MINING SAFETY IN WESTERN AUSTRALIA

(The Process and Determinants of Change)

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ABSTRACT

If the practical miner has a single distinguishing characteristic, it is conservatism, consolidated by determination and leavened by an irrepressible streak of optimism.

In the light of the hazardous and even hostile environment which the underground miner has faced over the millennia, (and indeed for the greater part of this current century), it is not difficult to appreciate how a culture of conservatism and reluctance to embrace change freely had become ingrained into the culture.

It is only in the past generation that a culture change has begun to evidence itself through the industry, even at the grass-roots level.

Aspects of the development of this process, and some of the determinants of a cultural change in the metalliferous mining industry in Western Australia are outlined and briefly discussed.

INTRODUCTION

Lord Robens, in his landmark report "SAFETY AT WORK", correctly identified the prevalence of apathy as the major impediment to improved safety in the workplace.

The problem is still with us, and in conjunction with several common and misguided mind sets, continues to impede progress.

Prior to examining and discussing the process of change in the safety culture in the industry in Western Australia, some retrospection will assist in reflecting light forward.

THE HISTORICAL CULTURE

There are some interesting insights to be gained from a glimpse of the distant and more recent past.

Two short excerpts from Agricola's great 16th century treatise "DE RE METALLICA" illustrate familiar but contrasting concepts.

".....so that I should consider that the metals should not be dug up at all, if such things were to happen very frequently to the miners, or if they could not safely guard against such risks by any means."

"But since things like this rarely happen, and only in so far as workmen are careless, they do not deter miners from carrying on their trade ...."

In this "strange harmony of contrast" we see an early recognition of the concept of risk management juxtaposed with the not yet extinct "myth of the careless worker".

Three hundred years later the following passages were contained in a paper by WA Goldfields Inspector of Mines Frank Reed, titled "ACCIDENTS IN METALLIFEROUS MINES" (1895).

"..... but, by the help of measures based on scientific principles and the exercise of caution, many disasters may be avoided, and the operations of mining rendered as free from danger as its nature permits."

"Ninety percent of our mine accidents occur with careless persons, who had been warned daily and disregarded the warning; but when an accident happens to the watchful man, as a rule it is from some unforeseen source, and purely accidental."

The concept of management of risk appears again, but it is qualified by an apparent acceptance of the hazardous nature of mining, a concept which is now not regarded as a justification for sub-standard safety performance.

Moreover, in Reed's next passage careless behaviour is deplored, whereas an accident to the watchful man is deemed "an Act of God". The history of experience tells us otherwise. The watchful man may be overtaken by circumstances of which he is unaware, or are beyond his control.

It is evident that at the turn of the century a comparatively "primitive" safety culture still prevailed, which to some degree has persisted well into the 20th century.

Although technological, social and economic progress through this present century has been marked, the development of a more enlightened safety culture has lagged behind other developments to a considerable degree.

MINING SAFETY IN WESTERN AUSTRALIA - POST WAR

In the period of some twenty years which elapsed between the end of World War II and the awakening of the sleeping giant which has become the present day mining industry in WA, the pace of change was slow.

There were technological improvements, but little to indicate the progressive development of a more enlightened approach to mining safety.

There has been a sustained improvement through the latter half of the 20th century, but given the appalling performance at the commencement of this period, the improvement during the first two or three decades was not difficult to achieve. Factors impacting on change are discussed below.

The broad picture is illustrated in Figures 1, 2.

Some of factors and influences which prevailed through this period are readily evident, and are in fact recognisable as a carryover of long standing, virtually ingrained, patterns of thinking.

Perhaps the most fundamental has been the tendency to a stoic and philosophical acceptance that a spectrum of minor and some serious injuries was an undesirable but unavoidable concomitant of the nature of mining; (Reed - "as free from danger as its nature permits").

Traditional mine safety legislation, (and all of its appurtenances such as statutory certification of managers etc.), was aimed at the management of major hazards and the prevention of disasters, the industry and its employees were generally satisfied if these ends were achieved.

Miners, while supporting the need for major hazard control, tended to regard the finer points of operating safety as something the management and the inspectorate had to "inflict" upon them, and the perception persisted of the inspector in a policing role.

Some of the adverse mind sets, which to an extent remain a problem today, are worth noting.

ENTRENCHED OR TRADITIONAL ATTITUDES

As mentioned above, the perception that some level of injury is unavoidable given the inherently hazardous nature of many mining activities, continues to be an almost intractable problem in some elements of the industry.

Even where a more enlightened attitude may prevail at the corporate level, it is still all too prevalent with front line supervision, and where this is the case it is reflected at the general employee level.

LESS THAN ADEQUATE INDUCTION, TRAINING AND RE-TRAINING PROGRAMS

It is all too easy to set up what are perceived to be appropriate systems and to apply them in a mechanical manner. On-going follow up and assessment is essential, and line operating management and supervision must be involved.

The length of the learning curve in adapting to underground work is often under-estimated, and the need for careful and thorough conversion to new tasks and work practices is of critical importance. Too much is done on an ad hoc basis. A structured and systematic approach is vital.

TENDENCY TO DEVELOP COMPLACENT ATTITUDES TO FAMILIAR SITUATIONS

It is common experience that complacency develops in familiar situations, and the sharp focus in which hazards should be kept is blurred or lost. Worse still, sub-standard practices are adopted and the mind set develops in less experienced operators in which repetition of such practices without mishap validates their use.

INADEQUACIES IN COMMUNICATION IN SAFE PRACTICE AND IN PERFORMANCE REVIEW AND ANALYSIS

Although there has been no lack of material to promote safety awareness, too little effort has been made to communicate and implement recommended practices at the operator level.

Too much reliance is placed on the inclination or the capacity of the individual worker to acquaint himself with material made available, but in a desultory manner. Posting papers on a notice board is not enough.

THE PROBLEM OF SUBSTANDARD PRACTICES

Some of the aberrant perceptions are recognised readily enough when they are expressed:

- "It'll never happen".
- "With my experience and skills I can handle it".
- "Accidents only happen to people who don't know what they're doing".
- "Can't let the job be held up".
- "I've often done it this way".
- "Nothing much can go wrong with this".

Most have a common element in that they reflect the individual trying to rationalise to himself less than adequate behaviour.

In this present era of much reduced frequency of accidents and injury, the drastic consequences of sub-standard practice are either outside of the experience of the individual or at least uncommon. The lessons of previous experience become dim unless a program of awareness and vigilance on risks can be sustained, generally by reference to a full spectrum of experience from elsewhere, and reiterating past experience.

One factor remains certain, these attitudes are common human failings, and safety management systems must take account of them.

FAILURE TO IDENTIFY MANAGEMENT DEFICIENCY

The period under review was also characterised by the corporate mind set which regarded safety as the role and responsibility of the safety department.

With some notable corporate exceptions, improvements in safety performance at most mines were largely technical, and organisational and managerial factors in accident causation were seldom considered.

It is only in the eighties and early nineties that realisation has come that deficiencies in organisation and management are the fundamental cause of the majority of accidents.

THE ROLE OF THE REGULATORY AUTHORITY AND MINE SAFETY LEGISLATION

Mine safety legislation has been a factor for improved safety in mining, and, if properly devised and administered, will continue to be so.

However one of the deficiencies in much of our present day mine safety legislation, which is a legacy from the past, is the extent to which so much is left to the decision, discretion or direction of the inspector.

This may well have been appropriate, and indeed was no doubt necessary in the latter half of the 19th century and the first half of this present century, but the time has come for the inspectorate to loosen the reins as far as possible.

So great has been the involvement of the inspector, that the culture became pervasive (and is only slowly being changed), that safety in mining was essentially the responsibility of the regulatory authority.

This belief persists in the minds of the general public, which is largely attributable to misguided media presentation of the issue.

THE CULTURE CHANGE OF THE PAST DECADE IN WESTERN AUSTRALIA

The improvements in mine safety performance in WA have been profound, and the rate of improvement has increased at a time when a general tendency to plateau may have been expected. There is evidence of a plateau effect in some sectors.

Prior to examining specific influences for a cultural change in WA, it is necessary to look at the wider implications.

DETERMINANTS OF CHANGE

The effect of the Robens Report on the last quarter of this century can not be ignored. The Report competently traversed the field of occupational safety and identified major deficiencies which are still not adequately accounted for even today. This is particularly the case in the critical area of the corporate approach and performance.

Some of the major readily identifiable factors impacting on safety performance are:

COMMUNITY (AND EMPLOYEE) EXPECTATIONS

There is no doubt that this factor alone will continue to compel improved performance. People are better educated, better informed and will continue to have higher expectations in terms of occupational health and safety. The obligation for higher standards in the duty of care rises with community expectations.

COST IMPERATIVES

Setting aside humanitarian considerations, it is simply not good business practice to conduct operations in a manner which results in injury and harm to health of employees.

Rising insurance costs and loss of performance and employee morale are detrimental to the enterprise, and may be terminal. It is therefore a matter of enlightened self interest, for corporations to strive for safer performance.

PERSONAL LEGAL LIABILITY OF CORPORATE MANAGEMENT

This liability now demonstrably extends beyond mine managers to the higher corporate echelons.

SAFETY MANAGEMENT AS A DISCIPLINE

The realisation has evolved, (although by no means universally), that safe practice is an integral part of the production function, and hazard identification and risk management and the wider elements of loss control are now recognised as an essential discipline. Moreover they are not the exclusive property of safety professionals, but are skills to be extended throughout the workforce.

CORPORATE PRIDE - (PEER PRESSURE)

The larger corporations are being driven, by the examples set by achievers of world class performance, to strive for an equivalent performance. Although the cost imperative is also a factor, many companies now exclude contracting companies from the short list for tender selection if they are not able to demonstrate a credible track record of high standards in safety performance. Terms such as "bench marking" and "best practice" have come into widespread use.

INUDSTRY ASSOCIATIONS

Industry (employer) associations have exerted a strong influence on member companies to improve and maintain occupational health and safety performance. In some cases such activity has demonstrably effected major improvement.

MINE SAFETY LEGISLATION AND THE REGULATORY AUTHORITY

There is no doubt that competently framed mine safety legislation and effective administration of it has made and continues to make a contribution to the improvement of safe operating performance in mines. However it is self evident that a regulatory authority can not in itself manage safety in mines.

TRADE UNION PRESSURE

The Trade union movement has, over the past decade in particular, channelled more of its resources into the pursuit of improvements in occupational health safety and welfare of employees.

The history of experience in WA has been a familiar one. During "boom" cycles in the industry the influx of new and inexperienced people to the workforce (including management), results in a deterioration in safety performance, which is eventually reversed when the industry stabilises.

This was evidenced in the first decade of the iron ore industry and in the nickel boom. The trend again manifested itself with the gold boom of the eighties, but the adverse effect was arrested and reversed.

THE PROCESS OF CHANGE

A confluence of several factors took place in the early eighties which became the catalyst for change in mining safety in the State.

The new Chief Executive of the Department of Mines had recognised that the expansion of the industry had outstripped the capacity of the mining Inspectorate to service it adequately. A full scale review of its role, function, and resources, (strongly supported by the Chamber of Mines), coincided with the appointment of a State Mining Engineer directly from industry; (this was not a precedent).

The Chamber of Mines strongly supported increased resources for the Inspectorate, and in particular the establishment of a Research and Technical Services Branch to support the Inspectorate and to monitor and advise the industry.

The rapid development of the current gold boom, (the "third wave" in WA), gave impetus to the Inspectorate restructure.

Government approval for funding, (subsequently extracted directly from the industry), was precipitated by a spate of 7 fatal accidents in 8 weeks, at the end of 1985, most of which occurred in the Eastern Goldfields.

The restructure process took time, and although initial approval was given in 1986, a further four years were required to achieve the recommended structure and resources level.

FACTORS AND EVENTS

Axtat

An early development enabled by the new thrust and the increased Inspectorate resources was the computer based accident data recording system, titled AXTAT.

This system, supported by a statistical analysis package, has for seven years provided the Inspectorate and the industry with timely accurate and detailed data on safety performance.

It has proved invaluable in identifying trends and problem areas, in targeting poor performers and in providing each enterprise with the capacity to assess its performance against its peer group and the aggregate for the industry.

The implementation of the system had the total support of the industry and detailed data has been collected to date without legislated compulsion.

CONTAM

An existing computer database for recording and collating data on atmospheric contaminant sampling across the industry has been revised and upgraded and analysis systems now provide valuable and useful information, both for current monitoring and as a source of valid exposure data for possible further epidemiological studies.

JOINT SAFETY INITIATIVES

Over the past six to eight years there has been a program of safety initiatives jointly developed between the Mining Operations Division and the Chamber of Mines and Energy.

These have taken the form of training programs, research activities, seminars, conferences, and the development of codes and guidelines.

The Chamber, supported by a very strong and developing industry, has substantial resources, and has been the major force for change and improvement and for raising the profile of mining safety to high levels, and so effecting a cultural change.

The two MINESAFE INTERNATIONAL CONFERENCES held in Perth, (1990, and 1993), were landmark events, attracted Worldwide participation at the highest levels of expertise, and produced documentation which will remain a valuable reference into the next century.

These conferences attracted a very large WA participation. A very important aspect was the level of attendance from the senior corporate ranks.

Joint training courses are conducted for ventilation officers for surface and underground mines on a regular basis.

The Chamber peak councils include a health and safety committee with a high level of expertise and a track record of achievement.

Regional meetings of Chamber groups (managers, occupational health committees) are held regularly in a number of widely scattered centres throughout the year.

These are regularly attended by Mining Operations Division (Inspectorate) staff for advice and consultation on the various safety programs, and on developments or issues specific to the region.

MINING OPERATIONS DIVISION (INSPECTORATE) INITIATIVES

With the increasing resources now available to it, the Division has progressively developed a range of pro-active strategies aimed at improving safety performance in the industry.

These include regular publications such as MINESAFE and data from AXTAT, Safety Bulletins, Guidelines, brochures, and safety posters. These last are sponsored by corporations, many of which are major mining contractors.

In the case of high potential hazards such as the use of cyanide in the gold sector, field seminars on safety with cyanide have been conducted across the State, with the emphasis on attendance by plant operators, and persons directly involved.

Audit programs have been conducted on targeted aspects, such as emergency preparedness and underground fire and emergency potential.

The Inspectorate has changed its mode of operation from the traditional (re-active) regular routine detailed inspection process, to a pro-active system built on auditing and educating and advising.

Inspectors involve health and safety representatives from the workforce in their inspections, and regularly provide input to training courses for health and safety representatives.

Over the past two years a programme of accident prevention awareness campaigns has been carried out across the State, including the remote areas.

Presentations are given, usually at shift change to catch two crews, with the aid of slides and overheads.

The material presented is high impact, (either the aftermath of accidents or obvious high potential situations), and the level of participation, interest, and response has been very high.

Use is made of videos, and the Division has collaborated successfully with commercial producers of videos, and with the Chamber of Mines and Energy, to produce relevant material of good quality.

Some of the larger enterprises with adequate resources have also been active in this field.

The essential thrust of these campaigns is to raise awareness and interest by educating and informing the whole workforce, and to empower individuals with the competence and drive to play an active part in accident prevention.

The creation of a Cartoon character ("Nugget" the miner's miner) has been very successful. Nugget is now a "trademark" on many publications, stickers, posters, and brochures, and appears in crib rooms in mines around Australia.

The safety program received a severe reverse in 1989, a year in which 18 lives were lost, 6 of which were in one event, the flooding of the EMU open cut and decline.

The State Mining Engineer and Senior Inspector for the State conducted an Inquiry into safety in underground gold mines in 1990, supported by a steering committee with Chamber of Mines and AWU representation.

The resulting report was widely circulated and its recommendations were extensively implemented. Extensive use was made of the Burkett Commission Report (1980/81) and the Stevenson Inquiry (1984/85) (Ontario - Canada) in follow up advice to Industry by the Inspectorate.

The Chamber produced guidelines aimed at fostering a uniform high standard for mine inductions.

The full spectrum of initiatives is too extensive to traverse in a paper such as this, but the effect is to keep safety management to the forefront.

The major mining contractors have formed a safety organisation to share resources, avoid duplication, and support their particular requirements.

The legislation providing a statutory basis for health and safety representatives and committees has been in place for only 18 months. However it had been widely implemented informally in the preceding two years.

In many enterprises, safety committee systems, both informal, and structured and formal, have been in place for many years. The major change has been the evolving recognition that safety is not just a management prerogative or obligation, and that employee involvement and commitment is essential.

A recent initiative is the establishment by the Minister for Mines of a MINES OCCUPATIONAL HEALTH AND SAFETY ADVISORY BOARD (MOHSAB). At present the Board has interim status, but will become a statutory body when the Mines Safety and Inspection Act 1994 comes into force at the end of the year.

This body is comprised of representatives of industry, workforce and government, and is structured and commissioned to operate effectively.

Since its formation in September 1993, a Bill to review and consolidate the existing Mines Regulation Act and Coal Mines Regulation Act into the Mines Safety and Inspection Act has been developed, and was introduced to Parliament in mid-June.

MOHSAB has two standing committees (Occupational Health and General Safety) and a temporary Legislation Development Sub-Committee.

The sub-structure is performance based and is operating effectively.

CURRENT SITUATION

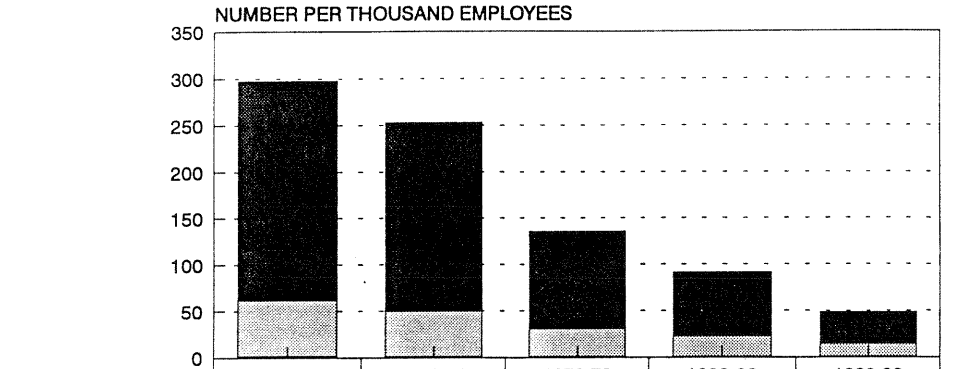
The aggregate industry performance continues to improve.

A general indication of trends is shown in figures 3, 4, 5 & 6

There is, however, full recognition that there is no room for complacency. Deaths and serious injuries still occur from time to time. Recognition is dawning that ALL ACCIDENTS ARE PREVENTABLE, but full commitment to the achievement of the climate, the mind set and the performance for zero incidence remains a goal which has not yet been won.

WESTERN AUSTRALIAN MINES

INCIDENCE OF INJURY



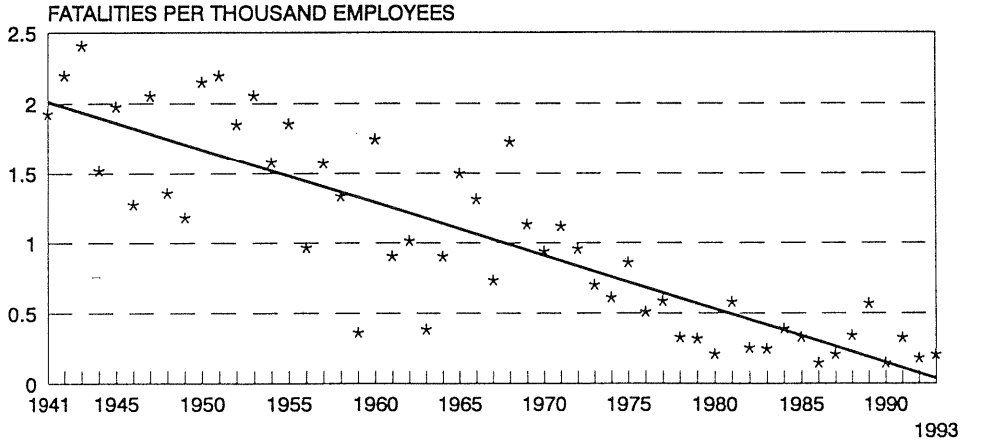
	1950-59	1960-69	1970-79	1980-89	1990-93
MINOR INJURIES	236	203	105	69	34
SERIOUS INJURIES	60	49	30	22	14
FATALITIES	1.6	1.14	0.65	0.33	0.22

DECADE

Figure 1

WESTERN AUSTRALIAN MINES

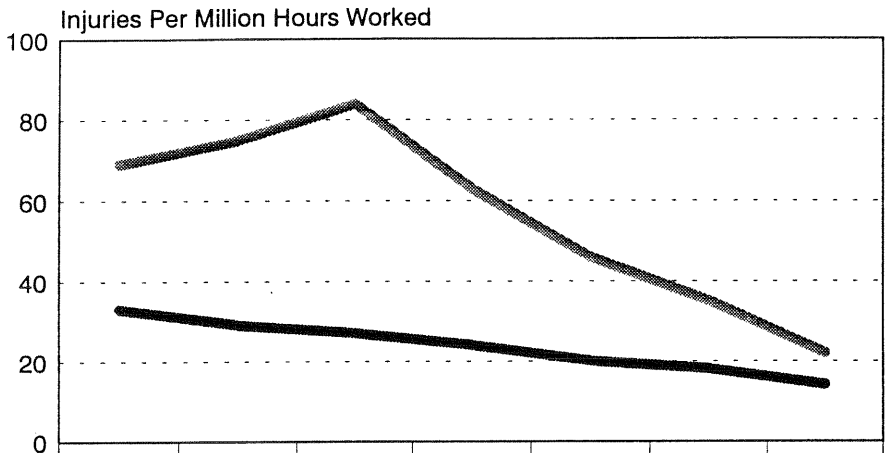
FATALITY INCIDENCE



YEAR

Figure 2

WESTERN AUSTRALIAN METALLIFEROUS MINES
Injury Frequency

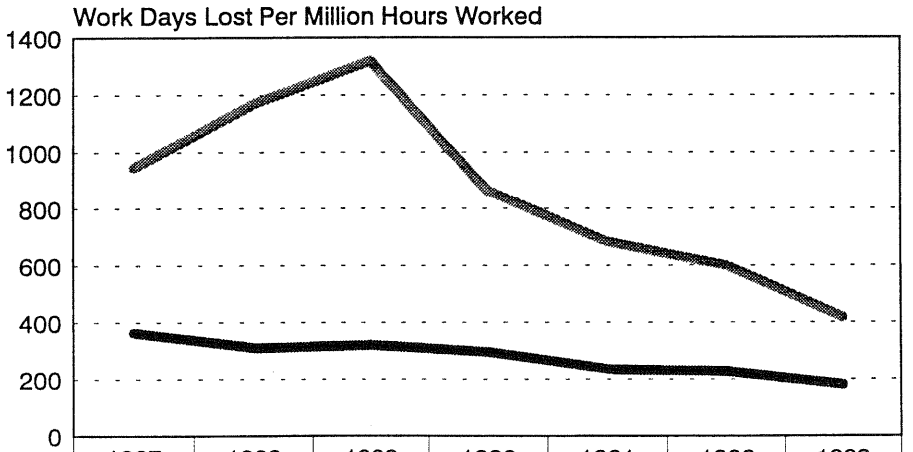


	1987	1988	1989	1990	1991	1992	1993
Underground	69	75	84	63	46	35	22
Surface	33	29	27	24	20	18	14

Year

Figure 3

WESTERN AUSTRALIAN METALLIFEROUS MINES
Injury Index

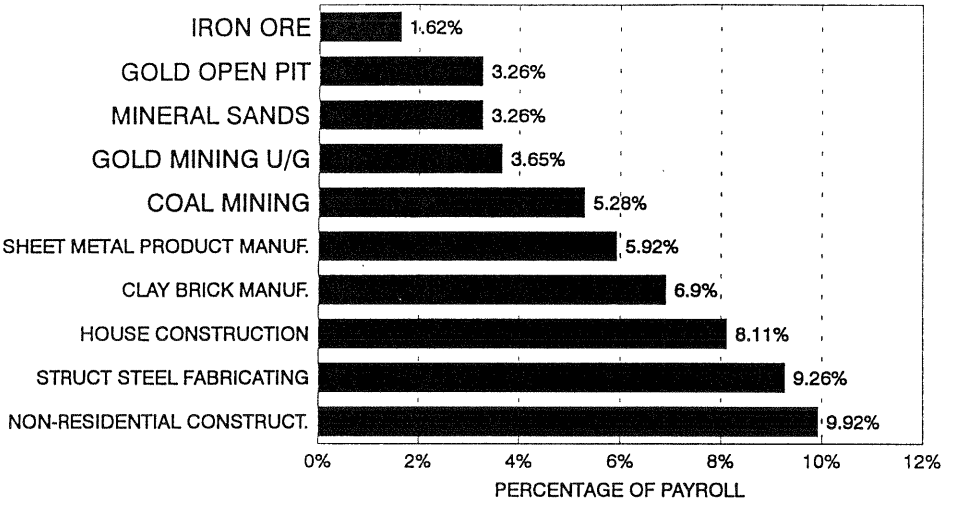


	1987	1988	1989	1990	1991	1992	1993
Underground	945	1169	1320	863	683	598	416
Surface	363	309	320	295	233	226	179

Year

Figure 4

WESTERN AUSTRALIA
RECOMMENDED PREMIUM RATES 1994-95



SOURCE: GOVERNMENT GAZETTE 21 JUNE, 1994

Figure 5

WESTERN AUSTRALIAN MINES
COMPARISON OF INJURY INDEX AND COMPENSATION PREMIUM RATE

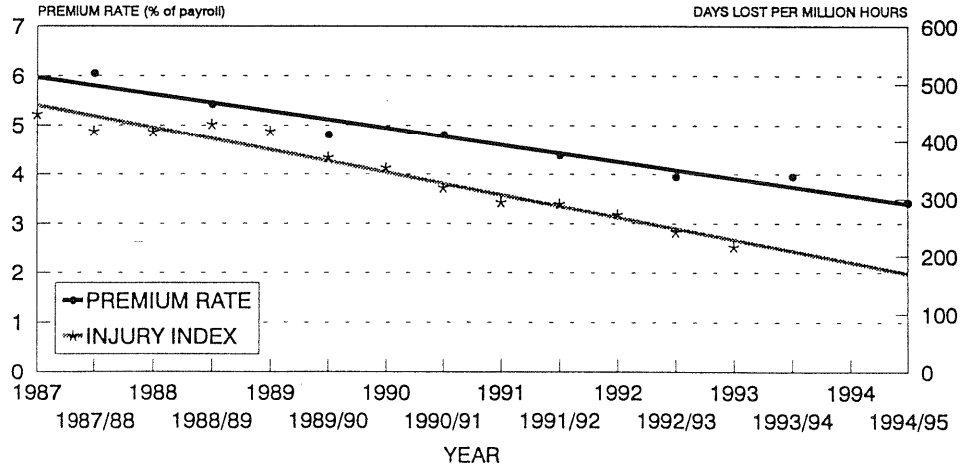


Figure 6