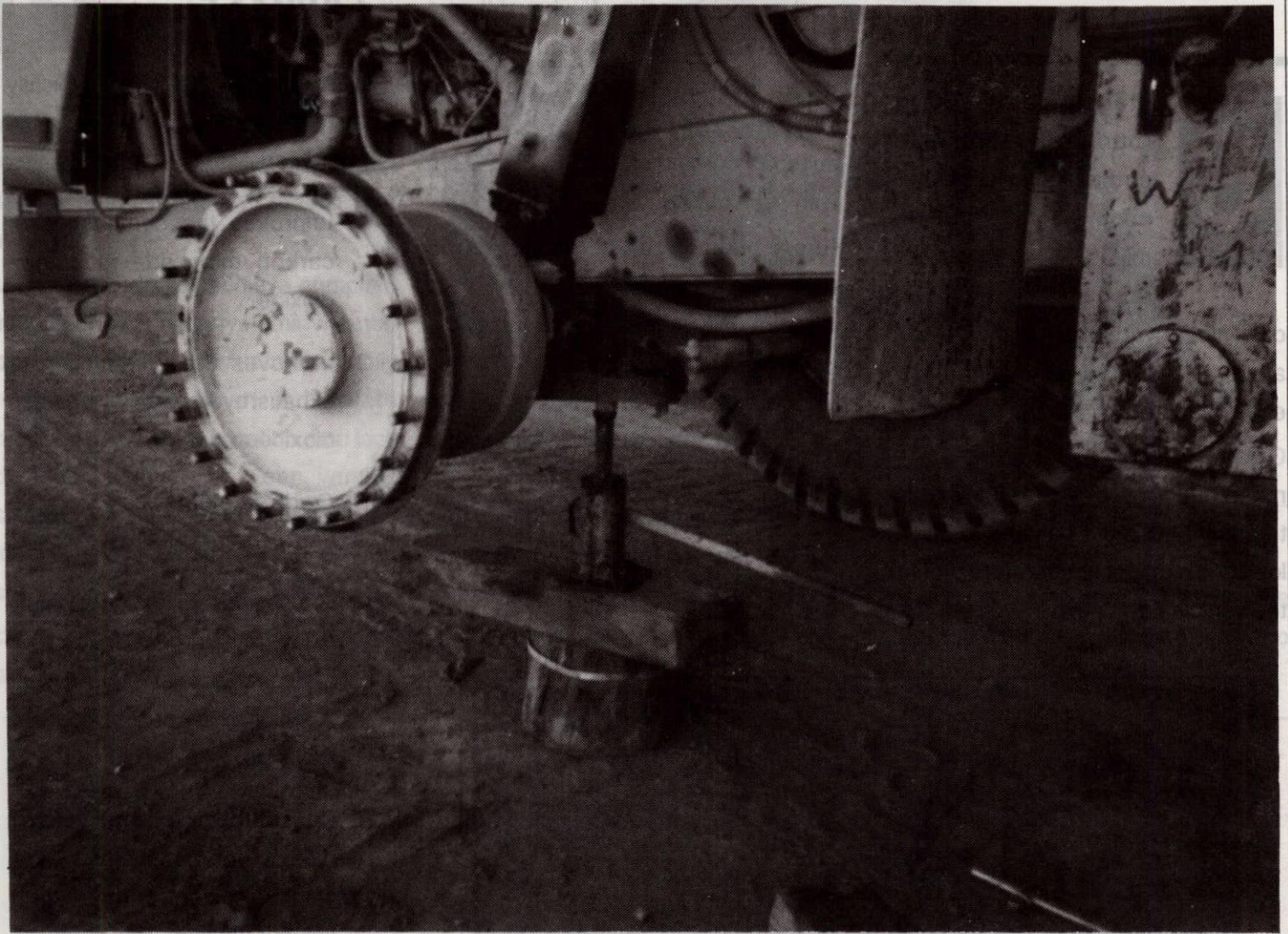




MINESAFE

ISSUED BY THE MINING ENGINEERING DIVISION OF THE DEPARTMENT OF MINES (WA)



THIS OPERATOR GOT IT WRONG ... IT'S *CATS* THAT HAVE *NINE LIVES*

W

ork practices that rely on chance to produce accident-free outcomes don't belong in W.A. Mines.

Our cover photograph is

Unfortunately, not an isolated incident. This truck is a 50 tonne vehicle unsupported by anything other than a 10 tonne Jack and block of wood.

The picture tells a story about a

complacent worker, an irresponsible management system and a combined tolerance of unacceptable work practices out of kilter with modern safety management systems.

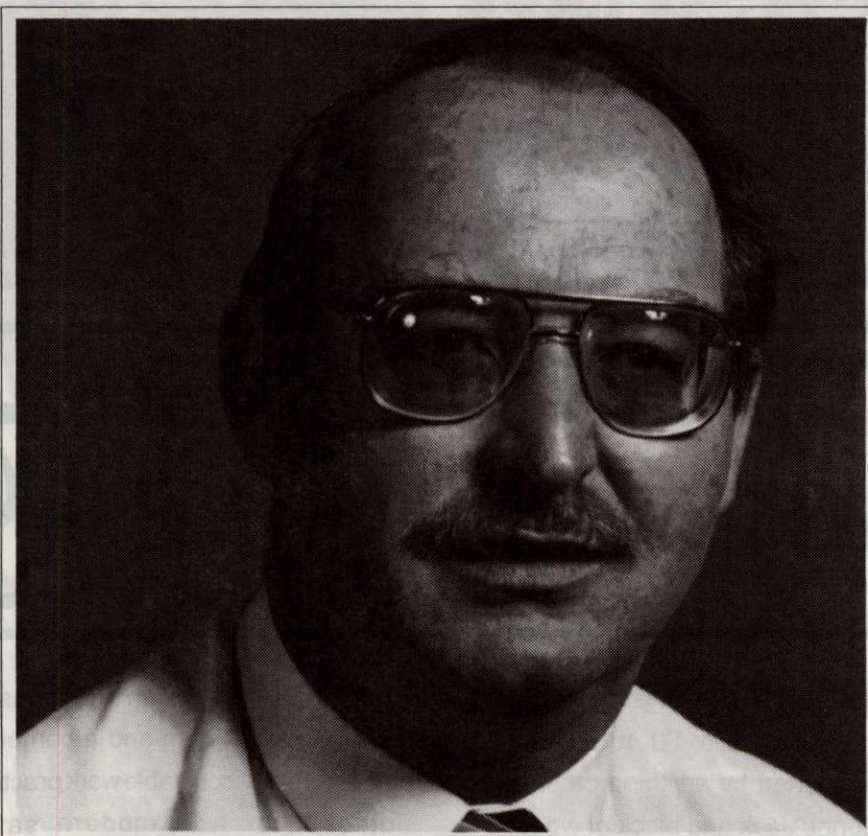
CATALYTIC CONVERTERS

Catalytic converters (purifiers) are most commonly used in underground (non-coal) mines. The inspectorate encourages the use of catalytic converters or ceramic filters on all turbo charged engines, and on engines rated at more than 100kw. Ceramic or particulate filters are the most effective devices for exhaust treatment but must be fitted to suit the load and exhaust temperature profile of the vehicle's work cycle.

Not all catalytic converters are suited to underground use, and early and less sophisticated models can even increase toxic gas emission, as would happen if automotive, or 3-way catalysts were used.

Australian commercial diesel fuels produce between 4 and 9 times more soot per cubic metre of exhaust than a comparable North American fuel. This means that catalytic converters or, better still, particulate filters, both of which are suited to burning off soot, are effective with such fuels.

Every vehicle used underground requires a diesel permit. This permit is issued by the Senior Inspector of Mines, when he is completely satisfied that the vehicle is satisfactory for underground use. This specifically includes the exhaust emission device installed on the vehicle which must be of a type that will suit the underground environment and is compatible for the engine and its duty cycle.



Terry Fisher, Principal Mining Engineer

PERFORMANCE CHARACTERISTICS FOR AN OXIDISING CATALYST.

An oxidising catalyst will typically have the following performance characteristics:

1. Improves the combustion of carbon monoxide to carbon dioxide.
2. Improves the combustion of exhaust hydrocarbons to carbon dioxide and water.
3. Oxidises aldehydes to carbon dioxide and water.
4. Causes the oxidation of nitric oxide to nitrogen dioxide, an undesirable characteristic that is inhibited, by design, in some products.
5. Causes the oxidation of sulphur dioxide, originating from the sulphur content in the fuel, to sulphur trioxide. This produces acid gas in the emission. Again this reaction is inhibited in the better products.
6. Reduces the 'diesel smell' to a more acceptable level.

Performance also depends on the presence of free oxygen in the exhaust, the exhaust temperature itself, and composition and characteristics of the fuel.

EDITORIAL

Nine months ago, this column highlighted specific types of accidents that occur with alarming regularity. Incidents involving dump trucks, conveyor belts, scaling practices and an unwillingness to wear seat belts were a problem in 1990/91 and have already surfaced early in 1992.

Many mines do not achieve complete integration of safety systems with the production function. Unless this actually happens, there is an immediate breakdown in communication; and lack of communication between various sectors of the same organization is an identified cause of accidents.

Production is a closely supervised and disciplined exercise. The same cannot always be said for safety programs,

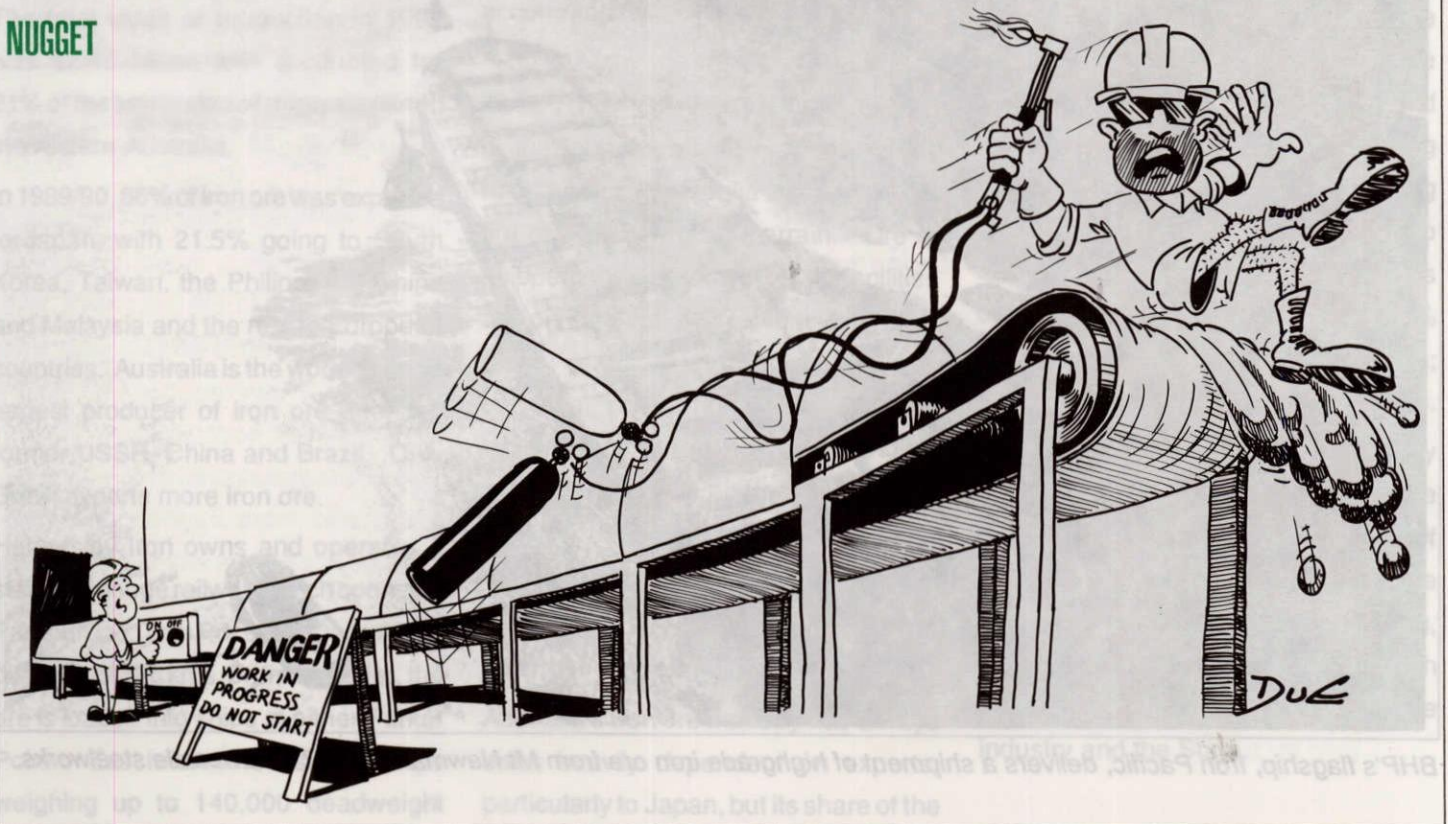


Catherine Stedman, Editor

where too often employees, are inundated with material, and expected to sort it out themselves. Commitment

to safety means commitment from the boardroom to the shop floor. There is no other way.

NUGGET



MINERAL PROFILE

IRON ORE PRODUCTION

- IT'S AWE INSPIRING

The iron ore industry in Australia dates back to the mid nineteenth century, when deposits were discovered in NSW. As reserves were considered to be small (approximately 50 million

tonnes), the Commonwealth, in 1938, imposed an export embargo.

By the end of the Second World War there was a growing awareness that Western Australia had huge reserves of iron ore. Major orebodies were discovered in the Hamersley Iron

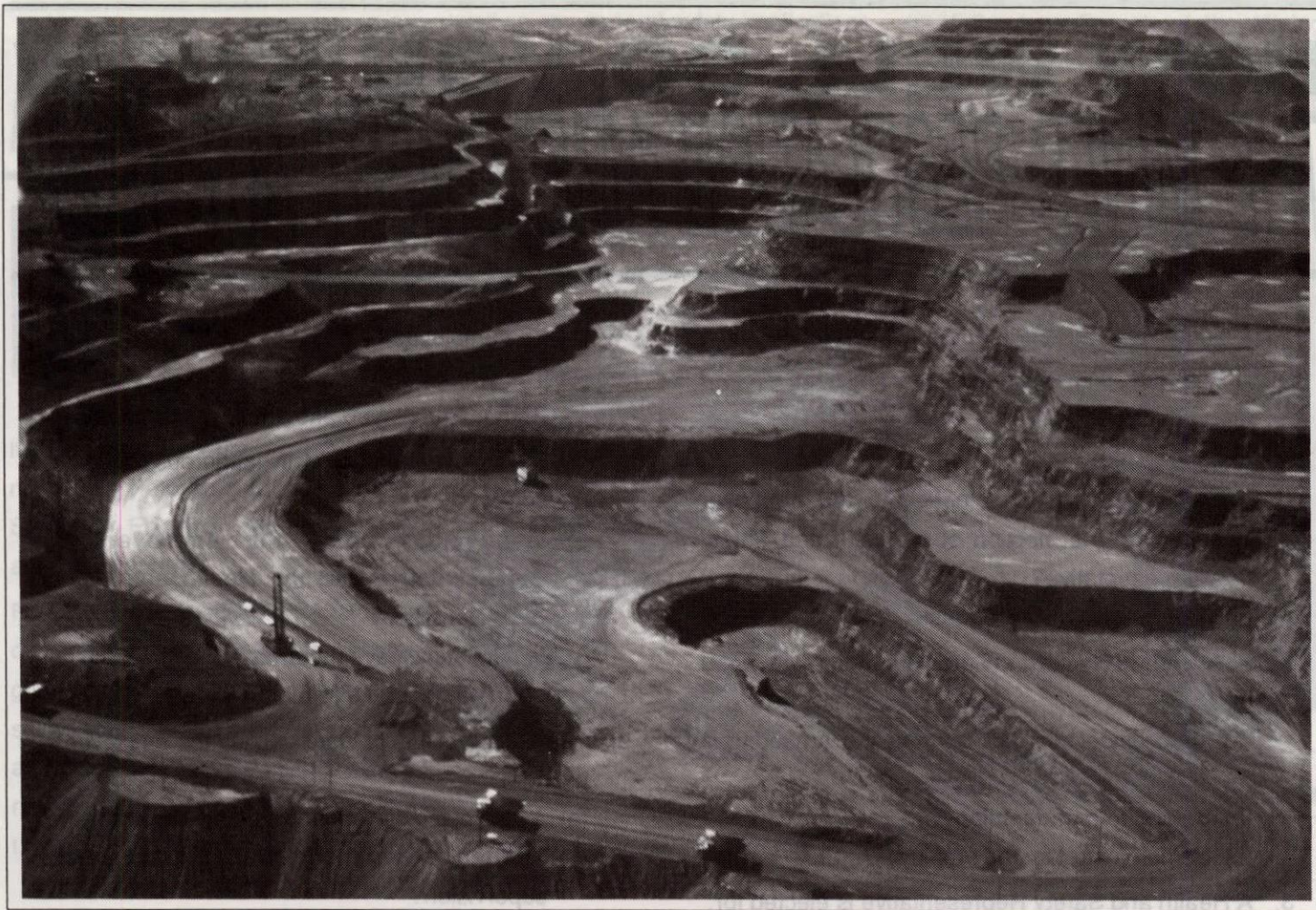
Province of the Pilbara, the first in 1962 when Conzinc Riotinto (now CRA) disclosed reserves of 380 million tonnes of high-grade ore at Tom Price. Other major finds quickly followed at Mt Whaleback, Paraburdoo, and Pannawonica.

The Hamersley Iron Province in the Pilbara is by far the most significant of the four other provinces in Western Australia, with reserves of up to 40 800 million tonnes of ore with a greater than 50% concentration of iron. Experts estimate these resources could sustain an export industry for around 300 years. In 1990, 103.9 million tonnes of iron ore were produced in Western Australia - roughly 95% of total Australian iron ore



BHP's flagship, Iron Pacific, delivers a shipment of highgrade iron ore from Mt Newman to BHP's Newcastle steelworks.

Terry Fisher, Principal Mining Engineer



Hamersley Iron's West Pit, Paraburdoo, looking East.

production - of which 99.08 million tonnes went overseas.

The total value of production in 1990 was \$2.43 billion and accounted for 21% of the total value of minerals mined in Western Australia.

In 1989/90, 66% of iron ore was exported to Japan, with 21.5% going to South Korea, Taiwan, the Philippines, China and Malaysia and the rest to European countries. Australia is the world's fourth largest producer of iron ore after the former USSR, China and Brazil. Only Brazil exports more iron ore.

Hamersley Iron owns and operates a standard gauge railway, which connects Paraburdoo, Tom Price and Dampier - a distance of 386 kms. From Dampier, the ore is loaded into ships at either Parker Point or East Intercourse Island. Ships weighing up to 140,000 deadweight

tonnes (DWT) can be loaded at Parker Point, while East Intercourse Island can accommodate ships of up to 250,000 DWT.

The Mt Newman - Port Hedland railroad is the longest privately owned heavy haul railway in Australia and spans 426 km of rugged Pilbara terrain. Ore is shipped from the Nelson Point facilities at Port Hedland, which consists of two rotary train unloaders as well as crushing, screening, stockpiling, and reclaiming facilities. The annual handling capacity at Nelson Point is over 40 million tonnes.

The volume of iron ore exports at both Dampier and Port Hedland make them the two largest tonnage ports in Australia. Australia's iron ore industry has always been heavily dependent on exports, particularly to Japan, but its share of the

world market is increasingly under pressure from competition by other countries, such as Brazil. These countries have the advantage of huge reserves of high grade iron ore and cheap plentiful labour. Compounding the situation is the steadily deteriorating steel market in Japan, which has led to Japanese steel manufacturers bargaining for and getting a cut of 5.6% in the price of Australian iron ore; effective from April 1992 to March 1993. Positive moves are already underway to meet these challenges and ensure the iron ore success story continues. Of particular promise are some of the proposals for downstream processing, which will provide, if successful, a much needed economic boost to both the industry and the State.

HOW WELL DO YOU KNOW THE MINES REGULATION AMENDMENT ACT 1990?

Test yourself with this short quiz

1. Health and Safety Representatives are elected on minesites because:
 - (a) It is compulsory?
 - (b) An employee gives notice to the employer requiring the election of a Health and Safety Representative?
 - (c) The Safety Officer requests it?
2. To become a Health and Safety Representative, you must:
 - (a) Meet guidelines laid down in the Amendment Act?
 - (b) Belong to a trade union?
 - (c) Be nominated by the employer?
3. A Health and Safety Representative is elected for:
 - (a) 5 years
 - (b) 2 years?
 - (c) No specific time?
4. Hazard information needed by a Health and Safety Representative must be supplied by:
 - (a) Employees in the workplace?
 - (b) The Safety Officer at the mine?
 - (c) The employer and Manager?
5. A Health and Safety Representative may request a Health and Safety Committee be formed if there are:
 - (a) More than 25 Employees at the mine?
 - (b) More than 10 employees?
 - (c) It doesn't matter how many employees there are at the mine?
6. Employees must report any hazard in the workplace to:
 - (a) The Safety Representative or Safety Officer?
 - (b) His/her immediate supervisor or the manager?
 - (c) The Safety Committee?
7. Personal safety equipment must be provided and paid for by:
 - (a) The employee?
 - (b) The employer?
 - (c) Both the employee and employer contribute?
8. When employees stop work in dangerous conditions they must:
 - (a) Immediately notify the employer, his Representative and the Health and Safety Representative?
 - (b) Immediately leave the area?
 - (c) Sound a general alarm?
9. The General Duty of Care obliges the employer to provide:
 - (a) A safe place of work and safe systems of work?
 - (b) Trained experienced staff and adequate supervision?
 - (c) Appropriate and well maintained plant and equipment?
 - (d) All of the above?
10. The General Duty of Care obliges employees to:
 - (a) Take reasonable care to ensure his own health and safety?
 - (b) Avoid affecting the health and safety of others?
 - (c) All of the above?
11. A Health and Safety Committee must:
 - (a) Meet at least once a month?
 - (b) Meet at least every three months?
 - (c) There is no formal obligation to meet?
12. The Duty of Care covers:
 - (a) Everyone at the minesite?
 - (b) The employees of the company?
 - (c) Only employees who work in the office or underground mine?

Copies of the Amendment Act 1990 are available from Simon Wood, Mining Engineering (09) 222 3532 or ask at your workplace.

ANSWERS PAGE 10

PETER KOZAK

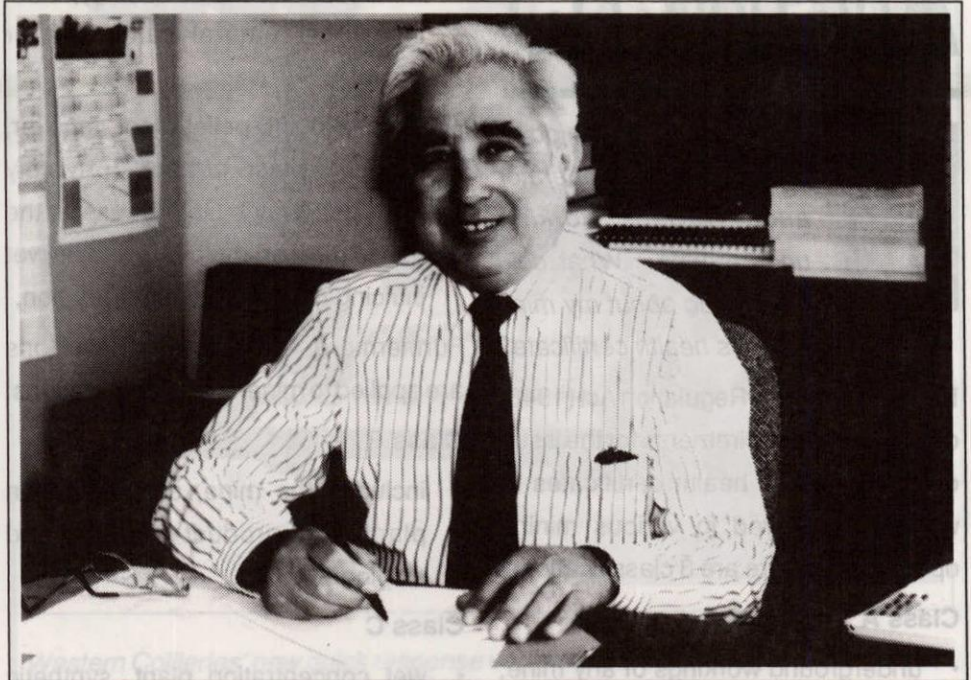
well as any general safety implications associated with the design and intended use of the equipment once completed. Peter is based in the Research & Tech-

nical Services Branch of the Mining Engineering Division, located in Mineral House, 6th Floor, 100 Plain Street, East Perth — (09) 2223536.

Have you ever wondered, 'Why is the headframe of an underground mine built the way it is?', or, 'Why can't I lift a 2 tonne load with a 1 tonne crane?'

If these questions have crossed your mind, then Peter Kozak, the Divisional Structural Engineer can provide the answers you need.

Peter's main tasks include the review of designs for headframes and underground haulage systems, attachments such as ore bins and lifting devices such as cranes. A full review includes material strength and suitability to perform the duty expected of the structure, as



Peter Kozak, Structural Engineer

UNDERGROUND DEVELOPMENT — TAGGING OUT OF FANS

The inspectorate advise that many underground mines are not using danger tags when extending, replacing or repairing the ventilation bag. Work on the ventilation bag is normally carried out at some distance from the fan and with the fan turned off. Should the fan be turned on whilst a person is working on the ventilation column, the potential for injury to that person is significant.

Part 6 of the Mines Regulation Act Regulations includes the mechanical equipment and attachments used for ventilation, ie; fans and ventilation bag. This means that the requirements of Regulation 6.8 apply.

Regulation 6.8 states:

1. When machinery is stopped for repair, maintenance, or cleaning purposes it shall be isolated from the power source, and the isolating switch

or device shall be tagged with a suitable prominent danger tag.

2. Machinery shall not be restarted until the person who fixed the danger tag has ensured that it is safe to do so and has removed the tag.

Act now and ensure that danger tags are available at the fan location and that persons who use or work on secondary ventilation systems know the tagging procedure.

QUESTIONS & ANSWERS

I have recently left my job as a treatment plant operator and started working underground. What do I have to do about my mine workers health certificate?

Part 9 of the Mines Regulation Act (1946) deals with the requirements for the issue of mine workers health certificates to workers employed in various mining operations. There are 3 classifications:

Class A

- underground workings of any mine;
- any mine worked for asbestos, manganese, lead, vanadium talc, mica or a radioactive substance.

Class B

- any quarry or other surface mining

operation other than a Class A or Class C mine.

Class C

- a surface mining operation or quarry which is worked for clay, gypsum, limestone, natural sand, salt or gravel.
- a sinter plant, pellet plant, smelter, refinery, blast furnace, privately owned railway built to transport the mined ore or material, and a wet sluicing or wet dredging operation.

Furthermore, the following definitions are applied to mineral sands operations:

Class B

- includes the mine, dry separation plant and product storage and shiploading.

Class C

- wet concentration plant, synthetic rutile plants and offices, laboratories and stores.

Every mine worker must obtain a mine workers health certificate (or exemption) within 3 months of the date of

commencing work on a mine (Regulation 9.6).

Workers employed in a Class A mine require renewal of their mine workers health certificate every two years. Workers employed in Class B or Class C mines require their certificates to be renewed every five years (Regulation 9.8(1)).

In the case of movement from Class B or C to a Class A mine, the certificate previously issued (for five years) is deemed to expire two years after starting work in the Class A mine, unless the five year period expires, in which case renewal on the expiry date is required (Regulation 9.8(2)).

For further information, refer to Mines Regulation Act (1946) Part 9. For clarification on issues contact Mr Alan Sheppard, Secretary, Ventilation Board, on (09) 222 3683. NB: Certificates are issued by the Mines Medical Officer at the Perth Chest Clinic, 17 Murray Street, Perth, telephone (09) 3253922.

**WESTERN AUSTRALIAN MINES
FATAL ACCIDENT INCIDENCE
YEARLY AVERAGE BY DECADE**

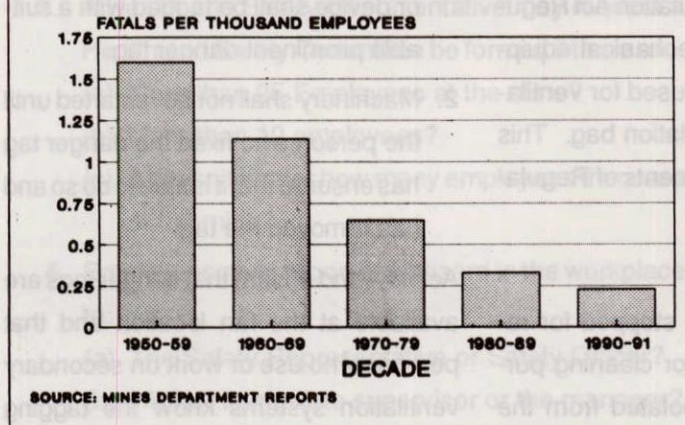


Figure 1. This graph shows the number of fatalities per thousand employees for each decade from 1950 to 1991. As can be seen from the graph, the number of fatalities per thousand employees has fallen from a high 1.6 in the 1950-59 decade to 0.23 for the first two years of the current decade.

**WESTERN AUSTRALIAN MINES
SERIOUS ACCIDENT INCIDENCE
YEARLY AVERAGE BY DECADE**

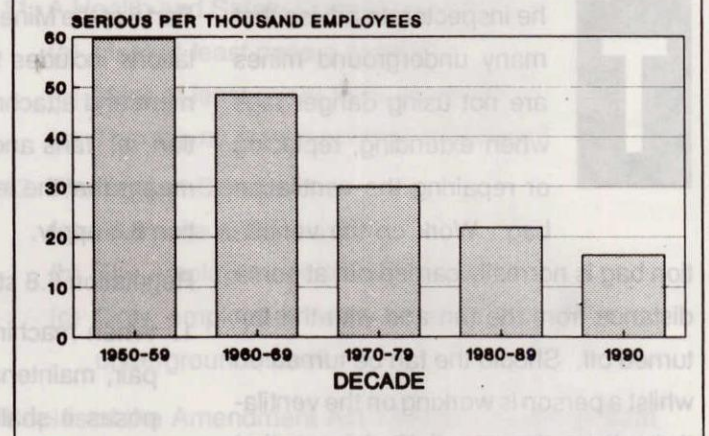


Figure 2. This graph shows the number of serious injuries per thousand employees for each decade from 1950 to 1990. Once again there has been a significant fall from 59.7 injuries per thousand employees in the 1950-59 decade to 16.4 for the first year of the current decade.

RESPIRATOR USE

Recently, in the United States of America, a mining company was fined \$500,000 for violations of fume exposure under their occupational safety and health legislation.

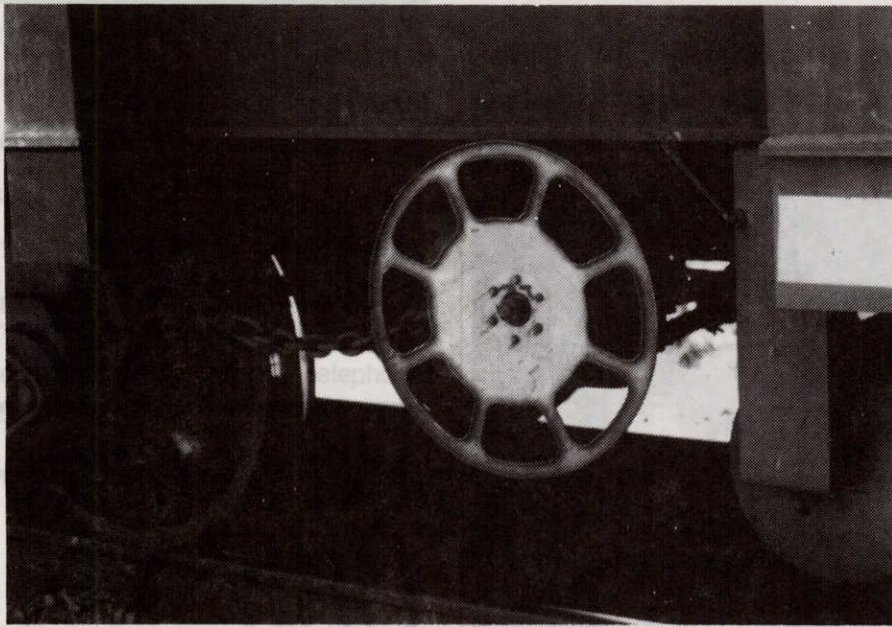
The company had not adequately monitored fumes in the workplace. It had failed to use engineering controls to reduce worker exposure, and respirator maintenance was poor.

Regulation 8.36 of the Mines Regulation Act relates to protection of employees from fumes and gases.

The Department of Mines recommends compliance with Regulation 8.7(a) and 8.36 as the preferred means of fume/gas control in treatment plants. Regulation 8.13, or respiratory equipment, is a temporary solution only.



Western Collieries' new quick response vehicle is a welcome sight to the district. It is used to cater for underground and open cut emergencies and is also committed to assist other organisations in emergencies as required.



SAFE WORK PRACTICE: the hand application of handbrakes on rail rolling stock - once a toilsome task, has been made easy by Robe River's safety innovation. The operating gear for handbraking on trains has been shifted so it can now be reached when standing alongside the wagons.

MATERIAL SAFETY DATA SHEETS

Companies that belong to the Chamber of Mines & Energy are aware of the hazardous materials database available in either hard copy or on floppy disk.

Material Safety Data Sheets for 1,400 chemicals are available from this source.

The Department of Mines subscribes to a Canadian database (CCINFO). If chemical information is not available from the Chamber of Mines & Energy database, or supplier information is inadequate, please contact this Department.

Telephone: Trevor Robinson (09) 222 3543 or Jenny Oosterhof (09) 222 3091.

EXAMINATIONS IN CERTIFICATES OF COMPETENCY

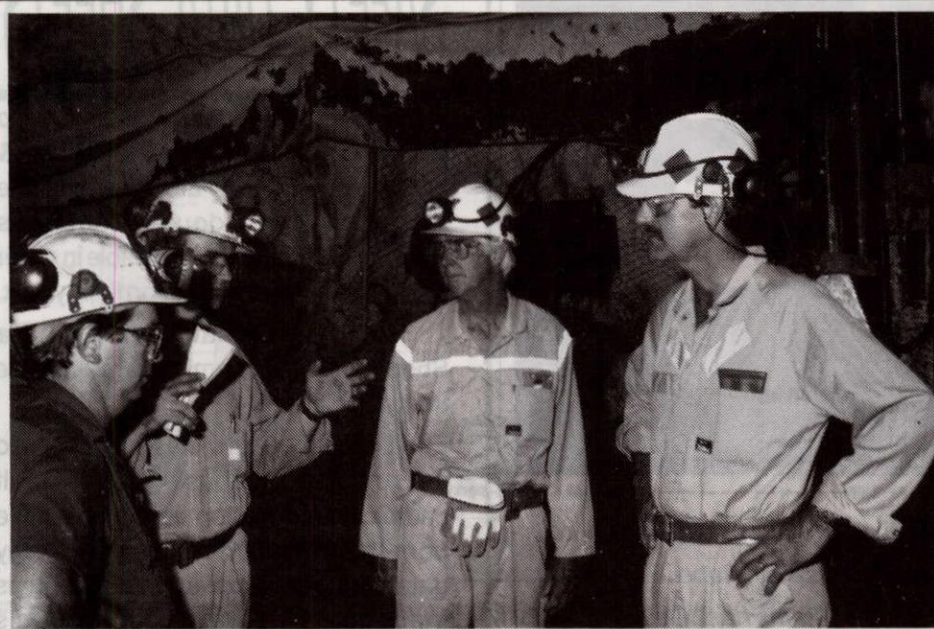
WA MINES REGULATION ACT & REGULATIONS FIRST CLASS MINE MANAGERS, QUARRY MANAGERS UNDERGROUND SUPERVISORS, RESTRICTED QUARRY MANAGERS

Would all intending applicants for Quarry Managers and Restricted Quarry Managers Certificates please note that the Board of Examiners has decided to reduce the duration of Examinations in Mining Law and Quarrying (RQM Certificate only) to 2 hours.

With respect to the examination papers in Mining Law, the number of questions on the paper will be reduced.

With respect to the examination papers in Quarrying (including the paper for candidates making certification where no explosives are used on the mine site) the number of questions is likely to increase, but the time required to answer each question will be reduced considerably as the subject matters will be restricted for each question. In other words, there will be more questions than in the past but they will require only short answers.

For First Class and Underground Certificates of Competency candidates, the examination format will remain unchanged for the April 1992 examinations.



Gordon Hill, MLA, Hon Minister for Mines, recently toured Kalgoorlie Consolidated Gold Mines' operation at Kalgoorlie. Pictured at the Mt Charlotte underground operations are: Alan Moyle and Ian Grey (KCGM), Dr Des Kelly (Director General of Mines) and Gordon Hill (Hon Minister for Mines).

INFORMATION PAMPHLETS

Work Practices Series

Titles now available:

- Conveyor Safety
- Dumping Over Edges
- Rockfalls
- Crane Safety
- Barring Down

Contact Simon Wood (09) 222 3532 or your local inspector.

MINESAFE

is published by the:

Mining Engineering Division

Department of Mines

100 Plain Street

EAST PERTH W.A. 6004

Telephone: (09) 222 3310/222 3438

ANSWERS TO QUIZ

1 = (b), 2 = (a), 3 = (b), 4 = (c), 5 = (b),
6 = (b), 7 = (b), 8 = (a), 9 = (d), 10 = (c),
11 = (b), 12 = (a)

WHAT'S ON?

WAMEX EXPO

This annual mining and engineering display will be held at the Perth Superdome between 13-15 May 1992.

Enquiries: Business Image Promotions, telephone: (09) 227 9004

MINERALS OUTLOOK 1992

May 13, 1992

This seminar will be held at the Burswood Convention Centre in conjunction with the WAMEX Expo.

It has developed as the principal review of the minerals and energy industries in WA and focuses political and public attention on the contribution made by the industry to the State.

For further information contact:
Marlene Tiney: (09) 325 2955

COLLIE INDUSTRIAL EXPO

April 2 and 3, 1992

If you are interested in holding a display at the Expo or just visiting, address enquiries to: Mr Jason Goff, Collie Industrial Expo Co-ordinator, telephone: (097) 34 4888

ALCOHOL AND OTHER DRUGS IN THE WORKPLACE

The Chamber of Mines & Energy, in association with the Coal Industry Council, will be conducting this workshop in Collie on April 2, 1992 (during the Expo). Papers discussed will be:

- Incidence of alcohol and drugs in the workplace;
- Developing an alcohol and drug policy;
- Employee assistance and workplace prevention programmes.

For further information contact:

Mark Pendlebury: (097) 34 4599
Peter Rowe: (09) 325 2955

AUSTRALIAN GOLD CONFERENCE

March 31 - April 1, 1992, Burswood Convention Centre, Perth

The Conference, which is organised by the Chamber of Mines & Energy in association with the Gold Corporation, is one of the major events for the world gold industry. International experts will be discussing where gold is going and will

consider production in the major gold producing areas in the world.

Enquiries to: Peter Rowe: (09) 325 2955

LOCOMOTIVE ENGINE DRIVERS CERTIFICATE OF COMPETENCY

Applications to sit the next examination at the Department of Mines, Karratha should be sent to:

Denis Brown
Mining Engineering Division
Department of Mines
100 Plain Street
East Perth WA 6004
Telephone: (09) 222 3546

by 1 May 1992

Examination date: May 29, 1992

SURFACE VENTILATION OFFICER'S COURSE

Venue: Department of Mines, 100 Plain Street, East Perth.

12-13 March 1992 AND 2- 3 July 1992

Interested parties to contact:

Tania Narducci (09) 222 3095

STAFF CHANGES

BRUCE MORRIN and **ANIL ATRI** are two new District Mining Engineers joining the Kalgoorlie Inspectorate. Bruce is commencing on March 18 from Mt Isa Mines and Anil, who has been working in Zambia, is commencing on March 16.

Our Kalgoorlie office is losing **PETER WADE**, Special Inspector of Mines. Peter is resigning from the Department

to study Mining Engineering full time at the School of Mines.

On 3 March, District Mining Engineer, **VIN ROSE** is transferring to our Collie Office.

GLENIS FLEURY will be our new Clerk/Typist at the Karratha Office as **FIONA BISHOP** has resigned.

ACCIDENT ALERT

INCIDENT

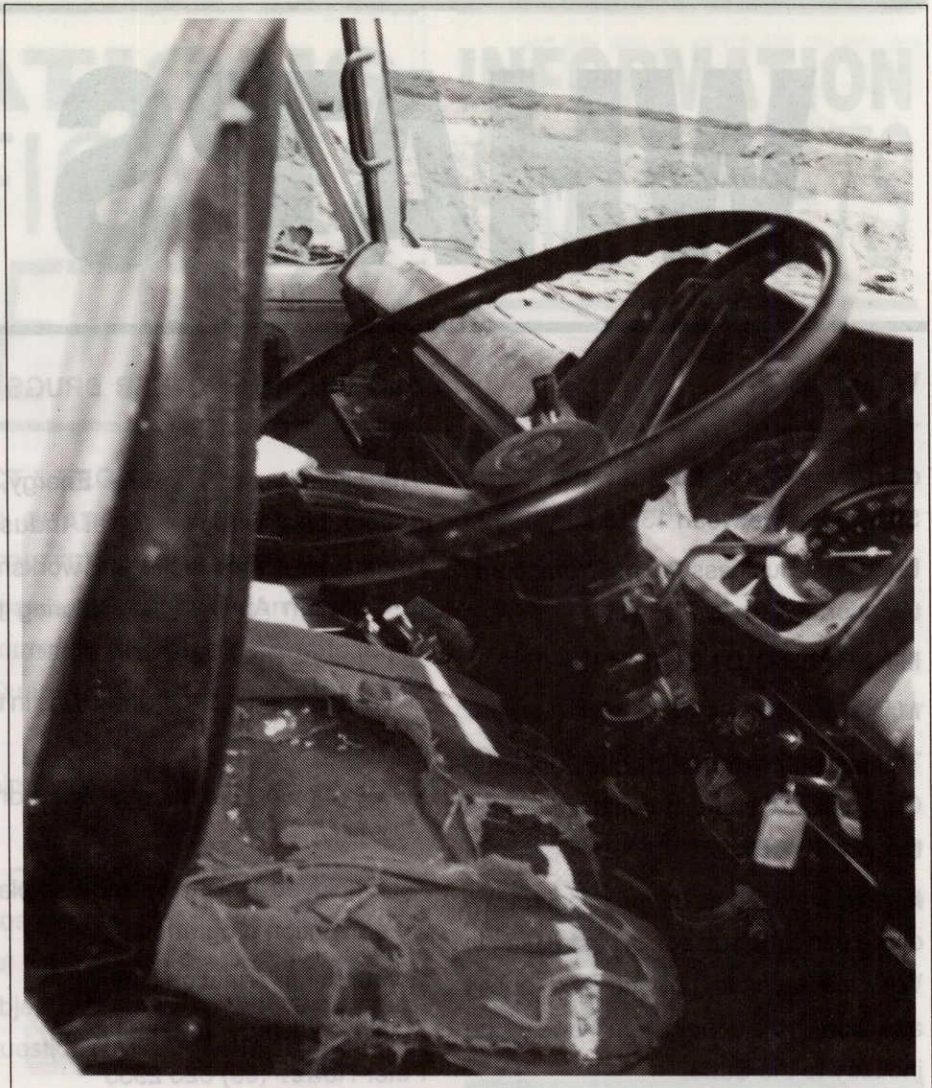
A loaded fuel truck lost control on a haul road when the driver engaged the wrong gear. The truck hit the pit wall.

RESULT

The fuel tank broke loose and was propelled into the cab. The driver escaped death by flinging himself sideways. The passenger had jumped before impact.

PREVENTATIVE ACTION

Follow instructions. There was a sign posted at the entrance to this ramp telling all vehicles other than haul trucks to engage low gear.



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