuries accounted for the largest proportion of surface injuries at 28%.
- Hand injuries accounted for the second largest proportion of injuries underground at 17%, followed by back injuries at 12%.
- Leg injuries accounted for the second largest proportion of surface injuries at 22%, followed by hand injuries at 11%. Of the leg injuries, 47% were to knees and ankles.

Injuries by nature

- Sprain or strain was the highest ranking nature of injury for both underground and surface injuries, with both at 33%.
- The second highest ranking nature of underground injury was fracture at 24%, followed by laceration and multiple, both at 7%.
- The second highest ranking nature of surface injury was fracture (14%), followed by superficial "not otherwise classified" (NOC) at 11%.

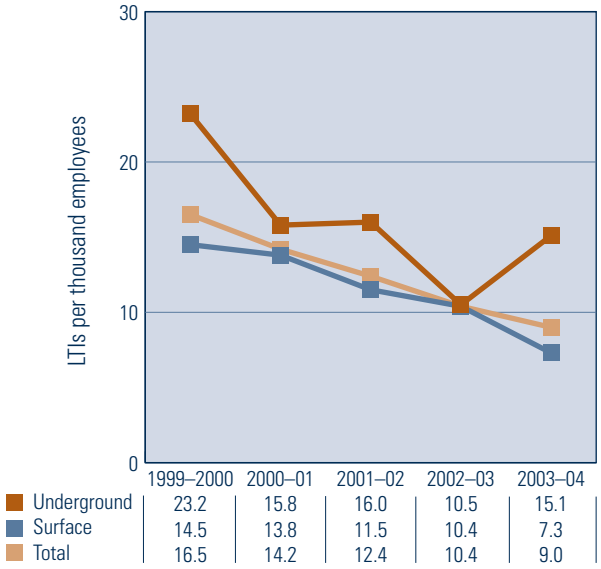
Injuries by location

- Most underground injuries occurred in production and development areas (67%), followed by access and haulage ways at 29%.
- The majority of surface injuries occurred in open pits (36%), followed by treatment plants at 33% and surface general at 12%.

Injuries by type

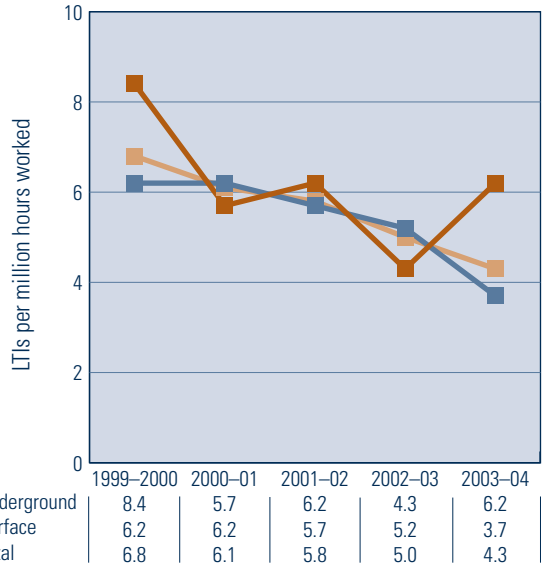
- Over-exertion or strenuous movements, and struck by objects were the most common accident types for underground injuries, with both at 14%, followed by rockfalls at 12% and caught by machines and struck against objects at 10% each.
- The most common accident type for surface injuries was over-exertion or strenuous movements at 30%, followed by struck by object at 18%, and slip or trip at 8%.

Gold performance indicators
1999–2000 to 2003–04



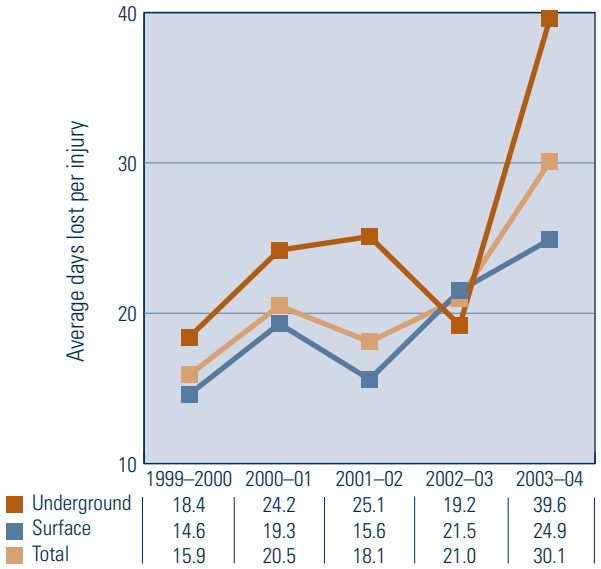
	1999–2000	2000–01	2001–02	2002–03	2003–04
Underground	23.2	15.8	16.0	10.5	15.1
Surface	14.5	13.8	11.5	10.4	7.3
Total	16.5	14.2	12.4	10.4	9.0

Figure 13 Incidence rate



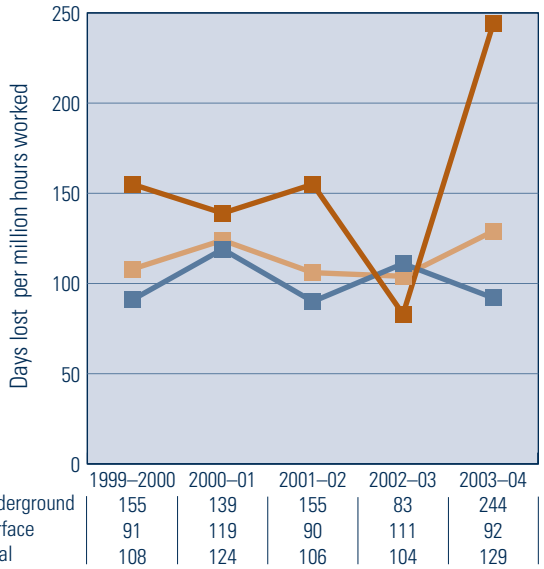
	1999–2000	2000–01	2001–02	2002–03	2003–04
Underground	8.4	5.7	6.2	4.3	6.2
Surface	6.2	6.2	5.7	5.2	3.7
Total	6.8	6.1	5.8	5.0	4.3

Figure 14 Frequency rate



	1999–2000	2000–01	2001–02	2002–03	2003–04
Underground	18.4	24.2	25.1	19.2	39.6
Surface	14.6	19.3	15.6	21.5	24.9
Total	15.9	20.5	18.1	21.0	30.1

Figure 15 Duration rate



	1999–2000	2000–01	2001–02	2002–03	2003–04
Underground	155	139	155	83	244
Surface	91	119	90	111	92
Total	108	124	106	104	129

Figure 16 Injury index

Injuries by Commodity cont.

Iron ore performance indicators

The performance indicators for the iron ore sector deteriorated during 2003–04. Figures 17 to 20 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 2003–04 include the following:

- The incidence rate deteriorated significantly by 51%, rising from 4.3 to 6.5.
- The frequency rate deteriorated significantly by 38%, rising from 2.4 to 3.3.
- The duration rate deteriorated by 28%, rising from 17.7 to 22.6.
- The rise in the duration rate and the frequency rate resulted in an overall 72% deterioration in injury index (from 43 to 72).

Iron ore injury percentage breakdown for 2003–04

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 20%.
- Leg injuries and arm injuries accounted equally for the second largest proportion of injuries at 16% each, followed by hand injuries at 13%. Of the leg injuries, 83% were to knees and ankles.

Injuries by nature

- Sprain or strain was the highest ranking nature of injury at 34%.
- Fracture was the second highest ranking nature of injury at 20%, followed by foreign body at 8%.

Injuries by location

- The majority of injuries occurred in treatment plants, which accounted for 50%.
- The next largest proportion occurred in open pits (17%), followed by surface general at 13%.

Injuries by type

- Over-exertion or strenuous movements was the most common type of accident resulting in injury (24%).
- Struck by object was the second most common type (12%), followed by slip or trip, fall from height, and contact with foreign body at 8% each.

Iron ore performance indicators
1999–2000 to 2003–04

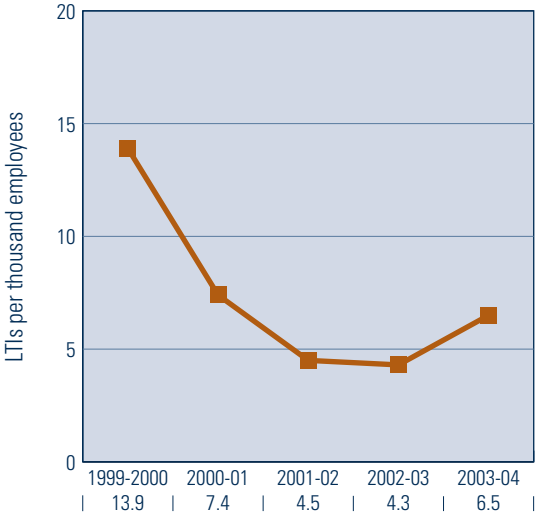


Figure 17 Incidence rate

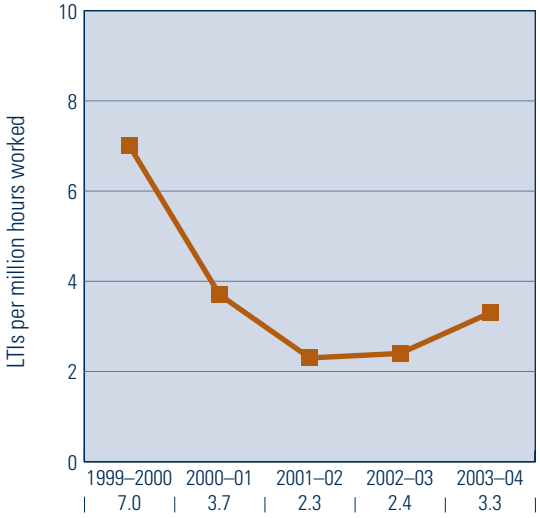


Figure 18 Frequency rate

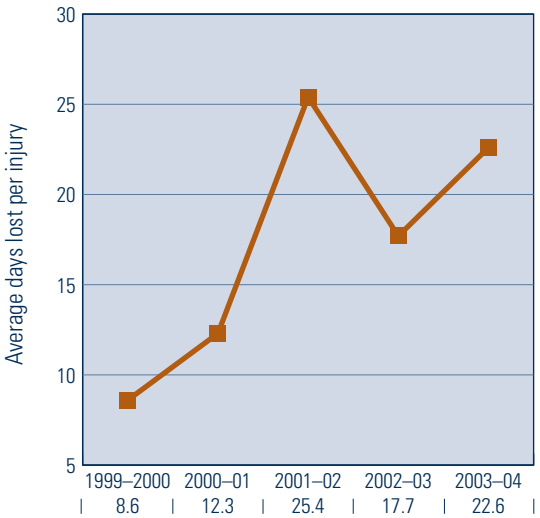


Figure 19 Duration rate

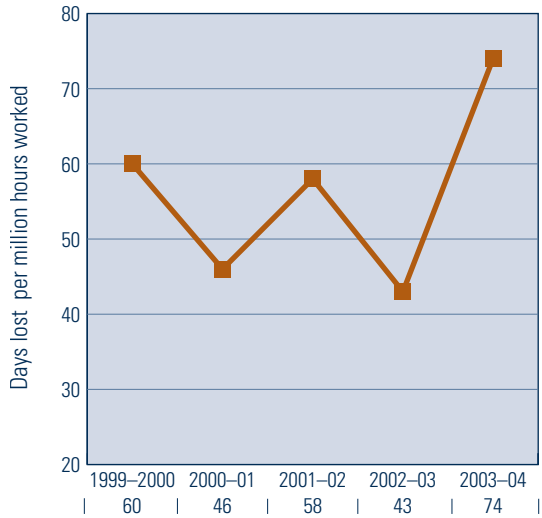


Figure 20 Injury index

Injuries by Commodity cont.

Bauxite and alumina performance indicators

There were mixed results in the performance indicators for the bauxite and alumina sector during 2003–04. Figures 21 to 24 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 2003–04 include the following:

- The incidence rate deteriorated slightly by 2%, rising from 5.1 to 5.2.
- The frequency rate deteriorated by 4%, rising from 2.7 to 2.8.
- The duration rate improved by 9%, falling from 14.9 to 13.6.
- The fall in duration rate was greater than the rise in frequency rate, resulting in an improvement of 5% to the injury index, down from 40 to 38.

Bauxite and alumina injury percentage breakdown for 2003–04

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 22%.
- Back injuries accounted for the second largest proportion of injuries at 19%, followed by leg injuries and hand injuries, both at 17%. Of the leg injuries, 67% were to knees and ankles.

Injuries by nature

- Sprain or strain was the highest ranking nature of injury at 56%.
- Laceration, effects of chemicals, and fracture were equal second highest ranking nature of injury at 8% each, followed by superficial NOC and burn, both at 6%.

Injuries by location

- The majority of injuries occurred in treatment plants, which accounted for 61%.
- The next largest proportion occurred in open pits (17%), followed by surface general at 11%.

Injuries by type

- Over-exertion or strenuous movements was the most common type of accident resulting in injury (39%).
- Slip or trip was the second most common type (11%), followed by fall getting off and contact with chemicals at 8% each.

Bauxite and alumina performance indicators
1999–2000 to 2003–04

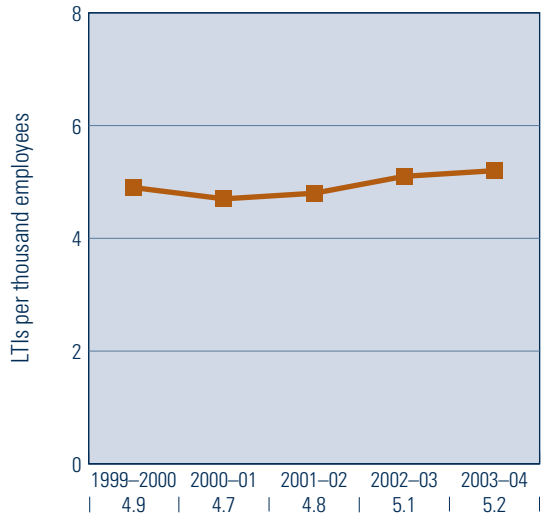


Figure 21 Incidence rate

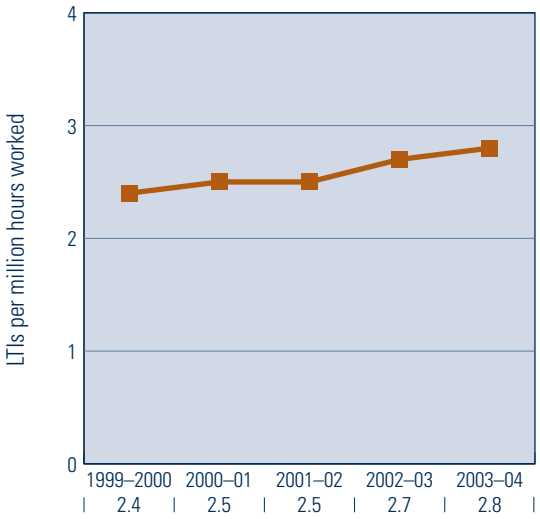


Figure 22 Frequency rate

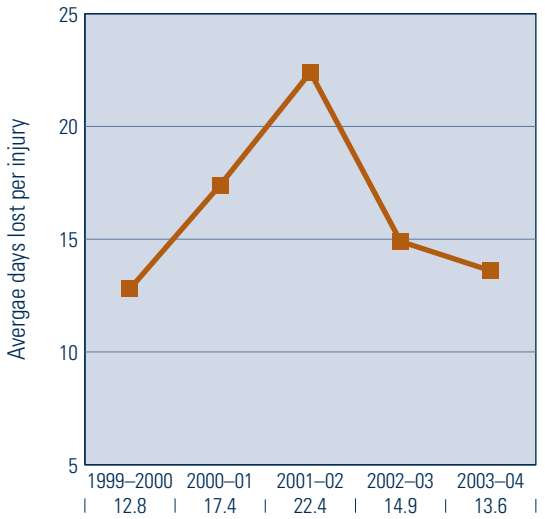


Figure 23 Duration rate

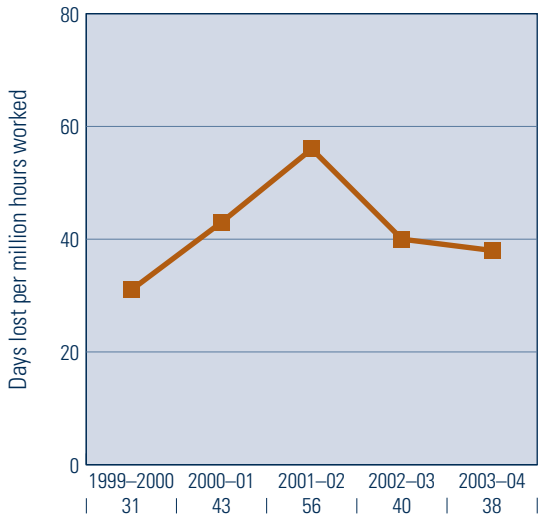


Figure 24 Injury index

Injuries by Commodity cont.

Nickel performance indicators

The performance indicators for the nickel sector improved during 2003–04. Figures 25 to 28 depict the performance indicators of incidence, frequency and duration rates, and injury index.

Some interesting trends noted in the nickel sector performance indicators during 2003–04 include the following:

- The incidence rate improved by 22%, falling from 10.7 to 8.3.
- The frequency rate improved by 19%, falling from 4.8 to 3.9.
- The duration rate improved by 19%, falling from 20.7 to 16.8.
- The fall in the frequency rate and the duration rate resulted in a significant 33% improvement in injury index (down from 99 to 66).

Nickel injury percentage breakdown for 2003–04

Appendix J 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

- Hand injuries accounted for the largest proportion of injuries at 27%.
- Back injuries accounted for the second largest proportion at 14%, followed by leg injuries and head injuries both at 12%. Of the leg injuries, 67% were to knees and ankles.

Injuries by nature

- Sprain or strain was the highest ranking nature of injury at 31%.
- At 10% each, fracture, crushing and laceration were equally ranked as second highest ranking nature of injury, followed by bruise or contusion and effects of chemicals, both at 8%.

Injuries by location

- The majority of injuries occurred underground, which accounted for 47%.
- The next largest proportion occurred in treatment plants (24%), followed by open pits at 10%.

Injuries by type

- Over-exertion or strenuous movements was the most common type of accident resulting in injury (14%).
- Slip or trip was the second most common type (12%), followed by struck by object and caught by or between moving objects at 10% each.

Nickel performance indicators
1999–2000 to 2003–04

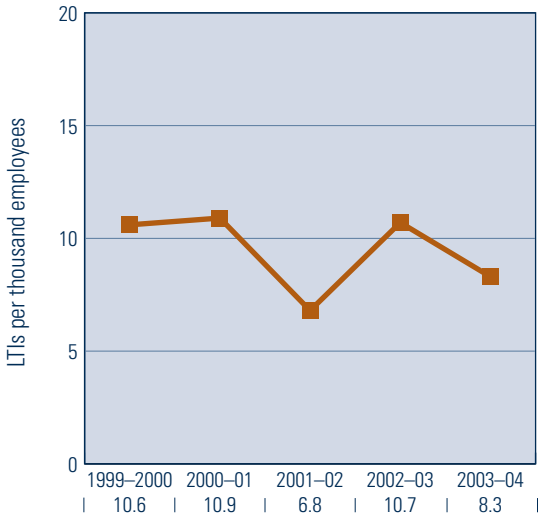


Figure 25 Incidence rate

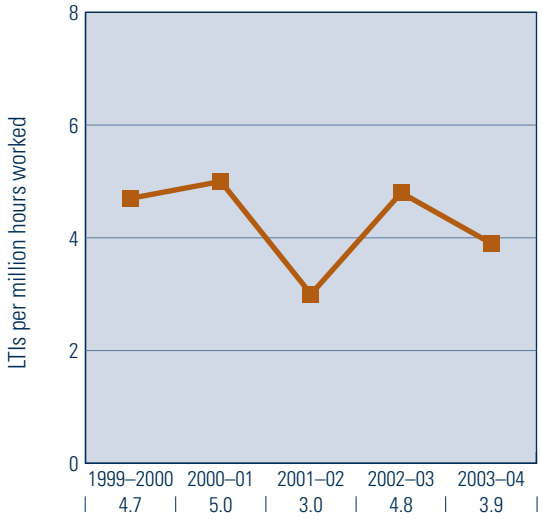


Figure 26 Frequency rate

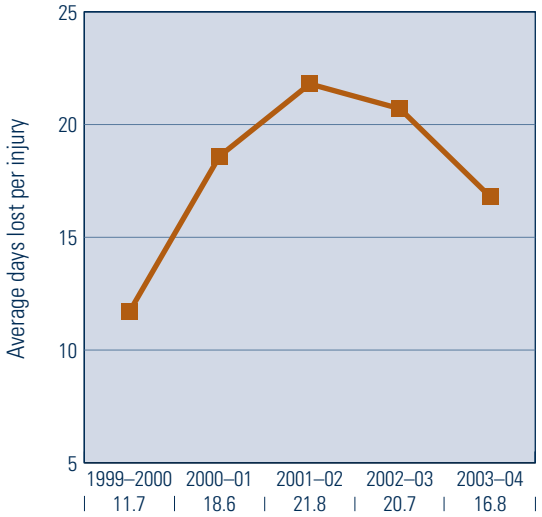


Figure 27 Duration rate

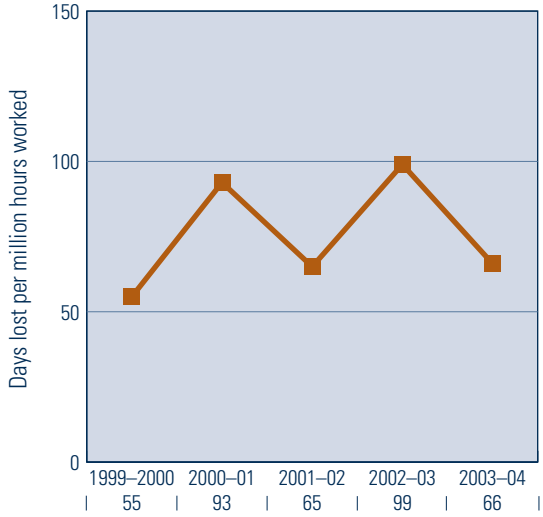


Figure 28 Injury index