



Safety *1999/2000* *Performance*

in the Western Australian Mineral Industry

Accident & Injury statistics



DEPARTMENT OF
MINERALS AND ENERGY
WESTERN AUSTRALIA

"Our Resources • Our People • Our Future"

Safety Performance

in the Western Australian Mineral Industry 1999/2000

Accident & Injury Statistics



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SUMMARY

The 1999/00 year has been one of consolidation in the safety performance of the Western Australian mineral industry, although some performance indicators for the year show a marginal reversal in the long-term downward trend. The statistics that follow are derived from the Department's AXTAT system as of October 2000.

Over the ten year period from 1990/91 to 1999/00 the lost-time injury frequency rate (lost time injuries per million hours worked) fell from 27.4 to 6.9. This performance, although very creditable, leaves scope for further improvement by a joint effort by employers and employees in the process of risk management.

The incidence and frequency of injuries in both the surface and underground mining sectors deteriorated during the year, increasing by 8 percent and 3 percent respectively in surface mining and by 35 percent and 31 percent respectively in the underground mining sector.

A fall in duration rate in both the surface and underground sectors represented a 21 percent improvement overall and resulted in a 17 percent improvement in injury index.

Total serious injuries fell from 258 in 1998/99 to 235 in 1999/00 but the number of minor injuries rose from 329 to 348 for the same period. The total decrease in injuries represents a marginal improvement on last year.

The number of employees in the mining industry fell by ten percent to 38,804. A breakdown of the number of employees and hours worked against commodity mined is provided graphically in Appendix A.

There were six fatal injuries during the year – four in the underground gold sector, one in the surface gold sector and one in the iron ore sector.

The Department's view is that no fatal accident is acceptable and that a fatal incidence rate of zero in the industry is achievable.

During the year the Department continued its program to shift the emphasis of its activities towards a higher degree of industry self-regulation. This is underpinned by a move from compliance inspections to field audits while maintaining a high degree of visibility and interaction with the industry and its employees. During the year, 121 Occupational Health and Safety audits, 25 Management Safety Systems audits and 231 High Impact Function audits were conducted.

These were complemented by 2026 inspections and another 538 site visits for other purposes.

With a number of large complex processing plants being recently established the Department has been promoting risk management principles. In particular the Department has been concentrating on the design and commissioning of new down-stream plants. However, auditing of risk management implementation is progressively extending to process plants which were constructed before detailed risk assessments were required. The management procedures used at these plants are being targeted to determine whether appropriate risk assessments were undertaken, particularly during plant modifications.

The Department continued to play an important role in providing education, training support and information to the mining industry including development of the "Geotechnical Considerations in Open Pit Mines" Guideline and other joint initiatives involving workshops, seminars and conferences.

The Mines Occupational Safety and Health Advisory Board (MOSHAB) took an active part in promoting safety in the industry with the publication of a number of guidelines including "Safety and Health Risk Management", "General Duty of Care in Western Australian Mines" and "A Guide to the Mines Safety and Inspection Act 1994". Promotion of the Thinksafe Minesafe campaign initiated by MOSHAB to foster an improved safety culture across the industry commenced with a formal launch of the program by the Minister. The Thinksafe Minesafe posters and Safety Matters pamphlets have been widely distributed to mining operations throughout the year.

In summary, the Western Australian mining industry data reported to the AXTAT system for the 1999/00 financial year and analysed in October 2000 indicates an improved safety performance in some areas but a deterioration in others. It is recognised that the Industry's treatment of injured employees has changed over the years to a role of active assistance in rehabilitation. This is often achieved by allowing an injured employee to continue attending the workplace and carrying out lighter duties. Whilst the Department is fully supportive of this enlightened approach to rehabilitation of injured employees, it is conscious of the anomaly being created in reporting of injuries. In consequence the Department is making changes to the AXTAT system to allow the recording of disabling injuries as specified in the Mines Safety and Inspection Act 1994.

SUMMARY

STATISTICAL SUMMARY

- There were six fatal accidents during 1999/00; four were in underground metalliferous mines and two occurred in surface metalliferous mines.
- There were 583 lost time injuries during 1999/00, slightly less than for the previous year (587 injuries in 1998/99) for a total workforce of 38,804. The breakdown of the number of injuries by commodity mined is illustrated graphically in Appendix A.
- The overall injury frequency rate for 1999/00 was 6.9. This shows a 5 percent increase on the 1998/99 figure which was 6.6.
- The overall duration rate of average work days lost per injury decreased from 15.5 to 12.3 during 1999/00. The breakdown of the average workdays lost for each commodity mined is illustrated graphically in Appendix A.
- Injury Index improved by 17 percent during 1999/00 (down from 102 to 85).
- Serious injuries in the mining industry during 1999/00 totalled 235, which is 23 less than for 1998/99.
- During 1999/00 the overall serious injury frequency rate improved slightly from 2.9 to 2.8.
- The bauxite and alumina sector had the lowest frequency rate at 2.4 during 1999/00.
- The gold frequency rate improved by 14 percent during 1999/00, decreasing from 7.9 to 6.8.
- The iron ore frequency rate increased by 5 percent during 1999/00 from 6.7 to 7.0.
- The nickel frequency rate improved slightly during 1999/00, falling 2 percent from 4.8 to 4.7.

EXPLANATORY NOTES

Introduction

The statistics published in this report relate to accidents that occurred in 1999/00 and involved 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 1999/00 has three components :

- i) *Initial Injuries* - days lost in 1999/00 from injuries that occurred in 1999/00.
- ii) *Recurrent Injuries* - days lost in 1999/00 through recurrences of injuries that occurred in 1999/00 and previous years.
- iii) *Carry Over Injuries* - days lost in 1999/00 by persons continuously off work from injuries which occurred before 1 July 1999.

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, the oil and petroleum industry injuries are not included in the statistics in 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 calculations except in the tables on page 14 which are in accordance with Australian Standard 1885.1-1990.

Collection of Information

Information is collected monthly, or by period (4 weeks). Accident/Injury details are reported to the Department of Minerals and Energy by mine managers, as are the number of persons employed (including contractor employees) and the hours worked during the month or period.

During the twelve months, on average, 170 mines or groups of mines reported to the AXTAT system.

Journey Accidents

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

Definitions

Lost Time Injury

A work injury which results in inability to work for at least one full day or shift any time after the day or shift on which the injury occurred.

Serious Injury

An injury which results in the injured person being disabled for a period of two weeks or more.

Incidence Rate

The number of lost time injuries per 1000 employees for a 12 month period.

Frequency Rate

The number of lost time injuries per million hours worked.

Duration or Severity

The average number of workdays lost per injury.

Injury Index

The number of workdays lost per million hours worked (frequency x duration).

Fatal Incidence Rate

The number of fatal accidents per 1000 employees for a 12 month period.

Fatal Frequency Rate

The number of fatal accidents 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.

EXPLANATORY NOTES

ABBREVIATIONS

BAUX ALUM	- bauxite and alumina mines
BRUISE/CONT	- bruise/contusion
C/BY MACH	- caught by or between operating machine
CHANGE RMS	- change rooms
CONST MAT	- construction materials
C/BY BETWN	- caught by or between moving and stationary object
C/W ELECTRIC	- contact with electric current
C/W FRGN BODY	- contact with foreign body
C/W OBJ/TOOL	- contact with object or tool
EFF CHEM	- effects of chemicals
EXPL DETON	- explosives detonation
FRACT/BREAKS	- fractures and breaks
FRGN BODY	- foreign body
METAL AV	- metalliferous average
METWORKERS	- metal workers
MIN SANDS	- mineral sands
MINE ROAD	- mine access road (not haul road)
MOTOR COLLSN	- motor vehicle collision
MOTOR VEH ROLL	- motor vehicle roll over
M VEH/EQUIP	- motor vehicle/equipment
O/C PROD	- open cut production
OBJT	- object
OVER/STREN MOV	- over exertion or strenuous movements
OFF/ADMIN	- office and administration
POWER GEN	- power generation
R/WAY	- railway
R/FALL U/G	- rock fall underground
S/AGAINST OBJT	- struck against object
S/BY OBJT	- struck by object
S/BY VEH/MOBILE	- struck by vehicle or mobile plant
STREN MOV	- strenuous movements
T/PLANT	- treatment plant, includes: stockpiles, train load/unload, wharf
U/G ACCESS	- underground access, includes: travelling and haulage ways
U/G DUMPG	- underground dumping
U/G PROD/DEV	- underground production/development
U/G PROD	- underground production
U/GROUND	- underground
VEH/EQP JOLT	- vehicle/equipment jolting
W/SHOP	- workshop

FATAL ACCIDENTS

Review of Fatal Accidents During 1999/00

Six fatalities occurred in the Western Australian mining industry during the 1999/00 fiscal year; four were in underground gold mines (three in one event), one in a surface gold mine and one in an iron ore mine.

- An underground diesel operator was killed when he was crushed between the bucket of his load haul dump unit (LHD) and a charge up vehicle. The deceased had dismounted from his LHD to talk to the operator of the parked charge up vehicle and while doing so the LHD rolled forward trapping him against the charge up vehicle.
- A drill jumbo operator, a serviceman and an electrician were caught by the inrush of a considerable volume of hydraulic fill into the lower mine workings after a fill barricade ruptured.
- A crane driver died in hospital from medical complications that resulted from a fractured pelvis he sustained in a fall from the deck of his crane. He had been working on the crane deck when he lost his balance and fell 1.7 metres to the ground.
- A shotfirer operating a haultruck on a run of mine stockpile had reversed the truck to the dump point when the truck went over the edge of the 12 metre high dump coming to rest on its back with the roof of the cab on the ground.

Fatal Incidence by Mineral Mined 1995/96 – 1999/00

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

Fatal Incidence Rate by Mineral Mined 1995/96 – 1999/00

Figure 1

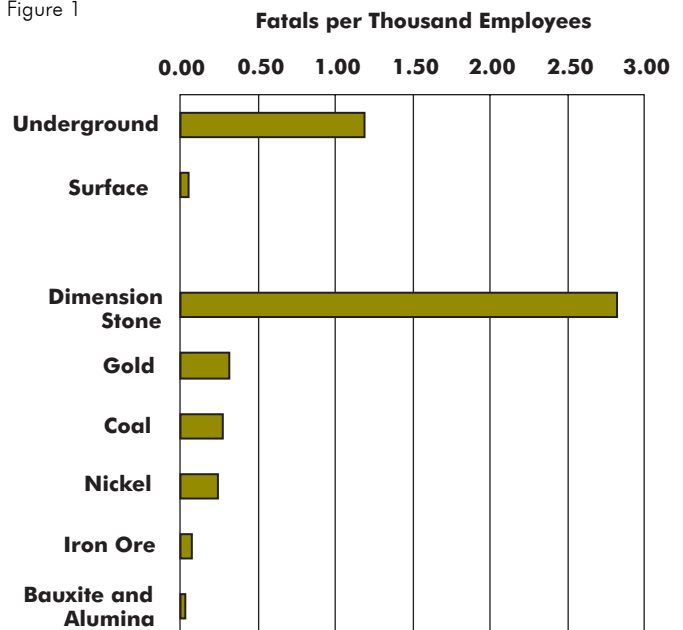


Figure 1 shows that underground mining has a much higher rate of fatal incidence than surface operations. This is reflected in the gold and nickel sectors where the majority of the State's underground mining occurs. The high incidence rates for the dimension stone and coal sectors were the result of two fatal accidents in relatively small work-forces.

Fatal Incidence Rate 1990/91 - 1999/00

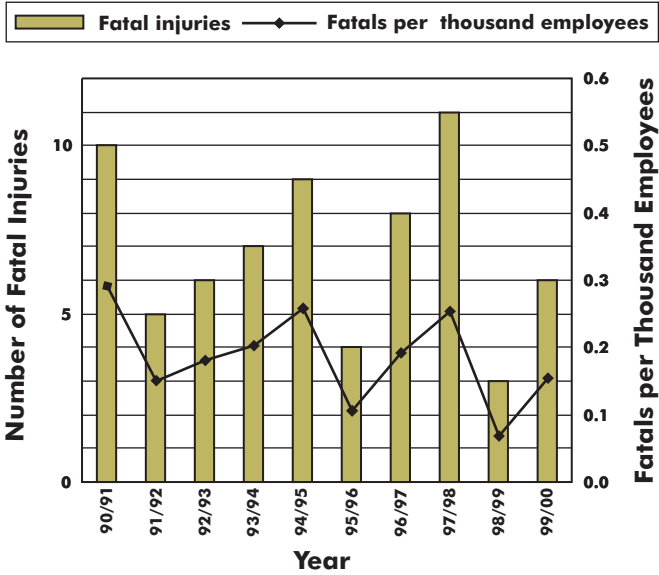
The fatal incidence rate for 1999/00, as indicated in Figure 2, was 0.16, (0.07 in 1998/99), and is still a major concern to the Department. While the overall trend continues to decline, there is a year-by-year scatter of incidence rates which appears typical for fatalities.

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

FATAL ACCIDENTS

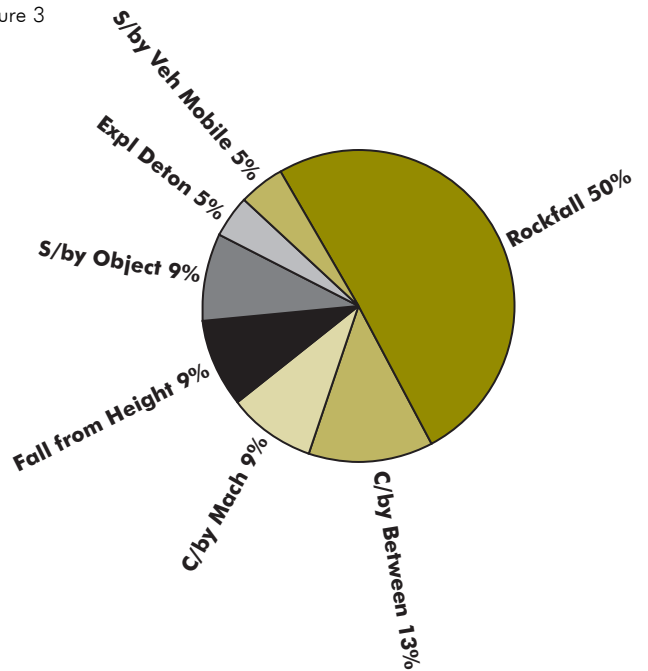
Fatal Incidence Rate 1990/91 – 1999/00

Figure 2



Underground Fatalities 1995/96 – 1999/00

Figure 3



Fatal Accidents by Type 1995/96 - 1999/00

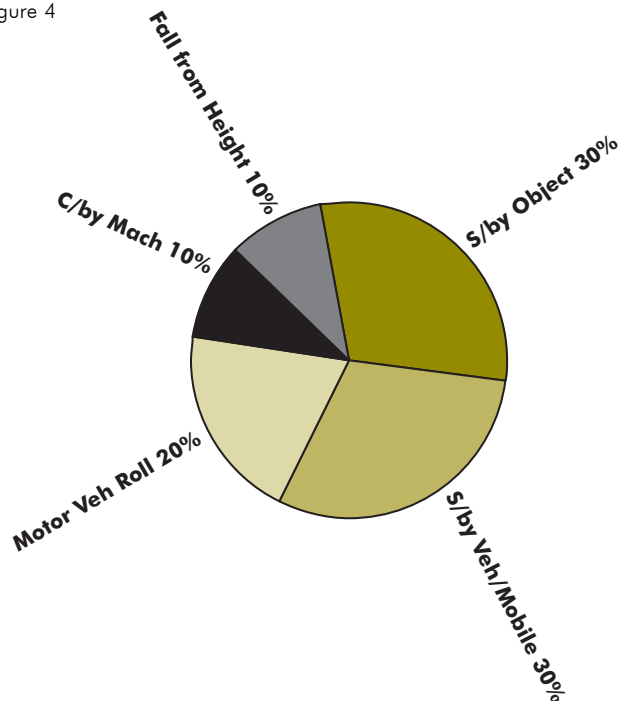
Figures 3 and 4 show the type of accidents (excluding exploration) for the 32 fatalities that occurred in the mining industry over the last five years. Of these fatalities, 22 occurred underground and 10 were in surface operations.

The most common type of underground fatal accident was rockfall which resulted in 11 fatalities (50%). Emphasis should continue to be placed on all aspects of ground control in underground mines, including training, excavation design and support, lighting, mechanisation of scaling operations and overhead protection for operators.

The most common types of surface fatal accident were being struck by objects and being struck by vehicles or mobile plant.

Surface Fatalities 1995/96 – 1999/00

Figure 4



SERIOUS INJURIES

Review of Serious Injuries During 1999/00

There was a total of 235 serious injuries in the mining industry during the 1999/00 fiscal year (258 in 1998/99). Of these injuries, 232 occurred in metalliferous mines and 3 were in coal mines. Descriptions of some selected serious accidents that occurred during the year follow:

- A rigger sustained a degloving injury to his arm while assisting in the placement of a pipe in a pipe rack. The lifting chains slipped on the pipe causing one end of the pipe to lift suddenly, trapping his arm between the pipe and a beam.
- A fitter received a fractured lower leg when he was struck by a falling rear access door to a chute in a treatment plant. The door was being raised by a 1 tonne chain block and when an additional load was applied to the chain block it ripped out of the attachment hole allowing the door to fall.
- A processing plant operator fractured his neck and leg when he fell 3.8 metres through a hole in a grating at a refinery.
- A boilermaker suffered steam burns to his face, neck, chest and arm while checking the radiator water on a front end loader. He was standing on the loader using his foot to retighten the radiator cap which did not seal properly and deflected steam upwards towards his face and body.
- A trades assistant received multiple electrical burns when a mobile crane came in contact with an 11 kv overhead powerline. At the time he was handling a load being moved by the crane.
- A drill jumbo operator's assistant received fractures to his head and neck and a crushed throat when he was struck by a rock which fell from the face. He was standing 1 metre from the face changing a drill bit.
- A smelter operator attempting to open a stiff discharge valve fractured his lower leg and dislocated his ankle when he stepped back and down awkwardly. He was standing on pipework and an instrument gauge cover to gain better access but slipped when the valve started to move.
- An underground miner received severe bruising to his back and lung while preparing stope blastholes for charging. He was struck by a rock (approx 50 kgs) which fell from the orebody.
- A fitter, attempting to knock out a pin, amputated the tip of his finger when he caught it between the handle of a hammer and a plate on an apron feeder.
- A haul truck driver sustained a strained back while an excavator was loading his truck. The driver was reaching for his water bottle when the truck rocked sideways due to large rocks that were being loaded.
- An exploration driller received a fractured foot while pulling drill rods at an exploration site. His foot was on top of the drill rig's hydraulic clamps and when the clamps were opened his foot was crushed between the sheave wheel pulley and the hydraulic clamps.
- A fitter was removing the belly plate from a bulldozer when the belly plate fell and dislocated his wrist.
- A diamond driller, deepening the waterways of a drill bit with an angle grinder, sustained a badly lacerated thumb when the angle grinder slipped. He was holding the drill bit in his hand while using the angle grinder on it.
- A drill jumbo operator fractured his jaw in two places while tightening bolts on a jumbo with a 600 mm shifting spanner. The spanner slipped off the bolt and the handle struck him in the face.
- A process plant operator, carrying out work on a conveyor, had his hand crushed when it was caught by the conveyor. The spanner he was using slipped and made contact with the conveyor belt.
- A miner, working from a basket hung off the jumbo boom, sustained a fractured forearm while attempting to remove a bent rockbolt from the backs. His arm was caught between the top rail of the basket and the rockbolt plate when he lowered the basket.
- A mobile plant operator received lacerations and bruising to his face when he fell asleep while driving a light vehicle. The vehicle left the haulroad, colliding with a tree.
- A process technician amputated two fingers while attempting to unblock a dust extraction line when his fingers were caught in a moving rotary valve.
- A deputy underground manager, travelling on a skip, fractured his forearm when it was struck against a shaft set as the skip freefell approximately 40 metres. An investigation revealed that an oil suction valve left shut off following a hydraulic filter change and a wiring fault in the hoist contributed to the accident.
- A truck driver, disconnecting an outlet pipe from a pump, was sprayed with hot water and received 2nd and 3rd degree burns to 25 percent of his body.
- A trades assistant suffered internal injuries while removing a platform from a decommissioned surge bin. He had just cut the last fixed support of the platform, which was suspended by chain blocks, when the platform buckled in the centre causing him to slide forward into the previously cut support.
- A drill jumbo operator sustained a fractured shoulder when he was struck by a poly pipe while extending decline services. An IT vehicle was lifting the polypipe when it blew apart at the isolation valve.

SERIOUS INJURIES

Serious Injury Incidence Rate by Mineral Mined 1995/96 – 1999/00

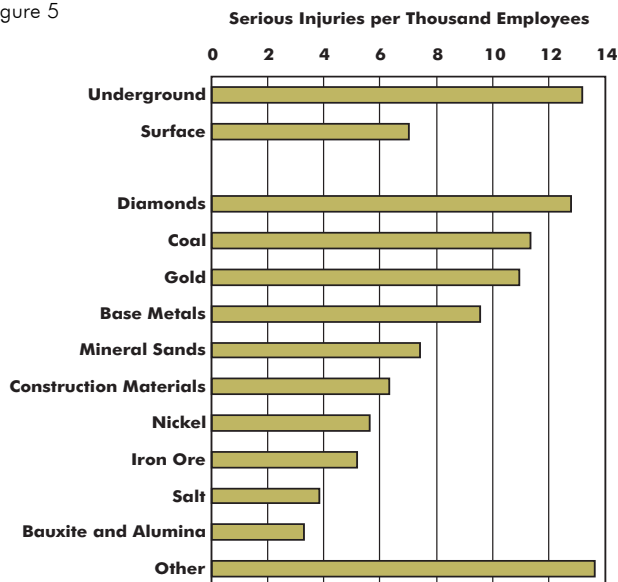
Figure 5 is a chart of incidence rates for serious injuries by mineral mined for the past five years. At the top of the chart the same information, grouped for all surface and underground operations, is provided.

The chart shows that underground mining has almost twice the number of employees seriously injured per 1000 employees compared to surface mining.

The diamonds sector had the worst serious incidence rate.

Serious Injury Incidence Rate 1995/96 – 1999/00

Figure 5

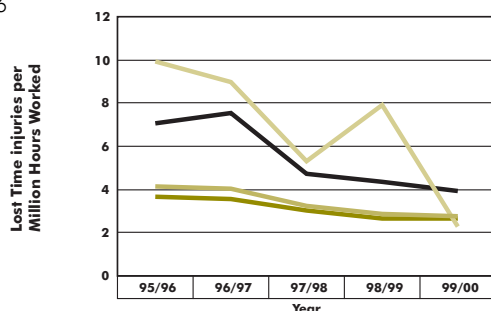


Serious Injury Frequency Rate 1995/96 – 1999/00

Figure 6 shows that, in underground metalliferous operations, the serious injury frequency rate improved during 1999/00 while in surface metalliferous operations the rate remained the same as in 1998/99. The coal sector serious injury frequency rate improved substantially by 71 percent during the last year, from 7.9 to 2.3.

Serious Injury Frequency Rate 1995/96 – 1999/00

Figure 6



	Year				
	95/96	96/97	97/98	98/99	99/00
Metalliferous U/G	7.1	7.5	4.7	4.3	3.9
Metalliferous Surface	3.7	3.5	3.0	2.6	2.6
Coal	9.9	9.0	5.3	7.9	2.3
Total	4.1	4.0	3.2	2.9	2.8

Serious Injury Percentage Breakdown for 1999/00

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 and arms accounted for 23 and 17 percent of serious injuries, respectively. Injuries to hands, backs, and feet and toes each accounted for 11 percent of serious injuries.
- Fracture was the most common injury (28 percent), followed by strain at 20 percent then bruise/contusion at 11 percent.
- The majority of serious injuries underground were in production and development areas (69 percent), and in access and haulage ways (14 percent).
- The most common accident types associated with serious injuries underground were rockfall (31 percent), over exertion and strenuous movements (20 percent), and caught by or between moving and stationary objects, and fall from height each at 9 percent.

Surface

- Injuries to legs, backs, and hands accounted for 27, 22, and 13 percent of serious injuries, respectively.
- Consistent with the high proportion of back injuries, strain represented the highest proportion by nature (30 percent). Fracture was the next highest (16 percent) and sprain accounted for 9 percent.
- The majority of serious injuries on the surface occurred in treatment plants (44 percent), open pits (21 percent) and workshops (15 percent).
- The most common accident types associated with serious injuries in surface operations were over exertion and strenuous movements (24 percent), struck by object (11 percent) and slip/trip (10 percent).

LOST TIME INJURIES

Review of Lost Time Injuries During 1999/00

In 1999/00, 16,939 days were lost through occupational injuries on mines in the State. This figure is made up of the number of days lost from injuries in 1999/00 (7,200), the number of days lost from recurrences of injuries which occurred before 1999/00 and in 1999/00 (2,464) and from lost time injuries which carried over into 1999/00 from accidents which occurred prior to July 1999 (7,275). A breakdown of work days lost in coal and metalliferous mining is given in Table 1.

During the 1999/00 fiscal year there were 583 lost time injuries in the State's mining industry, 562 in metalliferous mines and 21 in coal mines. A breakdown together with performance indicators is given in tables 2 and 3.

Eighty two persons who were injured before July 1999 lost time in 1999/00 amounting to 7,275 work days. A breakdown of these injuries is given in table 4.

In addition to the initial injuries there were 94 recurrences of previous injuries resulting in 2,464 work days lost during 1999/00. A breakdown of recurrent injuries by year of initial injury is given in table 5.

Table 1. Time Lost Through Injury During 1999/00

	Days Lost			
	Initial Injuries	Recurrent Injuries	Carry Over Injuries	TOTAL
Metalliferous Mining	7,126	2,410	7,266	16,802
Coal Mining	74	54	9	137
TOTAL	7,200	2,464	7,275	16,939

Table 2. Initial Lost Time Injuries During 1999/00

Mines	No. of Employees	No of LTIs	Incidence	Frequency	Duration	Injury Index	Days Lost
Metalliferous Surface	34,676	483	14	6.5	11.9	77	5,765
Metalliferous U/Ground	3,411	79	23	8.9	17.2	153	1,361
Metalliferous Total	38,087	562	15	6.7	12.7	86	7,126
Coal Total	717	21	29	15.9	3.5	56	74
Total Mining	38,804	583	15	6.9	12.3	85	7,200

LOST TIME INJURIES

Table 3. Injuries by Mineral Mined During 1999/00

Mineral Mined	No of Employees	No of LTIs	Incidence	Frequency	Duration	Injury Index	Days Lost
Gold	10,789	178	16	6.8	15.8	107	2,823
Iron Ore	7,984	111	14	7.0	8.6	60	954
Bauxite and Alumina	7,492	37	5	2.4	12.8	31	475
Nickel	4,885	52	11	4.7	11.7	55	606
Mineral Sands	2,190	57	26	12.8	11.0	141	628
Base Metals	1,283	30	23	10.6	15.2	162	456
Diamonds	854	25	29	12.9	13.0	168	326
Salt	744	13	17	8.6	8.4	72	109
Coal	717	21	29	15.9	3.5	56	74
Construction Materials	376	7	19	10.1	3.0	30	21
Other	1,490	52	35	15.1	14.0	212	728
TOTAL	38,804	583	15	6.9	12.3	85	7,200

NOTE: Duration in tables 2 and 3 does not take into consideration time lost after 30 June 2000 by persons still off work at the end of the fiscal year, or time lost by persons with carry over injuries from before July 1999, or for time lost from recurrent injuries.

Table 4. Carry Over Injuries During 1999/00

Year	Metalliferous Mining		Coal Mining	
	Number of Injuries	Number of Days Lost	Number of Injuries	Number of Days Lost
1999	51	3,029	1	9
1998	18	2,499	–	–
1997	7	1,063	–	–
1996	5	675	–	–
TOTAL	81	7,266	1	9

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

Table 5. Recurrent Injuries During 1999/00

Year	Metalliferous Mining		Coal Mining	
	Number of Injuries	Number of Days Lost	Number of Injuries	Number of Days Lost
2000	11	107	–	–
1999	42	1,269	16	29
1998	9	726	1	25
1997	9	222	–	–
1996	4	61	–	–
1994	1	8	–	–
1993	1	17	–	–
TOTAL	77	2410	17	54

LOST TIME INJURIES

Review of Lost Time Injuries During 1999/00 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. This 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 Standard treats fatalities as lost time injuries with a penalty of 220

workdays lost for each, whereas AXTAT keeps them separate with no penalty. Also, AXTAT calculates incidence per thousand, in contrast to the Standard's definition of injuries per hundred employees.

Tables 6 and 7 provide statistical information in accordance with this standard.

Table 6. Initial Lost Time Injuries During 1999/00 (AS1885.1-1990)

Mines	No of Employees	No of LTIs	Injuries per Hundred	Frequency	Duration	Days Lost
Metalliferous Surface	34,676	485	1.4	6.5	12.8	6,205
Metalliferous U/Ground	3,411	83	2.4	9.3	27.0	2,241
Metalliferous Total	38,087	568	1.5	6.8	14.9	8,446
Coal Total	717	21	2.9	15.9	3.5	74
TOTAL MINING	38,804	589	1.5	7.0	14.5	8,520

NOTE : Duration in this table does not take into consideration time lost after 30 June 2000 by persons still off work at the end of the fiscal year, or time lost by persons with carry over injuries from before July 1999, or for time lost from recurrent injuries.

Table 7. Injuries by Mineral Mined During 1999/00 (AS1885.1-1990)

Mines	No of Employees	No of LTIs	Injuries per Hundred	Frequency	Duration	Days Lost
Gold	10,789	183	1.7	7.0	21.4	3,923
Iron Ore	7,984	112	1.4	7.1	10.5	1,174
Bauxite and Alumina	7,492	37	0.5	2.4	12.8	475
Nickel	4,885	52	1.1	4.7	11.7	606
Mineral Sands	2,190	57	2.6	12.8	11.0	628
Base Metals	1,283	30	2.3	10.6	15.2	456
Diamonds	854	25	2.9	12.9	13.0	326
Salt	744	13	1.7	8.6	8.4	109
Coal	717	21	2.9	15.9	3.5	74
Construction Materials	376	7	1.9	10.1	3.0	21
Other	1,490	52	3.5	15.1	14.0	728
TOTAL	38,804	589	1.5	7.0	14.4	8,520

WORKERS' COMPENSATION

PREMIUM RATES FOR THE WESTERN AUSTRALIAN MINING 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.

Figure 7 indicates workers' compensation cost trends for some major mineral groups for the 10 year period since 1991/92.

Most mineral groups have shown reductions in compensation costs since 1991/92. In particular, underground gold operations for the 1991/92 fiscal year incurred a cost equivalent to 7.51 percent of payroll which has been reduced to 4.32 percent for 2000/01. This represents a 42 percent improvement in costs. The overall average premium rate for the Western Australian mining industry for 2000/01 is currently 3.22 percent, only a 12 percent reduction on 1999/00 (3.64 percent).

Figure 8 shows the current recommended premium rates for the 2000/01 fiscal year for a variety of mineral groups and other industries.

The safety performance in the coal industry during 1999/00 improved more than other mining industry sectors and is reflected in the premium rates. The coal mining industry currently has a rate equivalent to 4.21 percent of payroll.

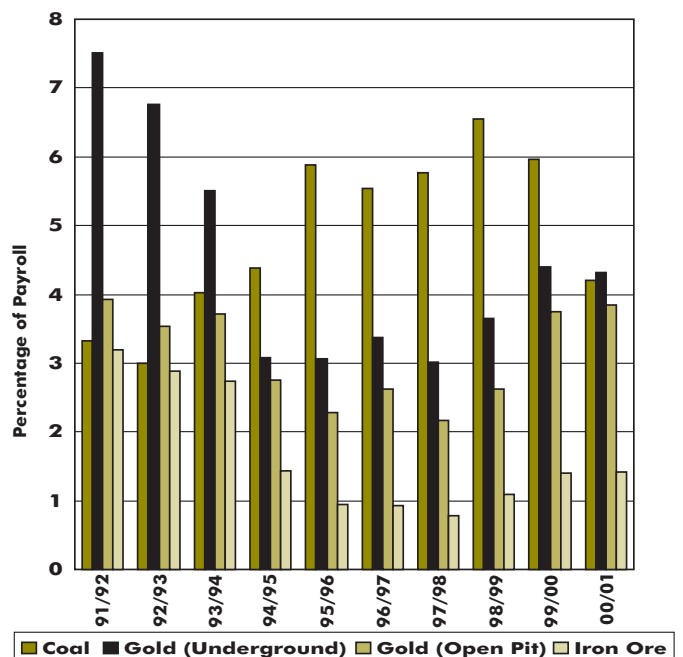
Premium rates for mining industry groups compare favourably with other industry groups such as clay brick manufacturing and structural steel fabrication which have current premium rates of 7.48 and 8.37 percent of payroll, respectively.

The industry has continued the recent trend where even the traditionally higher risk mining sectors have lower premium rates than many manufacturing sectors.

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

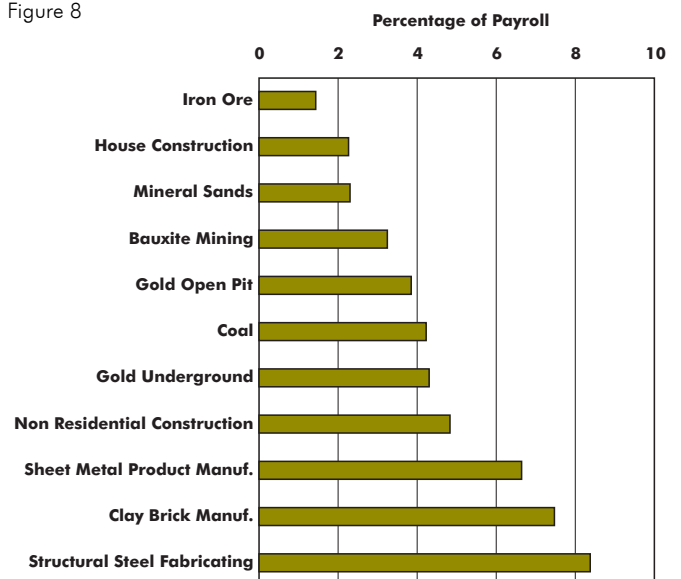
Western Australian Mines Workers Compensation Cost Trends

Figure 7



Western Australian Recommended Premium Rates 2000/01

Figure 8



INJURIES BY COMMODITY

METALLIFEROUS PERFORMANCE INDICATORS

The performance indicators for the metalliferous mining sector show mixed results during 1999/00. Figures 9 to 12 are charts depicting the performance indicators, incidence, frequency, duration and injury index (see explanatory notes for definitions) for the last five years.

Some interesting features of these performance indicators during 1999/00 include the following:

- There was a rise in both the surface and underground incidence rates during 1999/00 resulting in an overall 15 percent increase on 1998/99 (rising from 13 to 15).
- Similarly, the overall frequency rate rose from 6.2 to 6.7 representing an 8 percent increase.
- A fall in the duration rate for both underground and surface operations was evident. The overall duration rate is currently 12.7 representing a 20 percent improvement on 1998/99.
- The fall in duration rate more than compensated for the rise in frequency rate and resulted in a decrease in the overall injury index, an improvement of 13 percent (down from 99 to 86).

Metalliferous Injury Percentage Breakdown for 1999/00

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 injuries for surface operations (27 percent), while backs and legs were the most common parts of the body injured at underground operations both at 19 percent.
- Hand injuries accounted for the second largest proportion of injuries underground (15 percent), followed by arms at 10 percent.
- Leg injuries accounted for the second largest proportion for surface operations (20 percent, including 8 percent knee injuries), followed by hand injuries at 15 percent.

Injuries by Nature

- Strains accounted for the majority of injuries for both underground and surface operations at 23 and 32 percent respectively.
- For underground operations the second highest ranking nature of injury was fracture (16 percent), followed by bruise/contusion at 11 percent.
- The second highest ranking nature of injury for surface operations was also fracture (11 percent), followed by bruise/contusion and sprain both at 9 percent.

Injuries by Location

- For underground operations most injuries occurred in production and development areas (66 percent), followed by access and haulage ways at 18 percent.
- The majority of injuries for surface operations occurred in treatment plants (44 percent), followed by open pits at 17 percent.

Injuries by Type

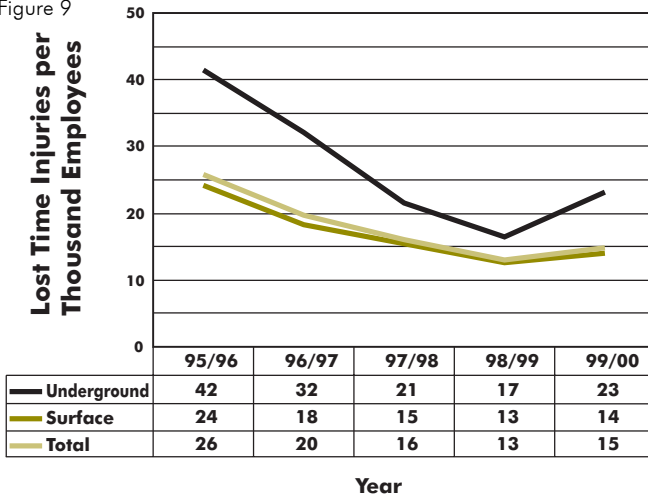
- Over exertion and strenuous movements was the major accident type for underground injuries (19 percent), followed by rockfall at 16 percent (up from 10 percent in 1998/99).
- For injuries in surface operations the most common accident types were over exertion and strenuous movements (29 percent), followed by slip/trip and struck by object both at 10 percent.

INJURIES BY COMMODITY

Metalliferous Performance Indicators 1995/96 – 1999/00

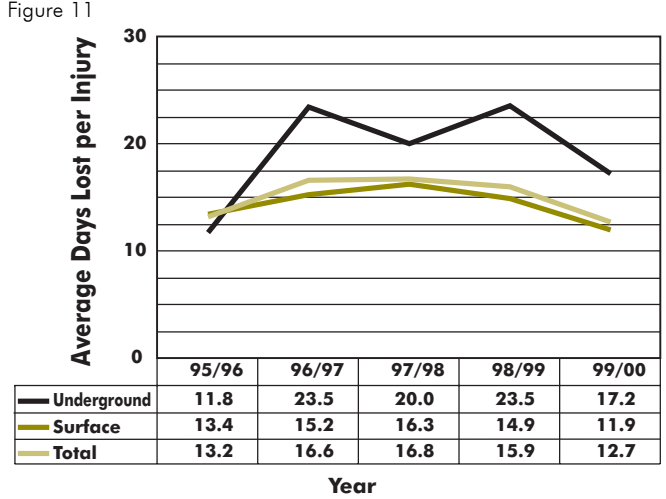
Incidence Rate

Figure 9



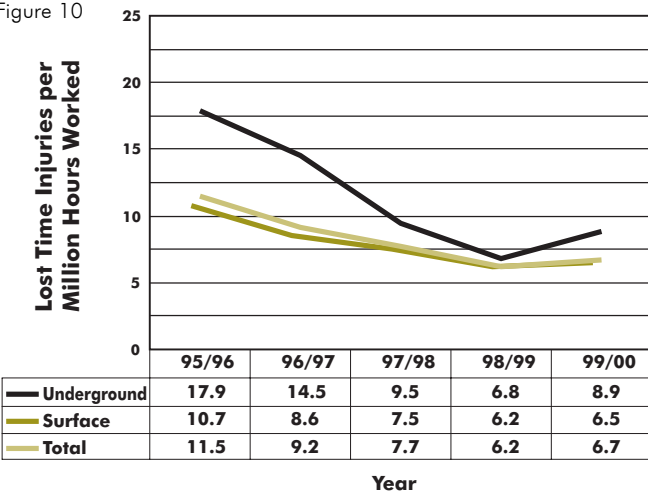
Duration Rate

Figure 11



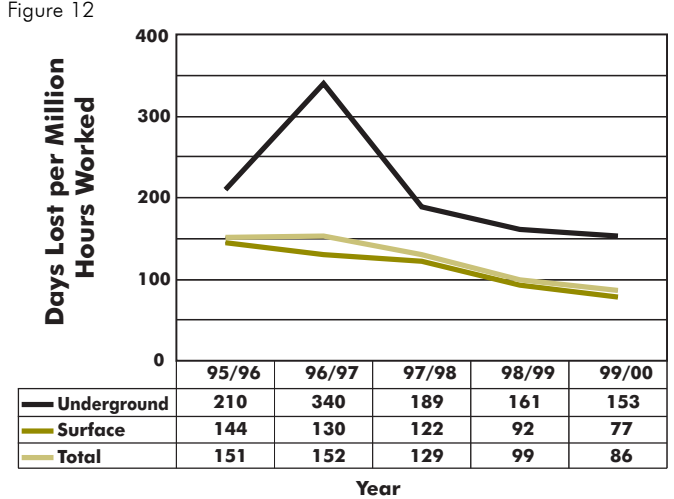
Frequency Rate

Figure 10



Injury Index

Figure 12



INJURIES BY COMMODITY

GOLD PERFORMANCE INDICATORS

The performance indicators for the gold mining sector, apart from the underground incidence, frequency and injury index, show a general improvement during 1999/00. Figures 13 to 16 are charts depicting the performance indicators, incidence, frequency, duration and injury index.

Some interesting features of these gold mining sector performance indicators during 1999/00 include the following:

- The overall incidence rate improved by 11 percent, dropping from 18 to 16. The surface sector improved by 22 percent (from 18 to 14) while the underground sector rate deteriorated by 35 percent (from 17 to 23).
- A similar trend was noted for the frequency rate for both underground and surface sectors. The overall frequency rate improved by 14 percent, currently at 6.8. The rate for the surface sector dropped by 24 percent (from 8.2 to 6.2) while the rate for the underground sector rose by 25 percent (from 6.7 to 8.4).
- The overall duration rate is currently 15.9 representing a 14 percent improvement on 1998/99. The duration rate improved for both the underground and surface sectors.
- The fall in duration rate and frequency rate for the surface sector has resulted in a significant decrease in the injury index, falling by 25 percent (from 144 to 108). In the underground sector the rise in frequency rate was balanced by a fall in duration rate resulting in the injury index remaining unchanged at 155.

Gold Injury Percentage Breakdown for 1999/00

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 injuries in both the underground and surface sectors at 22 percent and 23 percent respectively.
- In the underground sector hand injuries and back injuries accounted for the next largest, both at 16 percent.
- For the surface sector back injuries accounted for the next largest at 21 percent followed by hand injuries at 16 percent.

Injuries by Nature

- Fractures accounted for the majority of injuries in underground operations (21 percent) while strain was the most common nature of injury at surface operations (32 percent).
- For the underground sector the second highest ranking nature of injury was strain (19 percent), followed by bruise/contusion at 9 percent.
- For the surface sector the second highest ranking nature of injury was fracture (16 percent), followed by sprain at 7 percent.

Injuries by Location

- For underground operations most injuries occurred in production and development areas (69 percent), followed by access and haulage ways at 12 percent.
- The majority of injuries occurred in treatment plants for the surface sector (33 percent), followed by workshops at 23 percent.

Injuries by Type

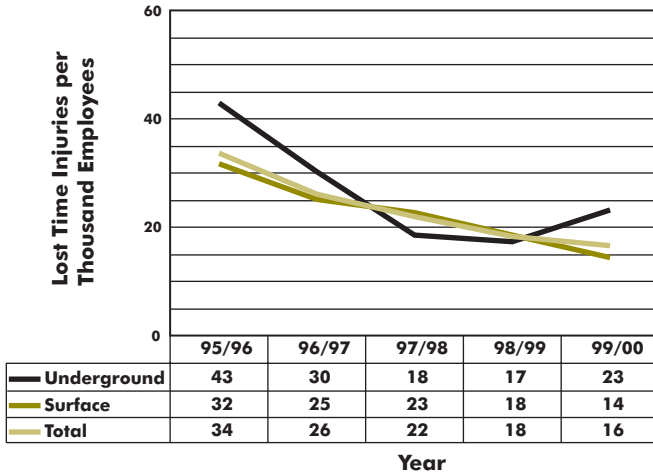
- Over exertion and strenuous movements was the major accident type for underground injuries (21 percent), followed by rockfall at 17 percent and fall from height at 9 percent.
- The most common accident types for surface operations were over exertion and strenuous movements (24 percent), followed by struck by object at 16 percent and slip/trip at 8 percent.

INJURIES BY COMMODITY

Gold Performance Indicators 1995/96 – 1999/00

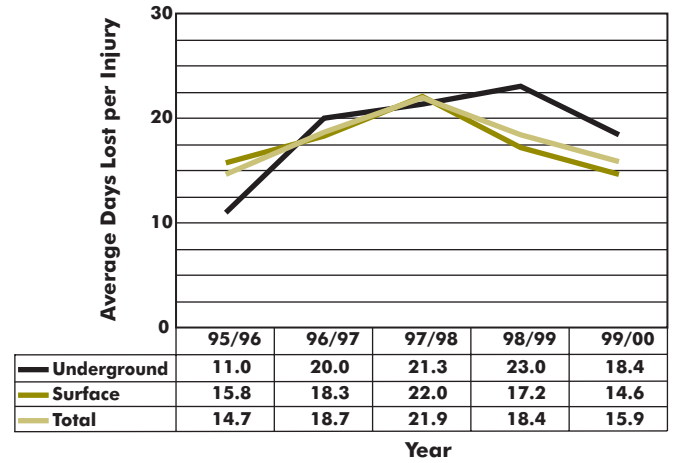
Incidence Rate

Figure 13



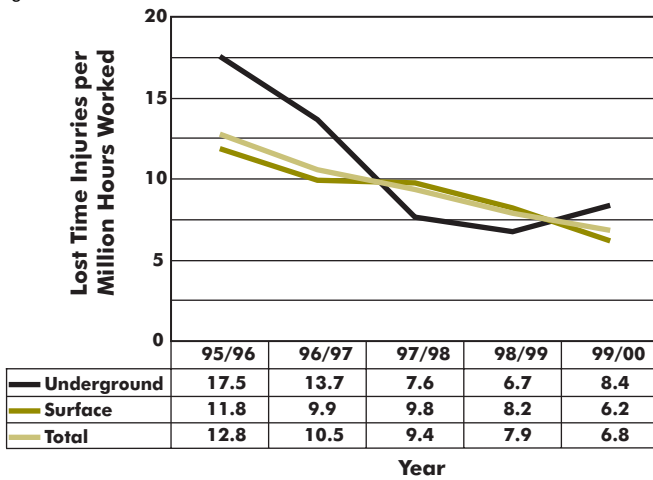
Duration Rate

Figure 15



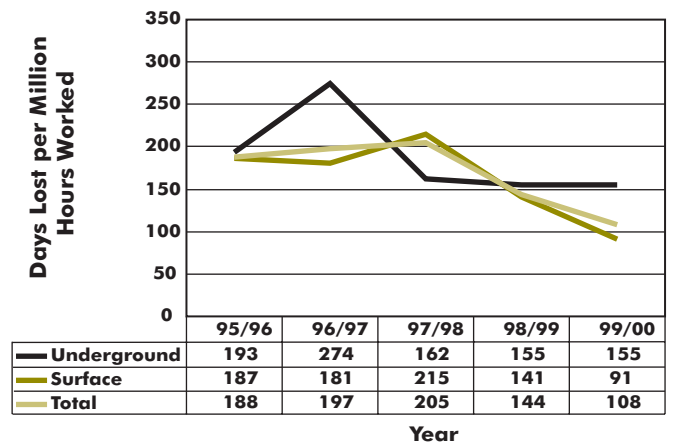
Frequency Rate

Figure 14



Injury Index

Figure 16



INJURIES BY COMMODITY

IRON ORE PERFORMANCE INDICATORS

The performance indicators for iron ore mining show mixed results during 1999/00. Figures 17 to 20 are charts depicting the performance indicators, incidence, frequency, duration and injury index.

Some interesting features of the iron ore performance indicators during 1999/00 include the following:

- The incidence rate at 14 represents a 27 percent increase on 1998/99.
- The frequency rate also increased but only by 4 percent, currently at 7.0.
- There was a drop in the duration rate to 8.6. This represents a 12 percent improvement.
- The slight rise in the frequency rate and the fall in duration rate has resulted in an overall improvement in injury index (down 9 percent from 66 to 60).

Injuries by Type

- Over exertion and strenuous movements continued to dominate as the major type of accident resulting in injury (31 percent).
- Slip/trip was the next highest type (10 percent), followed by caught by or between moving and stationary objects at 8 percent.

Iron Ore Injury Percentage Breakdown for 1999/00

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 representing 31 percent.
- Leg and arm injuries accounted for the next largest proportion of injuries, both at 15 percent, followed by hand and head injuries, both at 9 percent.

Injuries by Nature

- Strain was the most common nature of injury at 39 percent.
- Bruise/contusion was the next highest proportion (12 percent), followed by sprain at 8 percent.

Injuries by Location

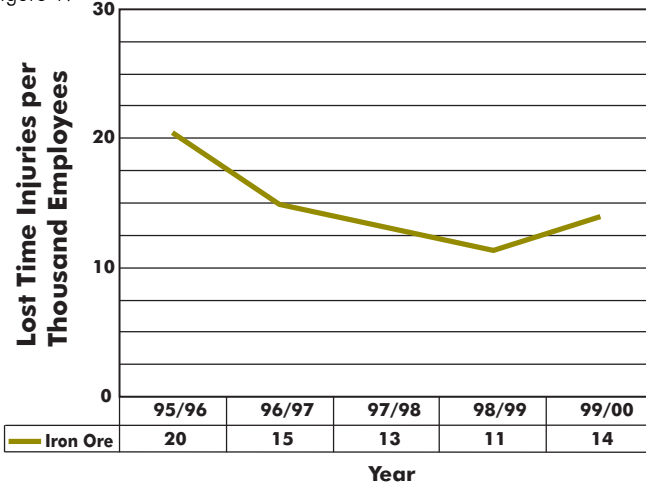
- The majority of injuries occurred in treatment plants which accounted for 30 percent.
- The next largest proportion occurred in workshops (17 percent), followed by railways at 13 percent.

INJURIES BY COMMODITY

Iron Ore Performance Indicators 1995/96 – 1999/00

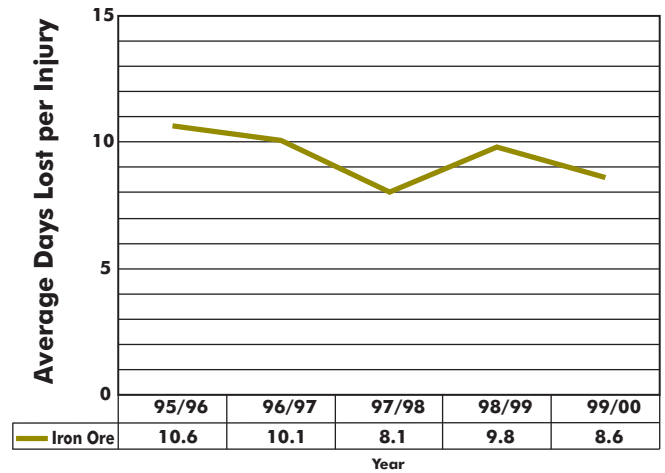
Incidence Rate

Figure 17



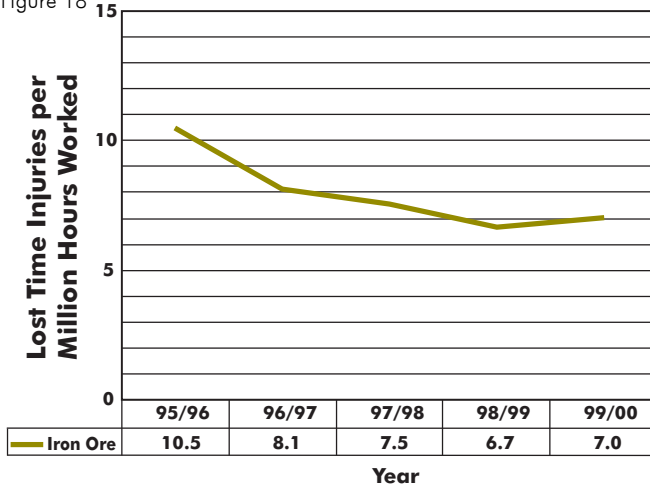
Duration Rate

Figure 19



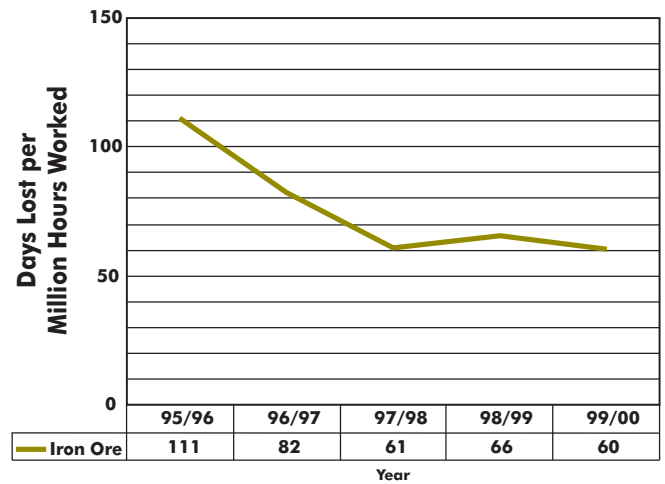
Frequency Rate

Figure 18



Injury Index

Figure 20



INJURIES BY COMMODITY

BAUXITE AND ALUMINA PERFORMANCE INDICATORS

Performance indicators for the bauxite and alumina industry showed significant improvement during 1999/00. Figures 21 to 24 are charts depicting the performance indicators, incidence, frequency, duration and injury index.

Some interesting features of the bauxite and alumina performance indicators during 1999/00 include the following:

- The incidence rate remained unchanged at 5 which is still the lowest incidence rate of all the major commodity groups.
- The frequency rate of 2.4 was also the same as 1998/99. Once again this is the lowest rate of all the major commodity groups.
- There was a significant fall in the duration rate now recorded as 12.8, representing a 35 percent improvement.
- The significant improvement in duration resulted in a large improvement of 34 percent to the injury index, down to 31.
- Apart from duration the bauxite and alumina sector continues to be the better performing major commodity group and is clearly established as the industry benchmark.

Injuries by Location

- The majority of injuries occurred in treatment plants (71 percent), followed by open pits at 14 percent.

Injuries by Type

- Over exertion and strenuous movements was the most common type of accident resulting in injury (19 percent).
- Struck by object, stepping, caught by or between moving and stationary objects, and contact with chemicals were the next highest proportion all at 11 percent each.

Bauxite and Alumina Injury Percentage Breakdown for 1999/00

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

- Leg injuries accounted for the largest proportion of injuries representing 24 percent.
- Hand and back injuries accounted for the next largest proportions of injuries representing 22 and 19 percent respectively.

Injuries by Nature

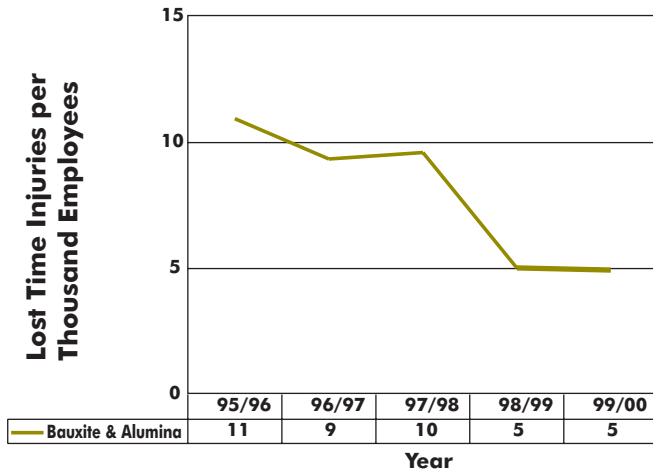
- Strains accounted for the majority of injuries at 19 percent.
- Bruise/contusion was the next highest proportion (14 percent), followed by fracture, crushing, and pain each at 11 percent.

INJURIES BY COMMODITY

Bauxite and Alumina Performance Indicators 1995/96 – 1999/00

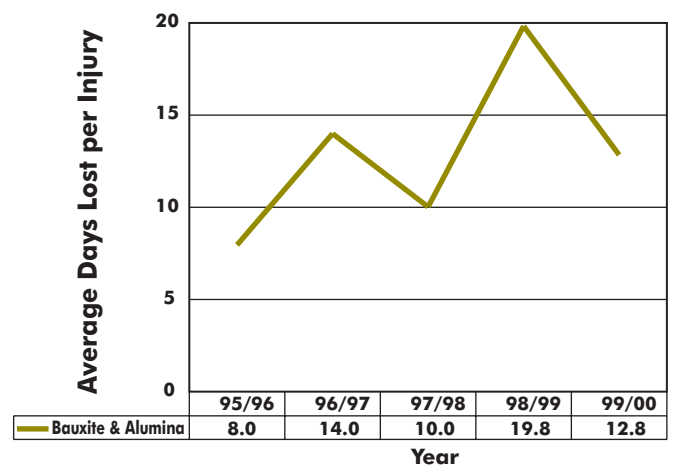
Incidence Rate

Figure 21



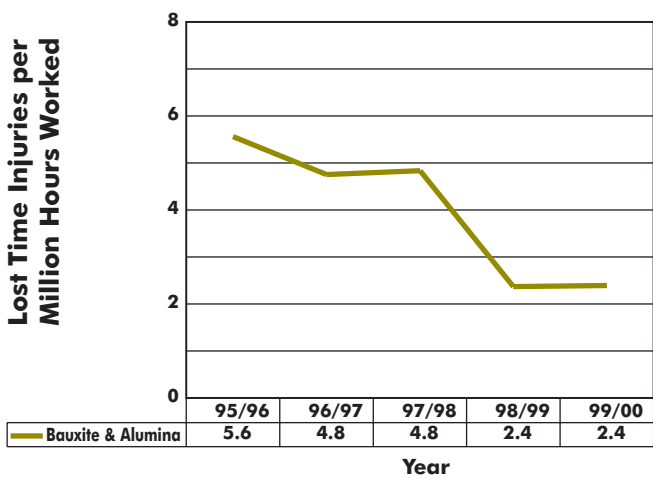
Duration Rate

Figure 23



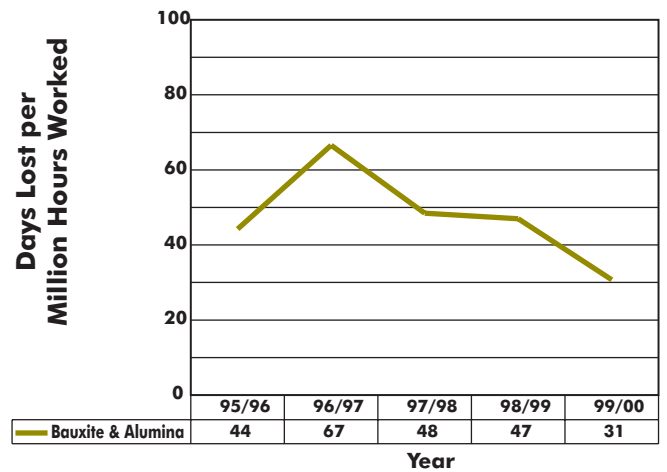
Frequency Rate

Figure 22



Injury Index

Figure 24



INJURIES BY COMMODITY

NICKEL PERFORMANCE INDICATORS

The nickel industry continued to improve in most performance indicators during 1999/00. Figures 25 to 28 are charts depicting the performance indicators incidence, frequency, duration and injury index.

Some interesting features of the nickel mining sector performance indicators during 1999/00 include the following:

- The incidence rate of 11 is a 10 percent increase on 1998/99.
- The frequency rate of 4.7 represents a slight improvement of 2 percent on 1998/99.
- The duration rate of 11.7 is 21 percent lower than 1998/99.
- The improvement in the frequency rate and duration rate resulted in a decline in injury index (from 72 to 55) which is equivalent to a 24 percent improvement.

Injuries by Location

- The majority of injuries occurred in treatment plants accounting for 60 percent.
- The next largest proportion occurred underground and in open pits both at 12 percent.

Injuries by Type

- Over exertion and strenuous movements continued to dominate as the major type of accident resulting in injury (25 percent).
- Contact with chemicals featured as the second most frequent type of accident (21 percent), followed by slip/trip at 19 percent.

Nickel Injury Percentage Breakdown for 1999/00

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

- Back injuries accounted for the largest proportion of nickel mining injuries representing 27 percent.
- Multiple injuries accounted for the next largest proportion representing 17 percent, followed by injuries to hands at 15 percent.

Injuries by Nature

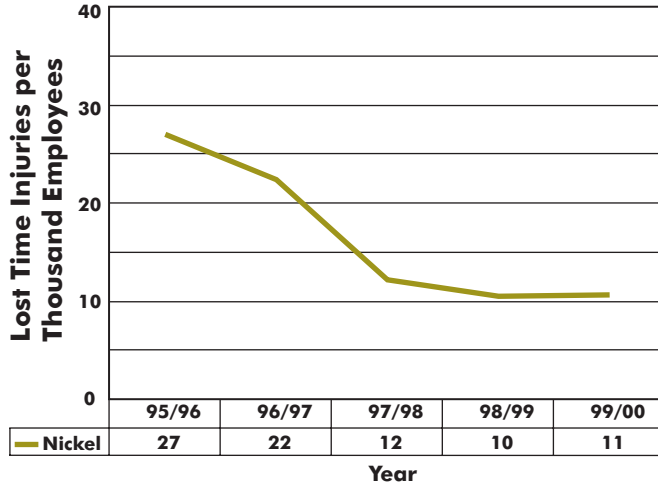
- Strains accounted for the majority of injuries at 21 percent.
- Effects of chemicals was the next highest proportion (19 percent), followed by fracture at 13 percent.

INJURIES BY COMMODITY

Nickel Performance Indicators 1995/96 – 1999/00

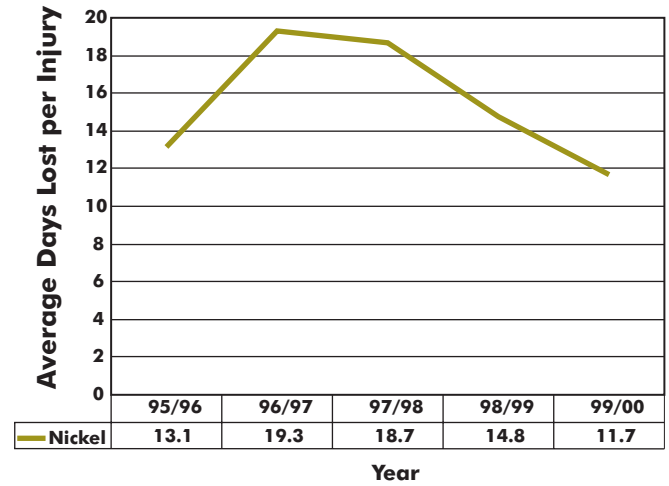
Incidence Rate

Figure 25



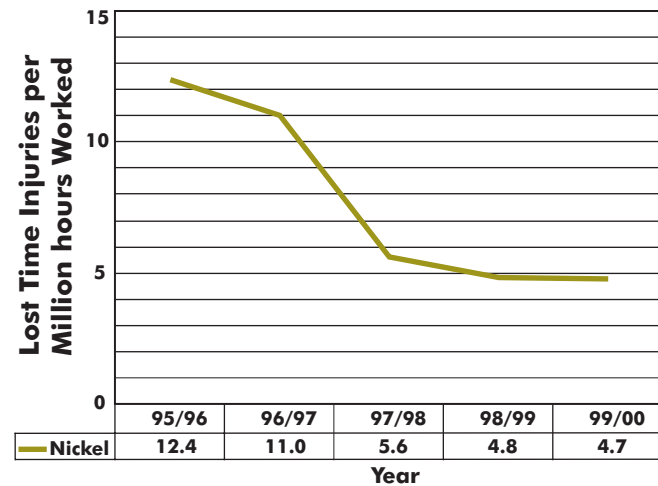
Duration Rate

Figure 27



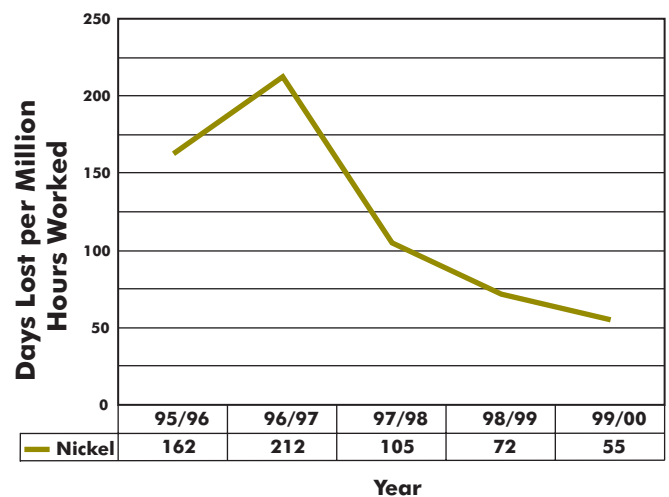
Frequency Rate

Figure 26



Injury Index

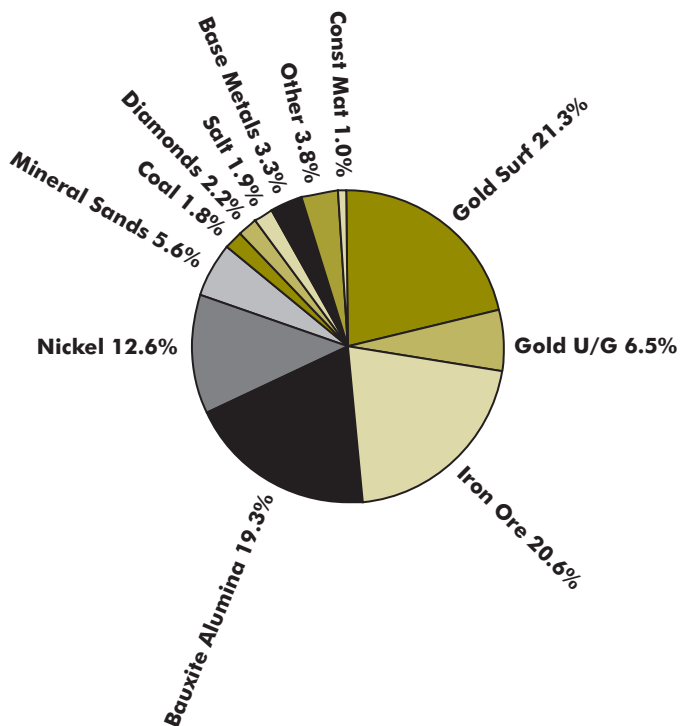
Figure 28



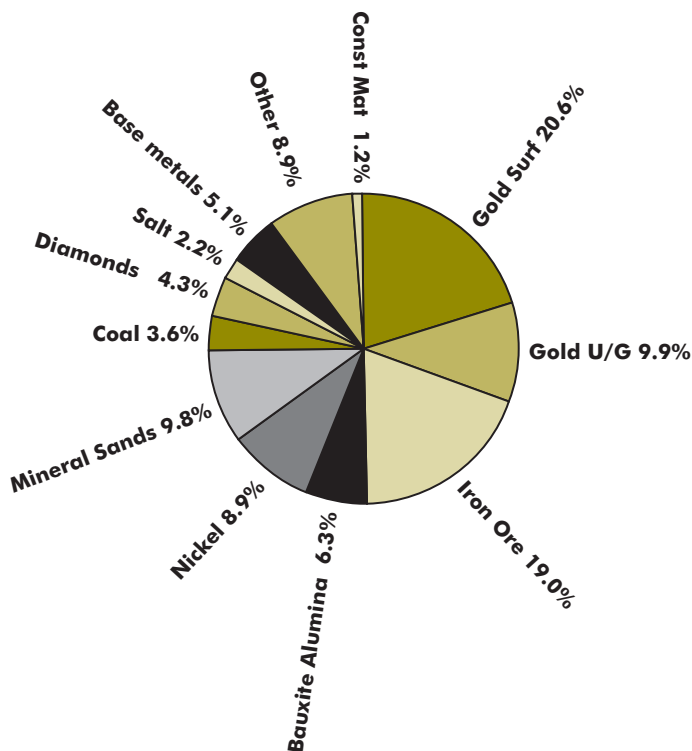
APPENDIX A

WESTERN AUSTRALIAN MINES 1999/00 FINANCIAL YEAR – 583 INJURIES

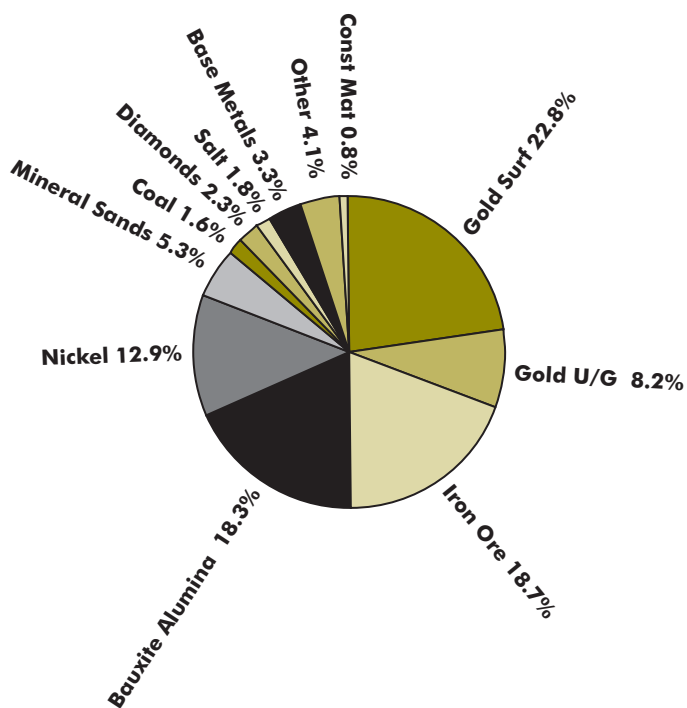
NUMBER OF EMPLOYEES



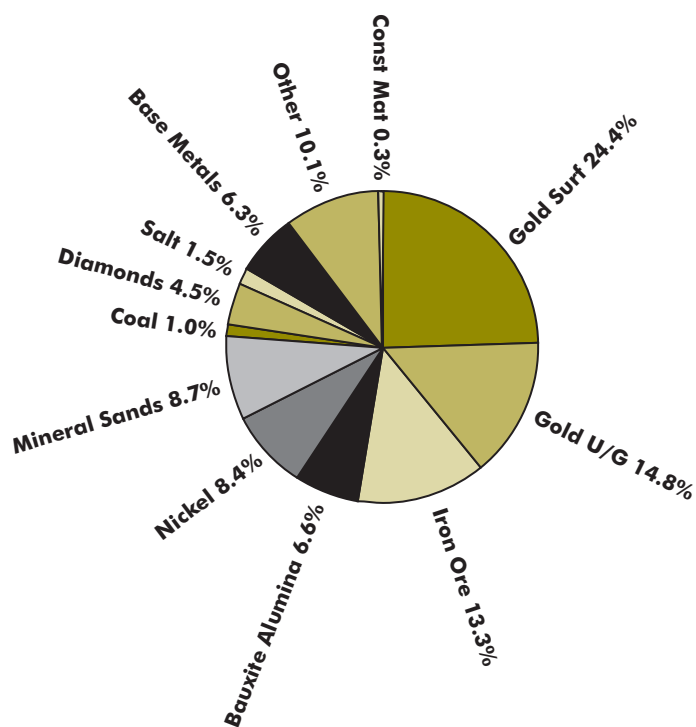
NUMBER OF INJURIES



MILLION HOURS WORKED



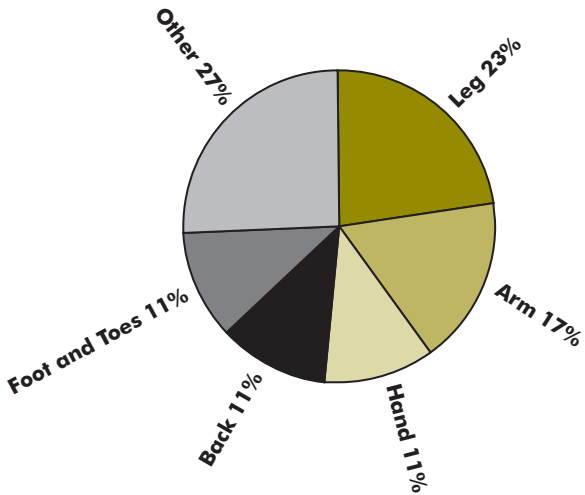
WORK DAYS LOST



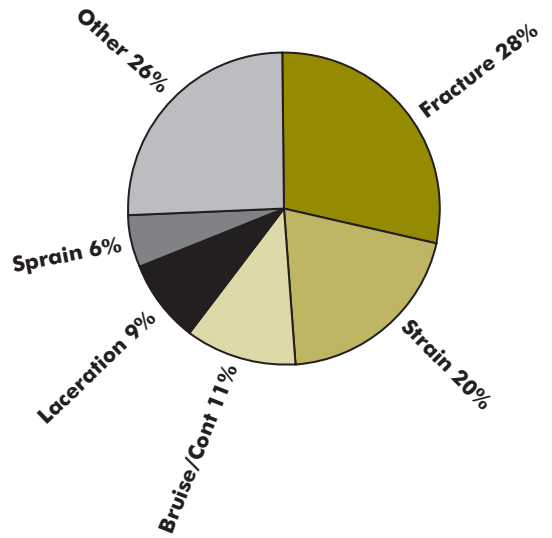
APPENDIX B

SERIOUS INJURIES UNDERGROUND 1999/00 – 35 INJURIES

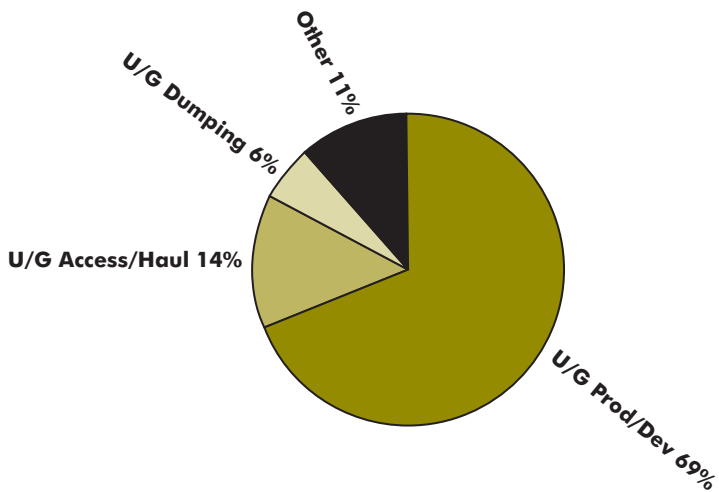
PART OF BODY



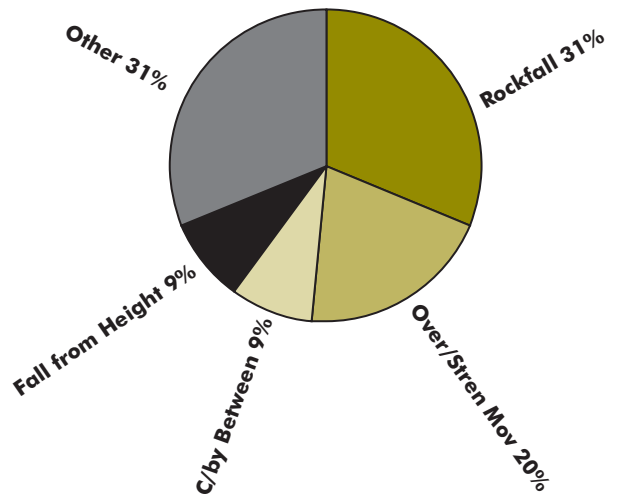
NATURE OF INJURY



LOCATION OF ACCIDENT



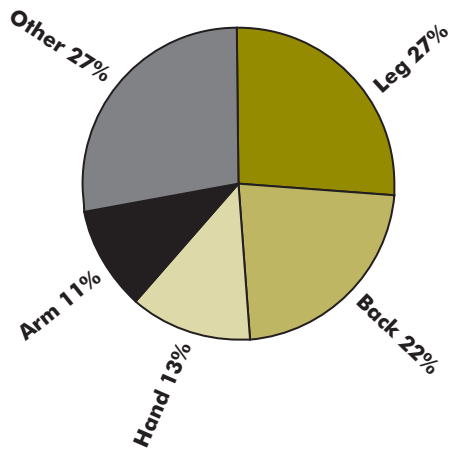
TYPE OF ACCIDENT



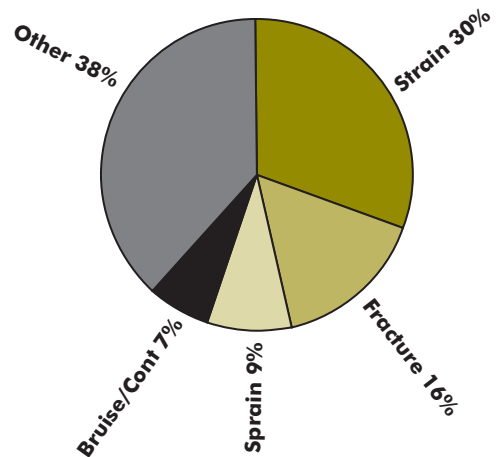
APPENDIX C

SERIOUS INJURIES SURFACE 1999/00 – 200 INJURIES

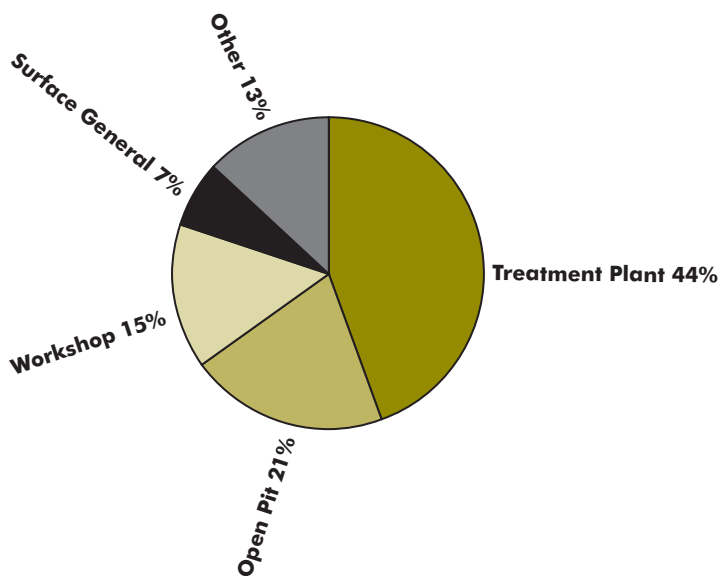
PART OF BODY



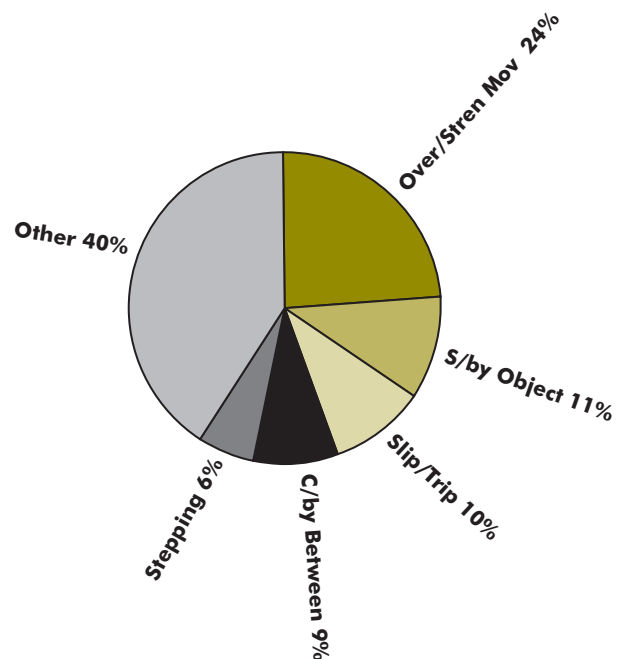
NATURE OF INJURY



LOCATION OF ACCIDENT



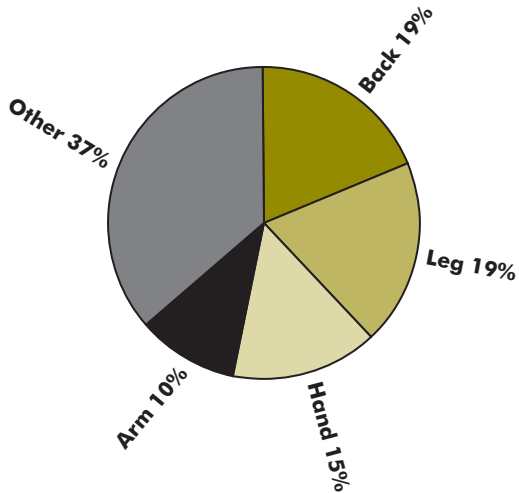
TYPE OF ACCIDENT



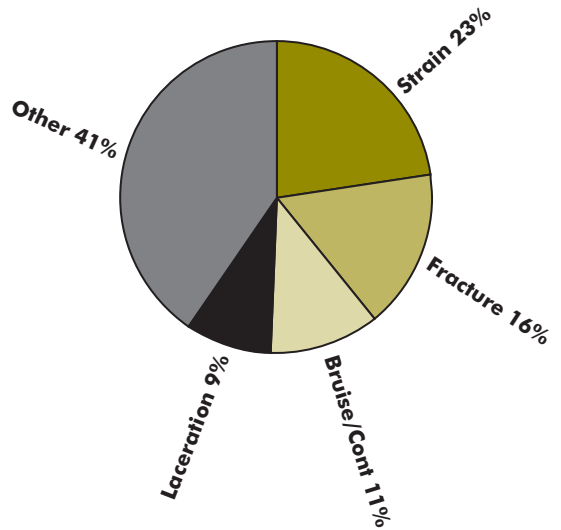
APPENDIX D

METALLIFEROUS UNDERGROUND INJURIES 1999/00 – 79 INJURIES

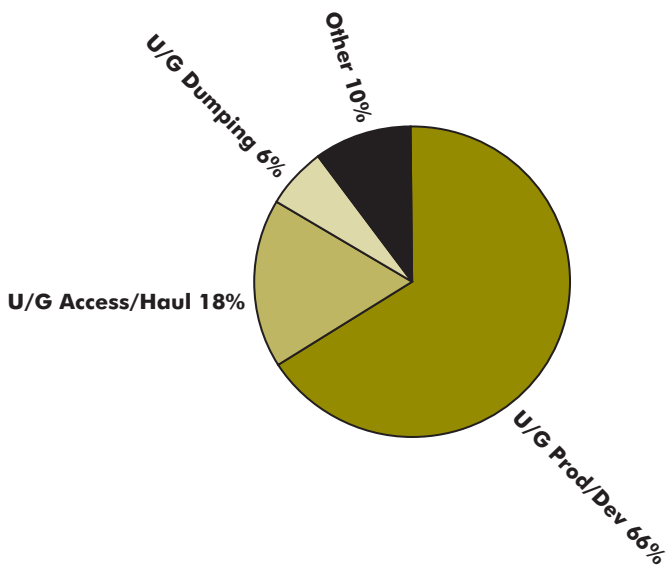
PART OF BODY



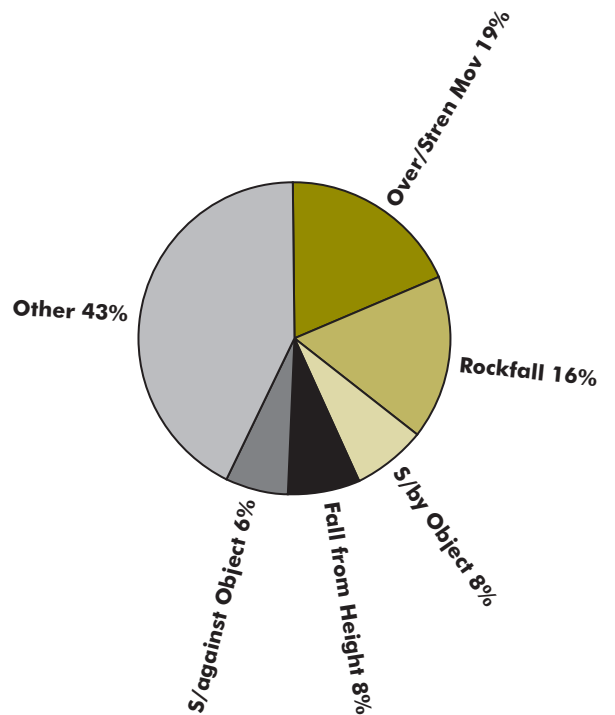
NATURE OF INJURY



LOCATION OF ACCIDENT



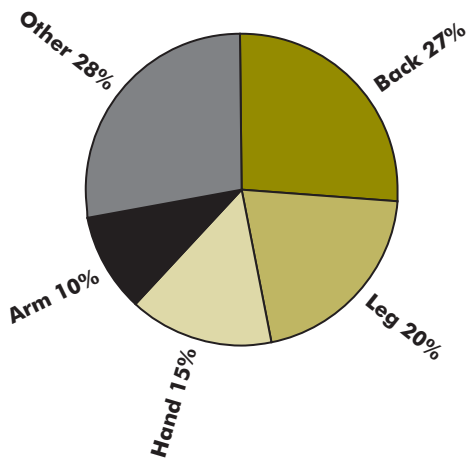
TYPE OF ACCIDENT



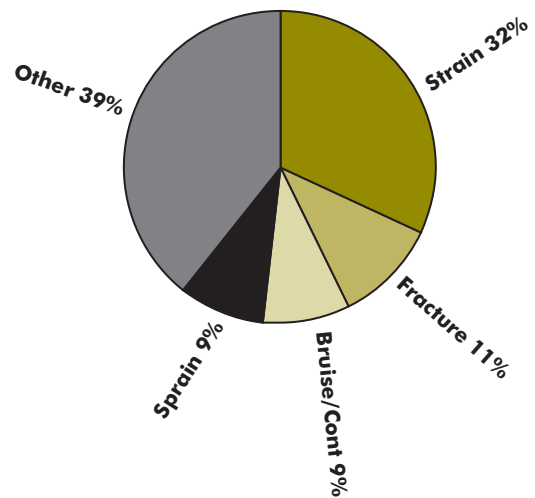
APPENDIX E

METALLIFEROUS SURFACE INJURIES 1999/00 – 483 INJURIES

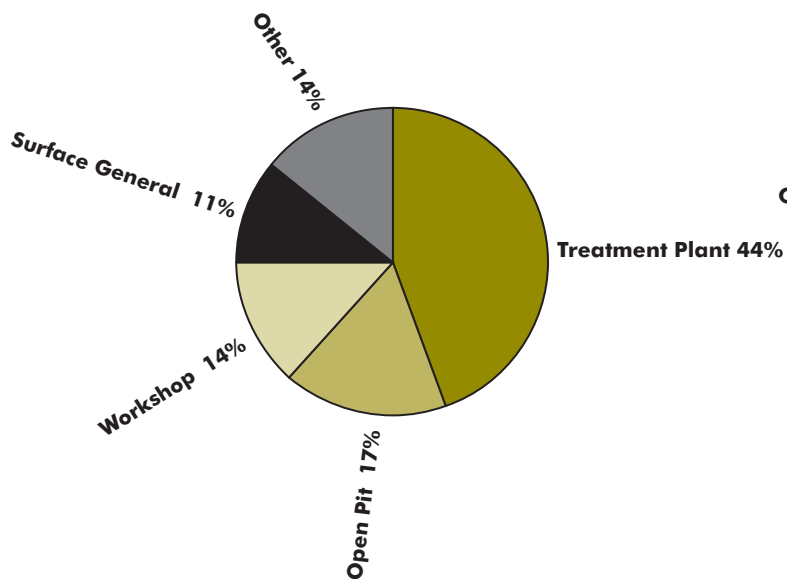
PART OF BODY



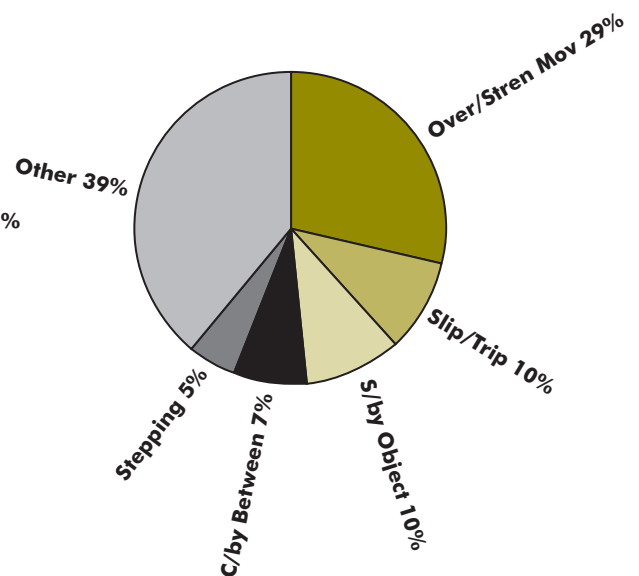
NATURE OF INJURY



LOCATION OF ACCIDENT



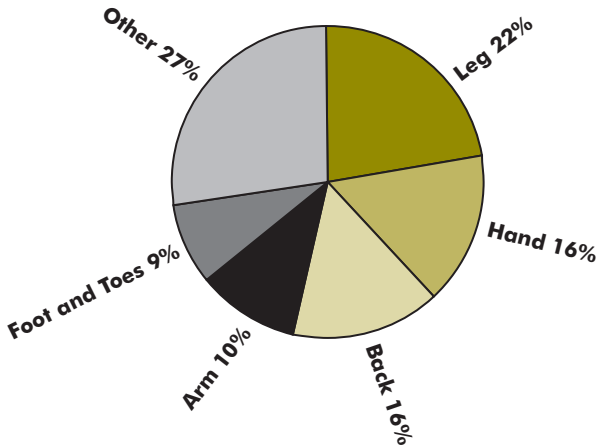
TYPE OF ACCIDENT



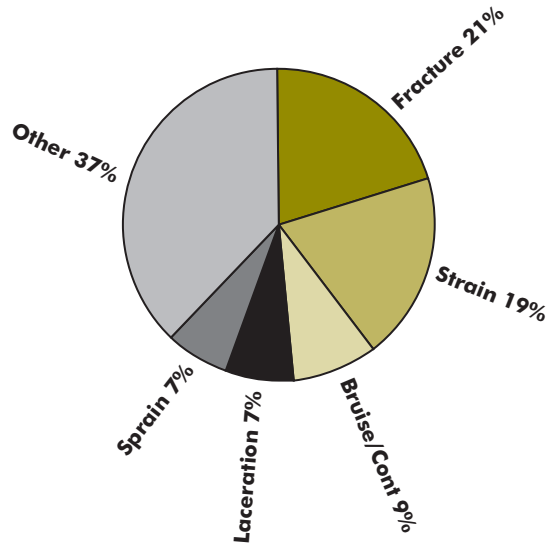
APPENDIX F

GOLD UNDERGROUND INJURIES 1999/00 – 58 INJURIES

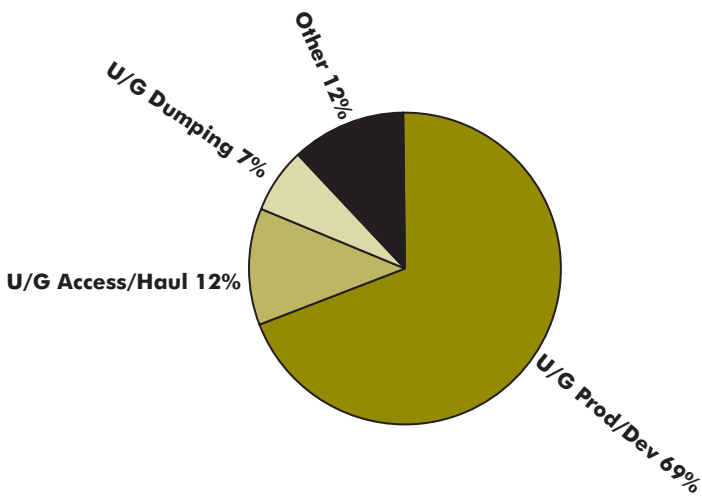
PART OF BODY



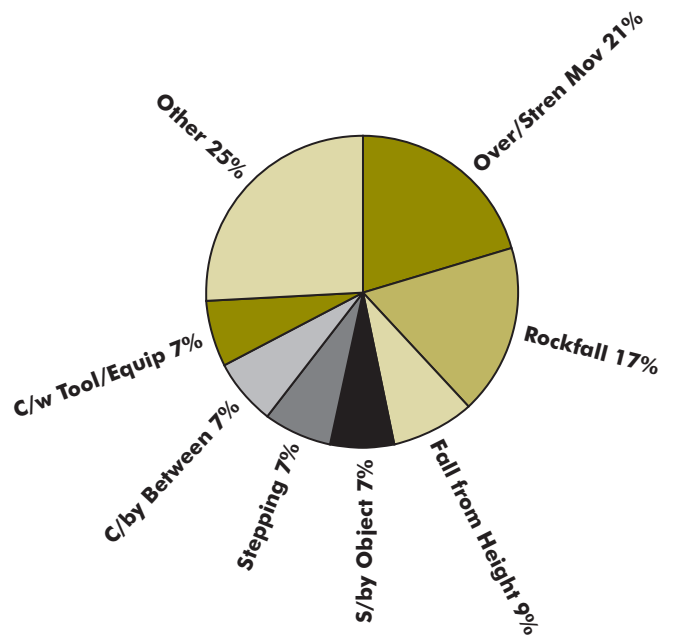
NATURE OF INJURY



LOCATION OF ACCIDENT



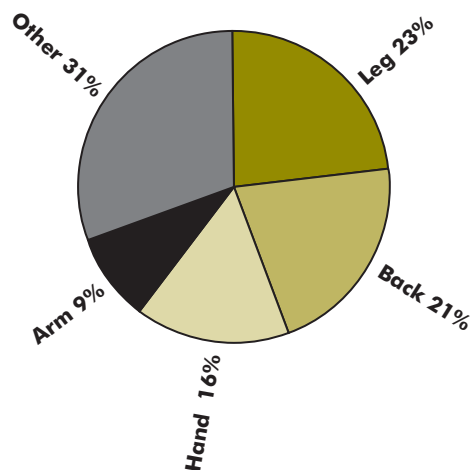
TYPE OF ACCIDENT



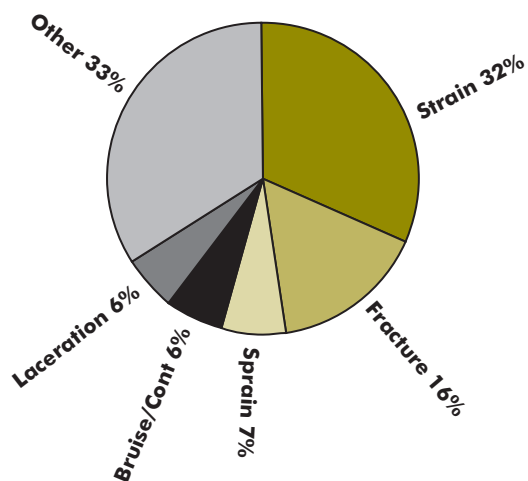
APPENDIX G

GOLD SURFACE INJURIES 1999/00 – 120 INJURIES

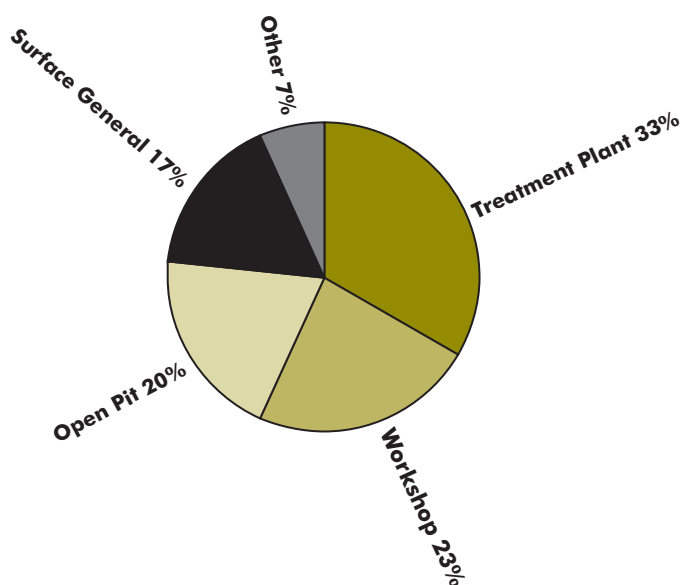
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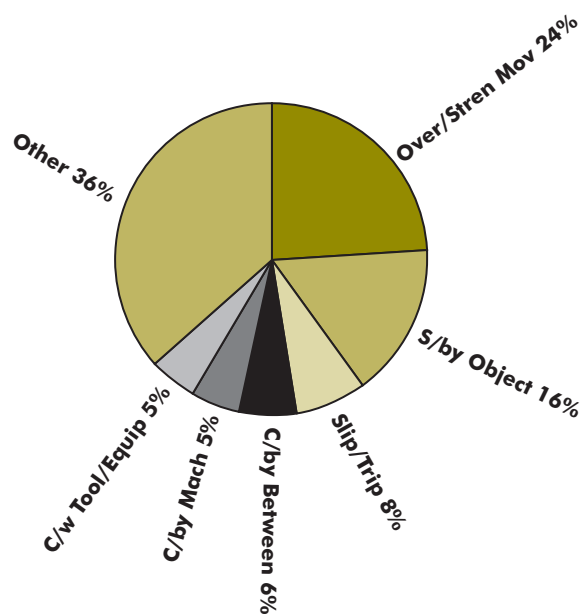
NATURE OF INJURY



LOCATION OF ACCIDENT



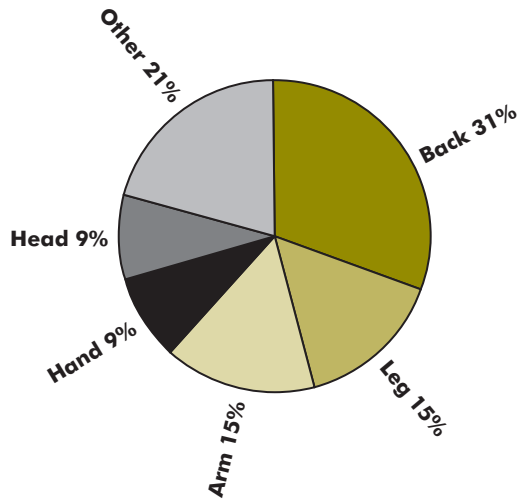
TYPE OF ACCIDENT



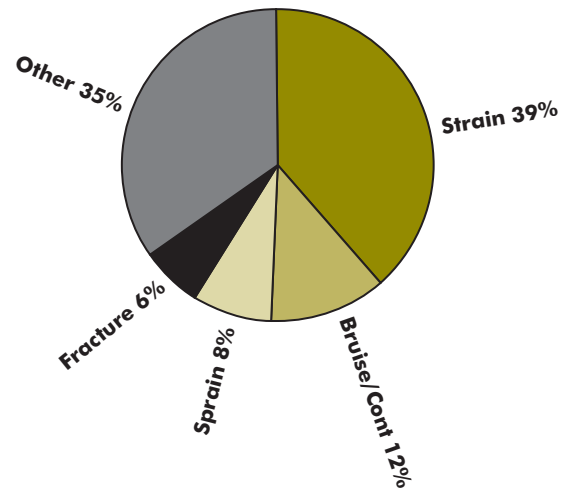
APPENDIX H

IRON ORE INJURIES 1999/00 – 111 INJURIES

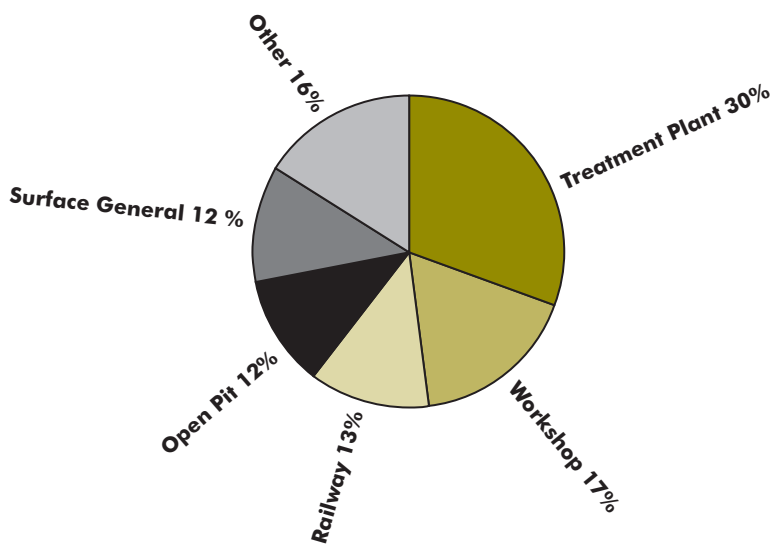
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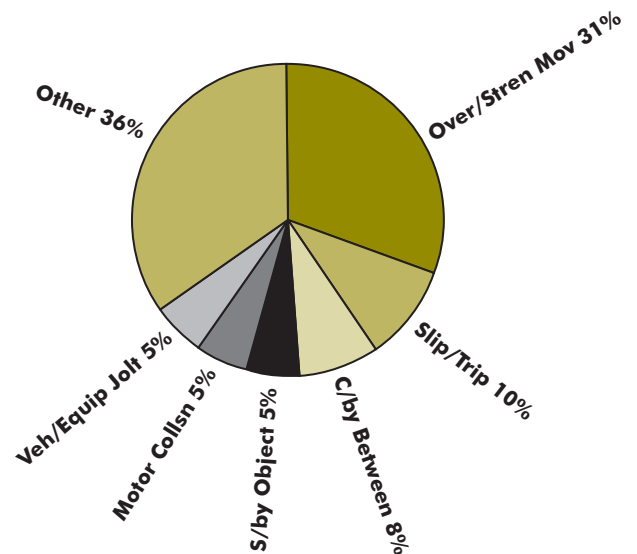
NATURE OF INJURY



LOCATION OF ACCIDENT



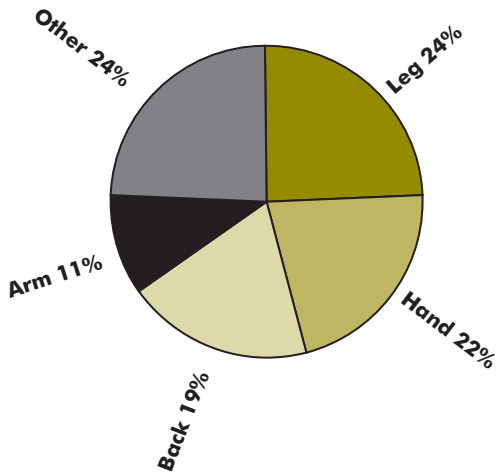
TYPE OF ACCIDENT



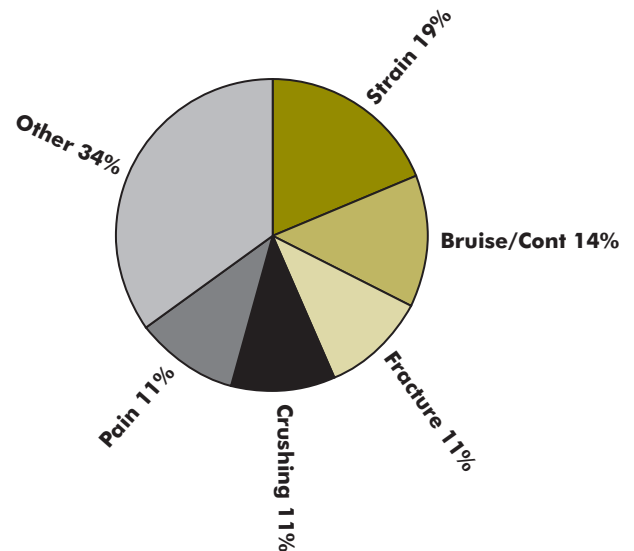
APPENDIX I

BAUXITE AND ALUMINA INJURIES 1999/00 – 37 INJURIES

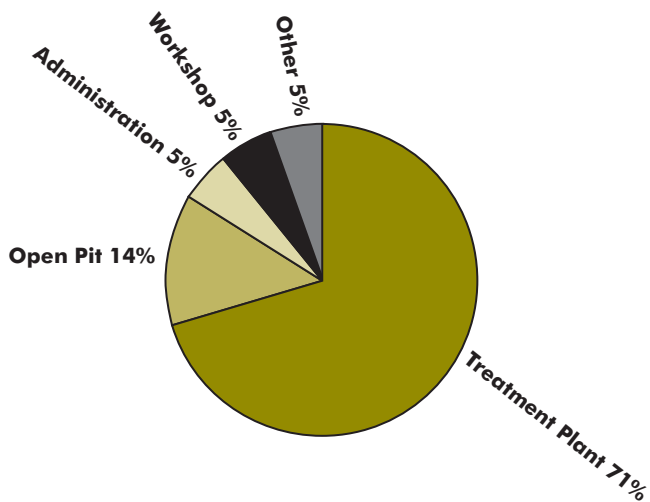
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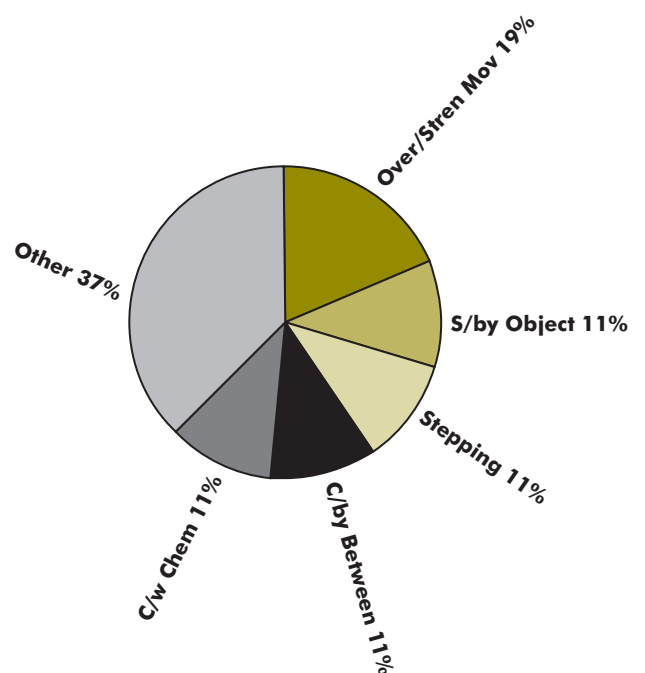
NATURE OF INJURY



LOCATION OF ACCIDENT



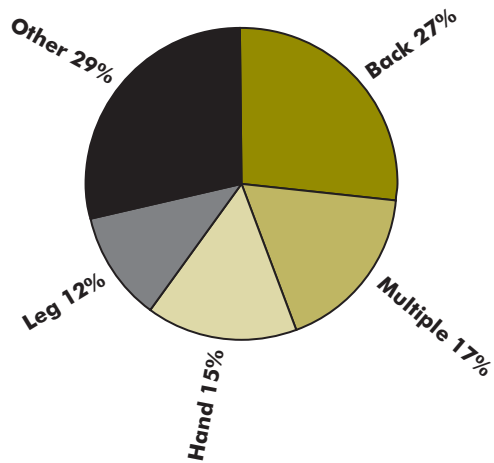
TYPE OF ACCIDENT



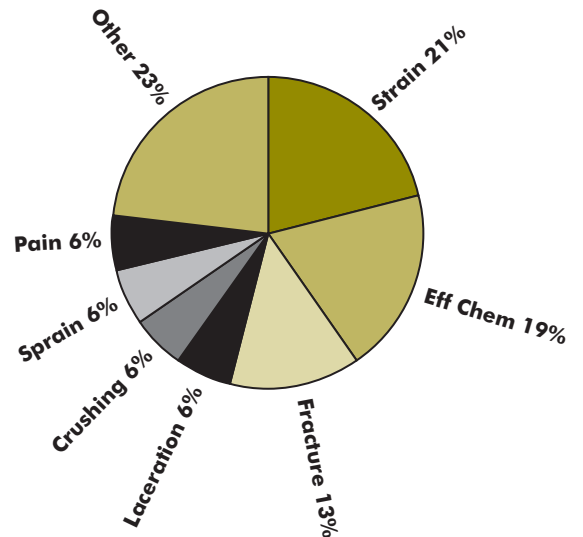
APPENDIX J

NICKEL INJURIES 1999/00 – 52 INJURIES

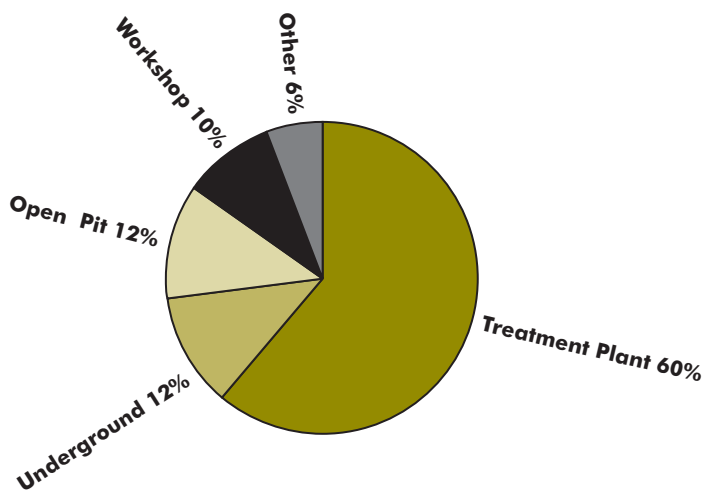
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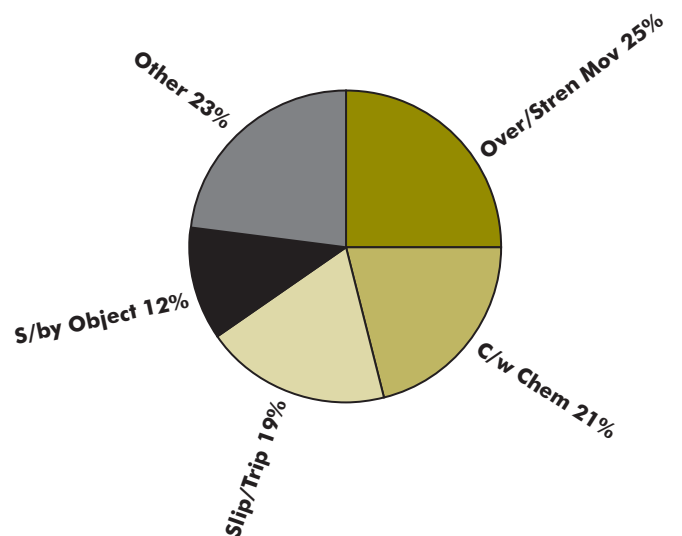
NATURE OF INJURY



LOCATION OF ACCIDENT



TYPE OF ACCIDENT





DEPARTMENT OF
MINERALS AND ENERGY
WESTERN AUSTRALIA

Our Resources • Our People • Our Future

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