
Occupational Health & Safety Practitioner

Reading

THE WITTENOOM DISASTER

January 2009



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OVERVIEW

This reading provides an overview of the history and development of asbestos mining at Wittenoom and briefly considers the extent of asbestos contamination at Wittenoom and surrounding areas.



Objectives

After reading this information you should be able to:

- briefly describe the development of the asbestos industry at Wittenoom;
- discuss working conditions at the Wittenoom asbestos mine and mill;
- describe the extent of asbestos contamination at Wittenoom and surrounding areas; and
- name the occupational safety and health laws applicable today.

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Section 1: INTRODUCTION

Glossary of terms

When they are first used, glossary terms are indicated with an asterisk (*). Make sure that you are familiar with the **Glossary of terms** before going any further.

Actinolite	type of asbestos from amphibole group.
Amosite	Brown asbestos - type of asbestos from amphibole group.
Amphiboles	Group of rock forming asbestos minerals which includes actinole, amosite(brown asbestos), anthophyllite, crocidolite (blue asbestos), and tremolite.
Anthophyllite	Type of asbestos from amphibole group.
Asbestos	A general term given to the fibrous form of mineral silicates belonging to the serpentine and amphibole groups of rock forming minerals.
Asbestosis	A progressively disabling inflammation of the fibrous lung tissue that scars the lungs or thickens its outer coverings.
Crocidolite	Blue asbestos - type of asbestos from amphibole group.
Tremolite	Type of asbestos from amphibole group.
Mesothelioma	A rare, painful and incurable cancer of the outside lining of the lungs and of the lining of the abdominal cavity (peritoneum).
Stope	Space or tunnel formed during horizontal excavation of ore underground.

1.1 The consequences

Many people are aware of the tragic consequences of asbestos* mining at Wittenoom. Several hundred people who worked and lived at Wittenoom, a small town in the north west of Western Australia, have died from asbestos related diseases. Sadly, many more will eventually die or be disabled due to the lengthy time period (from 15 to 60 years) between exposure to asbestos and the onset of some asbestos related diseases. The fine, deadly airborne asbestos fibres do not discriminate. The dead, sick and disabled include miners and mill workers and also men, women and children who lived and worked in the town. As asbestos fibres stay in the lung tissue, withdrawal from exposure to asbestos is ineffectual.

‘Wittenoom is an example of the problems facing our society due to past uncontrolled exposures from a whole range of manufacturing and user industries.’ (Rogers, 1992)

The exposure to asbestos occurred at Wittenoom over a number of years and at levels many times higher than allowed by exposure standards today. Thankfully, such exposures rarely occur in modern industry, due to a number of technical, social, political and legislative changes.



Wittenoom Mill

Photograph reproduced with the kind permission of Dr Jim McNulty

Section 2: DEVELOPMENT OF THE INDUSTRY

In 1917 the Department of Minerals and Energy (then the Mines Department) first recorded the presence of amphibole* minerals containing blue asbestos in the Hamersley Ranges.



Ore with asbestos fibres

Photograph reproduced with the kind permission of Dr Jim McNulty

The asbestos industry at Wittenoom started in 1936 when Lang Hancock reported blue asbestos deposits in the Wittenoom Gorges. Because of the 1938 world demand for long asbestos fibre, many prospectors mined the crocidolite* fibres with a pick and shovel. With the beginning of the Second World War, there was a sudden demand for asbestos for use in tanks, planes, battleships, helmets and gasmasks.

In 1938 Hancock secured several mining leases in Wittenoom and in 1940 he began mining operations. L G Hancock and West Australian Blue Asbestos Fibres Ltd produced milled crocidolite asbestos fibres in the Yampire and Wittenoom Gorges. The WA Government was keen for the industry to grow for economic reasons and to assist in opening up the north of the state for development.

In 1941 West Australian Blue Asbestos Fibres Ltd closed down and in 1943 Australian Blue Asbestos Ltd (ABA) - parent company Colonial Sugar Refinery (CSR) - took over Hancock and Wright's interests. In 1943 the Yampire Mine was opened. Production at the Yampire Mine to 1946 is estimated at 15,000 tons of ore for about 3,000 tons of asbestos fibre.

2.1 Wittenoom mine

In 1946 the Yampire Mine was closed and Wittenoom Mine was opened. Production to 1956 is estimated at 590,000 tons of ore from which about 20,000 tons of asbestos were recovered. In 1946 a small residential settlement was also established in Wittenoom Gorge, about one kilometre from the mine and mill.



Wittenoom Mine

Photograph by Paul Middleton

In 1947 the town of Wittenoom was built to service the nearby asbestos mine. It was built ten kilometres from the mine and mill as there was not a suitable area available to expand the original residential settlement. By 1951 the town had 150 houses and a population of over 500 (*Report of the Select Committee, 1994*).

In 1948 CSR took over the asbestos project at Wittenoom as the parent company of ABA (now known as MIDALCO). Progressively new mines and mills were opened, with mining operations continuing until 1966. Unfortunately, when the mines closed in 1966 the problems associated with exposure to asbestos fibres did not end. What remained were unsafe mine sites, huge dumps of tailings and a town extensively contaminated with asbestos tailings.

Total production between 1943 and 1966 was 161,000 tons of crocidolite fibre. Records indicate that during the 23 years of its operation, about 7,000 workers were employed by ABA at Wittenoom (Hansen et al, 1992).

Given the human suffering and loss of life directly attributed to asbestos mining at Wittenoom, it is ironic that for most of the years CSR mined asbestos at Wittenoom it lost money. When the mine closed it had an accumulated debt of \$2.5 million.

Section 3: WORKING CONDITIONS

Working conditions during the operation of the mines and mill at Wittenoom were extremely poor, especially in comparison to those of the 1990s. The biggest problem was the asbestos dust comprising small airborne asbestos fibres. Employees worked continuously amongst the asbestos dust in the poorly ventilated mine and mill, usually without effective personal protective breathing equipment. Safe working practices and systems of work were not evident.



Asbestos bagging area at the mill

Photograph reproduced with the kind permission of Dr Jim McNulty

The mine and the mill were housed in a series of tin sheds that staggered up the sides of the gorge. Much of the equipment used in the mine was second hand and had to be adapted to asbestos mining. The mill had been used at a gold mine, the power house came from Whim Creek and the crusher all the way from Melbourne (Hills, 1989).

3.1 Dr Jim McNulty's 1959 observations

Dr Jim McNulty, who was working for the Health Department of WA, provided a first hand account of the work conditions he observed when he visited Wittenoom to do a clinical examination in 1959 (*Australian Safety News*, May 1995). He reported:

"It was generally dirty and dusty, there were clumps of asbestos all over the floor and one's clothing was rapidly soiled by contact with any surface..... every operation in the mine was associated with dust."

Dust particles were visible in the air and in some areas were so thick they reduced visibility. Underground in the mine it was humid and poorly ventilated. The miners worked in a cramped, stooped position as the stopes* were low, some as low as 1,000mm to 1,200mm.

There was a high silicosis risk, as the rock was hard with a high free-silica content and use of water to damp down the dust was limited because it made the fibre more difficult to handle and overseas customers wanted dry fibre.



Miner crouching to work in the mine 'Stope'

Photograph reproduced with the kind permission of Dr Jim McNulty

After mining the ore went to the crushing plant and then onto a moving belt down through the mill. "Pickers" stooped over the moving belt manually removing larger pieces of rock. During the milling process small rocks were mechanically removed, the fibre freed and purified and then discharged from a hopper and bagged.

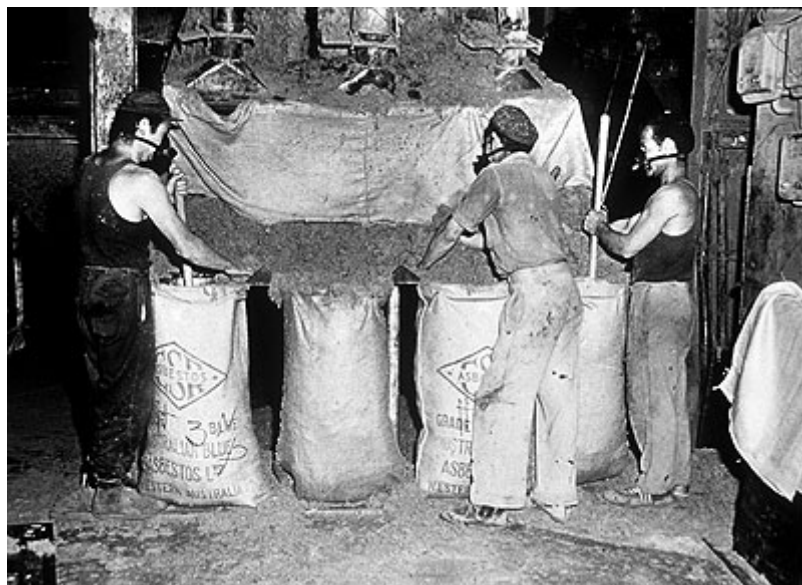


'Pickers' remove larger pieces of rock from the moving conveyor belt

Photograph reproduced with the kind permission of Dr Jim McNulty

At the bagging plant the floor and the men who stood over the open bags, which were filled from a chute, were covered in clumps of asbestos. In the mill all tasks were associated with dust.

During one visit to the mill Dr McNulty observed the baggers wearing respirators, but reports they were simple half faced cartridge types, and were ill fitting and ineffective. It was also very hot and impossible to wear the respirators for the reasonably heavy work, 10 hours a day.



Workers bagging milled asbestos at the Old Bagging Plant

Photograph reproduced with the kind permission of Dr Jim McNulty

3.2 Company manager warned of danger

While working for the Health Department of WA, Dr McNulty repeatedly warned the company's manager of the dangers to the miners and the people living in the town. Unfortunately Dr McNulty and the Health Department did not have the power to order CSR to close down the mine. That was the responsibility of the Mines Department.

The dust extraction system removed some of the dust and discharged it above roof level, but it flowed back to the mill and staff offices. The dust was also discharged at the same level as the main entrance to the underground



Airborne asbestos dust visible outside the mill

Photograph reproduced with the kind permission of Dr Jim McNulty

mine, so the air entering the mine already contained dust. A Mines Department Inspector reported dust levels on the lawn outside the staff offices would be unacceptable in a gold mine.

The waste material, tailings and remains from the dust extraction system were dumped from hoppers into open trucks and driven further up the gorge, over unsealed roadways and raising clouds of dust. Airline pilots claim they could see the blue haze on the horizon considerable distances away from Wittenoom.

Hills (1989) talked to former Wittenoom employees at the Wittenoom mine and mill. Eric Mercer, who worked for 2 years in the mill stencilling the destinations of the asbestos on the bags, remembered:

“It was unreal. You couldn't see a foot in front of you at times.....It was so dusty the conveyor belt used to seize up all the time, and the electric motors would burn out.”

One worker recalled the one hundred-watt light bulbs hanging from the ceiling of the shed looked like candles. You couldn't recognise a man until you were within a couple of feet of him, because the faces of the workers were coated in dust, like pancake make-up.

The dusty conditions observed by Dr McNulty were also observed by and reported on by Mines Department inspectors and others many times well before Dr McNulty's visit in 1959. In 1944 and 1946 Mines Inspector Adams reported on the "dust menace" and the need to reduce dust levels. The Australian Workers Union asked for an inspection on 13 May 1948. A diesel engine was stopped because of diesel emissions and the air filter on the engine was later found to be clogged with dust. In 1948, Dr Eric Saint, Government Medical Officer, wrote to the head of the Health Department of WA warning of the dust levels in the mine and mill and the lack of extractors.

3.3 Immigrants recruited to Wittenoom

The climate at Wittenoom is hot and humid in summer, which made working conditions in the poorly ventilated, dusty mine and mill even more uncomfortable. Many workers often stayed in the town for short periods only. Although around 200 people were employed at a time, approximately 7,000 workers drifted through the mine in the 23 years of its operation. Nearly half these workers stayed less than three months. CSR had problems attracting workers to the mine and mill, and in 1951 wrote to the Department of Immigration asking for help.

The Australian Government was still recruiting immigrants from post war Europe. The Western Australian Government was keen to develop the north west and at that stage Australian Blue Asbestos had the only viable industry. CSR sent representatives to European countries, such as Italy, to recruit workers. Many European immigrants unable to find work in their own country signed a two-year contract with CSR to work at the Wittenoom mine and mill. They were unable to leave Wittenoom before the end of their contract unless they paid back CSR their fare, which for most was impossible.

The wages paid by CSR were quite good but many of the immigrant workers did not speak or understand the English language very well, were poorly trained and were not aware of the health risks associated with the asbestos dust. One former worker recalls:

“ CSR knew about it all along. If they had done the right thing then and told us about the danger, we would have had the option on whether or not we wanted to take the risk. But they never said a thing.” Hills (1989).

There is no doubt the asbestos dust was harmful to the health of the workers and the people who lived in the town of Wittenoom. It is important to consider that at the time asbestos mining began at Wittenoom it was recognised throughout the world that the inhalation of asbestos dust was dangerous. In the 1920s it was recognised that asbestos diseases were associated with work in mining and milling asbestos ore and the manufacture of asbestos products.

Section 4: HISTORY OF HEALTH CONCERNS

Strong concerns about the health hazards associated with asbestos had been described many times over the years. Some of the concerns from the Chronology of Events are outlined below.

As early as 1898 the Chief Inspector of Factories of the United Kingdom reported to the Parliament in his Annual Report about the "evil effects of asbestos dust". He reported the "sharp, glass like nature of the particles" when allowed to remain in the air in any quantity, "have been found to be injurious, as might have been expected" (Report of the Select Committee 1994).

In 1906 a British Parliamentary Commission confirmed the first cases of asbestos deaths in factories in Britain and recommended better ventilation and other safety measures.

In 1918 an American insurance company produced a study showing premature deaths in the asbestos industry in the United States and in 1926 the Massachusetts Industrial Accidents Board processed the first successful compensation claim by a sick asbestos worker.

4.1 Asbestosis

By 1930 it was recognised that asbestosis* was a horrific disease frequently resulting from exposure to asbestos. The 1930 Merryweather and Price report to the United Kingdom Parliament is recognised as an important medical report. It included a report on the effects of asbestos dust on the lungs, on dust suppression in industry and it established that asbestosis was a serious disease from which asbestos workers suffered.

In 1935 a WA Factories and Shops Inspector reported on the effect of asbestos dust on the lungs of workers in the James Hardie factory in Perth.

A Health Bulletin distributed to doctors in Victoria in 1942 referred to asbestosis and advised that persons likely to get asbestosis were asbestos miners and workers, and that it resulted from the inhalation of asbestos fibres.

In 1943 the link between asbestos and cancer was confirmed by a report from a laboratory in New York. Johns Manville (later the principal buyer of asbestos from Wittenoom) suppressed the report (Govt. Select Committee Report). A report on an asbestos mill at Zeehan in Tasmania (owned and operated by a CSR subsidiary) identified asbestos dust was a health hazard and discussed ways of eliminating the dust.

In 1944 Mines Inspector Adams reported on the dust menace at Wittenoom and discussed the need to reduce dust levels, and the WA Assistant State Mining Engineer reported on the dangers of the dust being generated at Wittenoom.



Workers cleaning up generate more asbestos dust

Photograph reproduced with the kind permission of Dr Jim McNulty

In 1946 the known asbestos toll reached 235 in Britain, 16 in France, 30 in Italy and in WA the first known asbestosis case at Wittenoom was reported.

In 1948 Dr Eric Saint, a Government Medical Officer, wrote to the head of the Health Department of WA. He warned of the dust levels in the mine and mill, the lack of extractors and the dangers of asbestos and risk of asbestosis, and advised the mine would produce the greatest crop of asbestosis the world has ever seen. He also advised the Wittenoom Mine Management that asbestos is extremely dangerous and that men exposed would contract chest disease inside six months.

In 1959 Dr McNulty reported the dirty, dusty conditions throughout the mine and mill to the Health Department of WA.



New Bagging Plant

Photograph reproduced with the kind permission of Dr Jim McNulty

4.2 Mesothelioma

An article by Wagner, published in the *British Journal of Industrial Medicine* in 1960, first established mesothelioma* as a disease arising from exposure to crocidolite asbestos. The article ("Diffused Pleural Mesothelioma and Asbestos Exposure in the North Western Cape Province") referred to over 30 case studies of people who had suffered from mesothelioma in South Africa. Some exposures were transient and some were mine workers.

In 1962 Dr McNulty reported the first diagnosed case of malignant mesothelioma in an Australian asbestos worker in the *Medical Journal of Australia*. The worker had worked in the mill at the asbestos mine in Wittenoom from 1948 to 1950.

In 1965 an article in the *British Journal of Industrial Medicine* established that people who lived in the neighbourhoods of asbestos factories and mines, but did not work in them, had contracted mesothelioma.

Despite proof that the dust associated with asbestos mining and milling causes asbestos related disease, mining began at Wittenoom in 1943 and continued until 1966. It is difficult to understand why the mine and mill was allowed to initially open and operate without adequate risk control measures; and why nothing was done to force CSR to clean them up, adopt safer work practices or close down their operations.

In 1974 the first public warnings of the dangers of blue asbestos were published in a cover story called "Is this Killer in Your Home?" in the *Bulletin* magazine. In 1978 the Government decided to phase out the town of Wittenoom, following the publication of a Health Dept. booklet, "The Health Hazard at Wittenoom", containing the results of air sampling and an appraisal of worldwide medical information.

By 1979 the first writs for negligence had been issued against CSR and its subsidiary ABA, and the Asbestos Diseases Society had been formed to represent the Wittenoom victims.

Section 5: CONTAMINATION OF THE TOWN

There is extensive, severe crocidolite fibre contamination in the town of Wittenoom and surrounding areas. The Yampire, Colonial and Wittenoom mine sites and mill were contaminated with fibres and tailings from the mining and milling processes. There are large tailing dumps in the Eastern and Western Gorges, which have spread into the Joffre Creek and surrounding areas. The tailings have also washed into the beds of nearby creeks that eventually flow into the Fortescue River. These sites are still popular tourist sites.



Joffre Creek bed showing asbestos contamination

Photograph courtesy of the Legislative Assembly of Western Australia

5.1 Residents and shire used asbestos tailings

During the 1950s and into the mid 1960s crocidolite tailings from the tailings dump were spread around the town as cheap gravel and sand substitute. There was very little sand around Wittenoom. Australian Blue Asbestos spread the tailings around its buildings in Wittenoom and the State housing homes.

The tailings were used by the Shire of Ashburton, the Public Works Department and the Main Roads Department in public works on local roads around the town, at the golf course, race course, airport, drive in cinema and caravan park.

Tailings were also used for concrete slabs and pads for houses. Residents spread tailings around domestic driveways, gardens and yards. Domestic activities like mowing the lawn, children playing on the ground or pets digging stirred up the dust. The airport was very hazardous because of the dust from aircraft taking off and landing.

ABA and the Shire of Ashburton were repeatedly warned against the use of tailings in the towns and there were many attempts to ban the use of the tailings. It was considered safe to incorporate the tailings into concrete as they were sealed. This practice later ceased as transporting the tailings into the town for this purpose was hazardous.

5.2 Air monitoring

Between 1977 and 1992 eight studies involving air monitoring were carried out by the Health Department of WA and other authorities. The aim of the studies was to assess the risk to people living and working in the town or visiting it. There were a number of shortcomings with these studies, which meant the debate over risk to residents was not conclusively settled. There was agreement on some aspects, including agreement that the levels of airborne crocidolite in the town were low under most conditions, activities that disturbed tailings would result in significant exposures and it was not possible to control or prevent such activities because of the remoteness of Wittenoom.

Reports by the Environmental Protection Authority (Ashton, 1986 and Davies, 1990) provide detail on the extent of the contamination. Inspection reports indicated that asbestos fibres were present in some quantity in almost every area of the town.



Derelict mine equipment and tailings

Photograph courtesy of the Legislative Assembly of Western Australia

For example, extensive contamination was found in many housing areas, the grounds of the hospital, public roads and unsealed areas of the airport car parks and runways. The physically unsafe condition of the mine sites was also noted.

Wittenoom's contamination with crocidolite appears to be unique in the world. The extensive use of large quantities of milled crocidolite as land fill and in construction has not occurred anywhere else in the world. Thus there was no prior experience with similar situations to provide guidance on appropriate courses of action.

5.3 Planned clean-up of town

Legal proceedings initiated by victims of mesothelioma and other asbestos-related diseases have attracted the attention of the media and maintained the high profile of asbestos and Wittenoom since the mine was closed. This has contributed to the pressure to prevent even low exposures to asbestos.

A number of estimates on the cost and possible methods of rehabilitating Wittenoom and nearby mine sites were produced by organisations such as the Shire of Ashburton, the Department of Minerals and Energy and the Environmental Protection Authority. The suggested methods primarily involved removal of the overlay of obvious surface tailings, removal of tailings to a particular depth and top dressing with clean fill, and sealing roads with bitumen. These clean up methods involved human activity and machinery, disturbance of the asbestos tailings and generation of dust containing crocidolite. Thus the clean up itself would be hazardous.

Over the years, the Shire of Ashburton has made a number of attempts to clean up the town, by removing contaminated land fill, installing kerbing and resealing roads.

In 1986 an Interdepartmental Committee on Wittenoom was established to advise the Government on issues involving Wittenoom. The Committee included representatives from the Department of Commerce and Trade, the Health Department of WA, the Environmental Protection Authority, Land Administration, the Department of Minerals and Energy, the Ministry of Justice and WorkSafe Western Australia.

A Parliamentary Select Committee was appointed to inquire into Wittenoom in 1992. The Select Committee "determined that there is no doubt that the situation in the town of Wittenoom is unique and the risk is much greater than experienced anywhere else in Western Australia." It made 34 recommendations in its report in 1994, including recommendations that:

- the town should remain open but the policy of phasing down activity be accelerated;
- no systematic clean up of the town be undertaken;
- the government take action to close off the mine sites; and
- steps be taken to prevent any further building in the town.

The Select Committee considered implementation of the 34 recommendations would have the effect of "reducing the exposure of the members of the public to cancer causing crocidolite fibres; reducing the possibility of people contracting asbestos related diseases from exposure to crocidolite at Wittenoom . . ."

In 1993 the Government commissioned CMPS&F Environmental to undertake a feasibility study for cleaning up the town site. The study found there was still extensive contamination, after approximately fifteen years during which attempts were made to clean up the town. The final report proposed a clean up involving removal of 100mm of contaminated top soil and replacement by gravel capping under strict guidelines. The cost was estimated at \$2.43 million and suggested the town could be developed further after clean up.

A systematic clean up of the town was not undertaken. Members of the Interdepartmental Committee on Wittenoom believed it was unlikely the town could be satisfactorily cleaned up and the benefits of attempting to clean up the town were not in proportion to the costs, or the risks involved. The legal implications of encouraging people to live in a town contaminated with crocidolite (even after clean up) were enormous. If residents or visitors contracted an asbestos related disease at some point in the future, it was very likely they might initiate legal action against the Government or organisations involved in such a project.

Section 6: PHASING DOWN WITTENOOM

In 1978 the State Government adopted a policy of phasing down activity in the town of Wittenoom. This policy was seen as the most appropriate course of action to take in response to the widespread contamination of crocidolite in and around the town. The policy encouraged residents to relocate out of Wittenoom voluntarily, through the purchase of their homes, business and property and included a contribution to their relocation costs.

The Shire of Ashburton and many Wittenoom residents were opposed to closing the town. They lobbied hard to have the town cleaned up and developed as a tourist attraction. The phasing out of Wittenoom progressed relatively slowly. In 1981 the Government re-affirmed its policy for phasing out Wittenoom and initiated planning for a new tourist resort. In 1984 the policy was modified by the Government to ensure the existing State Government facilities and the Fortescue Hotel were maintained until alternatives were available.

6.1 Population decreased

Up until the end of 1991 over \$1.4 million was spent under the phasing down policy, with the result that the population of Wittenoom fell from over 90 in May 1984 to about 45 in March 1992. Between 1986 and 1992 around 50 houses and other buildings were demolished by the Government. The Fortescue Hotel was closed in 1992.

When the population decreased, the school, nursing post and police station were closed, with alternative services being provided primarily from Tom Price. The continued presence of these services could not be justified when comparing the level of services provided per head of population elsewhere in the State. Also, with a very real threat to employees' health from crocidolite asbestos, service provider organisations removed their staff after consultation with relevant unions and health authorities.

In 1993 the airport was officially closed and the Government advised the Wittenoom residents they would not be forced to leave, but new residents would not be encouraged to the town. Most Government and private employers no longer allow their employees to visit Wittenoom on business.

6.2 Wittenoom today



The main road into Wittenoom

Photograph by Paul Middleton

February 1998 - Information from a resident in the town indicates from 25 to 30 people still live in the town. There are around 29 buildings, mainly residential, still remaining. Businesses include a general store, which is part of the caravan park and a gem store. Tourist coaches still visit the town regularly. Visitors and backpackers can stay at the caravan park, one of the six holiday houses or the youth hostel. Kangaroo shooters also stay in the town during the wet season when there are plenty of kangaroos around the area.

The residents in the town do not pay rates to the Shire of Ashburton, as they do not receive any services from the Shire. Telstra provide a telephone service through a solar powered unit located outside the town. Negotiations are still occurring between residents and relevant organisations in relation to the maintenance of the electricity and water infrastructure in the town.

There are signs located at the entrance to the Karijini National Park warning tourists of potential health risks in the gorges and the town. The Shire of Ashburton and the Western Australian Tourist Commission have a policy of not encouraging people to visit the town.

December 2002 – the multi-agency Wittenoom Steering Committee was established by Cabinet to develop a strategy to remediate the asbestos contamination in and around Wittenoom and the mines and to accelerate the closure of Wittenoom.

November 2005 - the resident population is around 12 persons. Western Power does not intend to renew the licence for electricity supply after 30th June 2006.

A small number of residents still remained in early 2006, defying the Government of Western Australia's removal of services and stated intention to demolish the town. On 30 June 2006, the Government turned off the power grid to Wittenoom.

A report by consultants GHD and Parsons Brinkerhoff in November 2006 evaluated the continuing risks associated with asbestos contamination in the town and surrounding areas and classed the risk to visitors as medium and to residents as extreme. In June 2007 the townsite status was officially removed. The town's name was removed from official maps. Remaining residents were encouraged to accept the Government's relocation offer.

The Department of Health, which has reviewed the Report, has expressed the view that the exposure and risks identified in the report pose an unacceptable public health risk.

The Department of Environment and Conservation subsequently classified Wittenoom as a contaminated site under the Contaminated Sites Act 2003 on 28 January 2008. A Steering Committee that includes several Government departments meets regularly to discuss the continuing stages of closure of the area.

Asbestos fibres are widely disseminated in the Wittenoom area, posing a risk to people visiting the area. These fibres readily migrate as a result of wind and flooding, and human activities such as the movement of vehicles. To protect travellers, the State Government has warned against all travel to the Wittenoom area.

Section 7: CHRONOLOGY OF EVENTS

Adapted from the 1994 Report of the Select Committee Appointed to Inquire into Wittenoom

1st Century AD	Roman historian Pliny noted that slaves wearing asbestos cloth sicken and die, and described the use of respirators made from animal bladders.
1898	British factory safety inspectors expressed concern about the 'evil effects' of asbestos dust.
1906	British Parliamentary Commission confirmed first cases of asbestos deaths in factories, and recommended better ventilation and other safety measures.
1911	Royal Commission into working conditions in gold mines in Australia revealed widespread lung disease. Ventilation laws were introduced.
1917	Occurrence of crocidolite in Hamersley Region first noted at the Mines Department.
1918	Prudential Insurance Company in the US produced an actuarial study showing premature death in the asbestos industry. Other companies began increasing premiums and refusing insurance.
1926	A sick asbestos worker filed the first successful claim for compensation to the Massachusetts Industrial Accidents Board. Over the following three years several hundred further claims were filed.
1927	Asbestosis was given its name.
1929	Johns Manville Corporation, the world's largest asbestos miner/manufacturer, was served with 11 writs by asbestos victims. Claims were settled out of court with secrecy orders. Metropolitan Life Insurance company in the US found that half the men working at Johns Manville and Raybestos asbestos plants for more than three years developed lung disease.
1930	British Home Office survey found widespread asbestos disease in UK factories.

1935	Inspector of Factories and Shops in Western Australia reported on the effect of asbestos dust on the lungs of workers in the James Hardie factory in Perth.
1936	Lang Hancock 'discovered' the Wittenoom blue asbestos (crocidolite) deposits and later began pick and shovel mining.
1937/38	The demand for long blue asbestos fibre in 1937-38 created a small boom in the area. Many prospectors were engaged in the production of hand cobbled long fibre.
1938	<p>CSR Ltd sent senior executive M.G. King to the US, Canada, South Africa and Europe to study asbestos mining and manufacturing. This was the start of regular contact between CSR and Johns Manville, including further overseas trips in 1947 and 1952.</p> <p>German researchers identified six cancer deaths among asbestos textile workers. Later animal studies confirmed asbestos dust kills mice.</p> <p>US adopted a 'safe' dust limit of 176 particles of asbestos per cubic centimetre in the workplace.</p>
1938/43	Some milled asbestos fibre was produced by West Australian Blue Asbestos Fibres Ltd and Mr L. G. Hancock in Yampire and Wittenoom Gorges. The former company closed down in 1941. Hancock and Wright's interests were taken over in 1943 by Australian Blue Asbestos Ltd. Mr L. G. Hancock was retained as manager until 1948.
1939	Western Australia Commissioner of Public Health and Chief Inspector of Factories found respiratory disorders among James Hardie workers.
1940	Hancock began mining at Wittenoom. Plant opened in 1943, and CSR took over in 1948.
1943	<p>Yampire Mine opened. Production to 1946 is estimated at 15,000 tons ore for about 300 tons asbestos fibre.</p> <p>Saranac laboratory in New York confirmed the link between asbestos and cancer. Johns Manville suppressed the report.</p> <p>A report on an asbestos mill at Zeehan in Tasmania (owned and operated by a CSR subsidiary) said that asbestos dust is a health hazard, and discussed methods of eliminating it.</p>

1944 Mines inspector Adams reported on the 'dust menace' at Wittenoom and discussed the need to reduce dust levels.

First warning of asbestos dust at Wittenoom - the WA Assistant State Mining Engineer reported on the dangers of the dust being generated.

1946 Wittenoom Mine opened. Production to 1956 was 590 000 tons of ore, from which about 20 000 tons of asbestos fibre was recovered. Yampire Mine closed.

Residential settlement was established in Wittenoom Gorge, about 1 kilometre downstream from the Wittenoom mine and mill.

Mines Department Inspector Adams described dust conditions at Wittenoom as 'terrific'.

Wittenoom mine manager wrote to head office about the first known asbestosis case, a man named Dignam.

Australian Workers Union first argued for the inclusion of a dust allowance in the award. The claim was not allowed.

Known asbestos death toll reached 235 in Britain, 16 in France, 30 in Italy.

1947 Building of the town of Wittenoom at the entrance to Wittenoom Gorge commenced, because of a lack of a suitable area for expansion at the settlement. The town was located 10 kilometres from the Wittenoom Mine and mill.

1948 7 July: The town was named Wittenoom.

13 May: Australian Workers Union asked for inspection at Wittenoom. A diesel engine was stopped because of diesel emissions in the mine. It was subsequently found the air filter on the engine was clogged with dust.

Dr Eric Saint, Government Medical Officer, wrote to the head of the Public Health Department of Western Australia warning of the dust levels in the Wittenoom mine and mill, the lack of extractors and the dangers of asbestos and asbestosis. He warned that the mine will produce the greatest crop of asbestosis the world has ever seen.

Dr Eric Saint told Wittenoom mine management that asbestos is extremely dangerous, and that men exposed would contract chest disease inside six months.

Mr L. G. Hancock was replaced as manager at Wittenoom mine.

Over the following three years dust levels at the mine and mill were regularly monitored at six to eight times 'safe' levels. Further warnings were given to mine management. No improvement in conditions was noted.

1949

15 July: Australian Workers Union argued at an arbitration hearing for the payment of a dust allowance. Mill workers were awarded an extra sixpence (5 cents) per hour. The Award was not amended until 1957 to include a dust allowance because of 'excessive' dust nuisance.

November: The Occupational Health Committee of the National Health and Medical Research Council suggested that consideration should be given to the Industrial Hygiene Unit at Sydney University undertaking a field investigation at Wittenoom.

1950

State Mining Engineer reported insufficient attention to safety regulations and ventilation at Wittenoom.

WA Commissioner for Public Health reported to his Minister that "Asbestos dust, if inhaled, constitutes a very grave risk and is, if anything, worse than silicosis".

1951

17 August: Wittenoom had 150 houses and a population over 500.

September: The work force at Wittenoom consisted of: 97 underground and bench workers, 34 mill operators, 62 tradesmen and 82 town site workers.

WA adopted a 'safe' dust limit of 176 particles per cc. Wittenoom readings were continually off the scale at 1 000 particles. Mines and Health departments took no action apart from issuing further warnings.

Commissioner for Public Health wrote to the Under Secretary for Mines advising that: "The hazard from asbestos is considerably greater than that from silica.....we have reason to believe that attention to this aspect of mining operations at Wittenoom has been inadequate in the past".

27 October: A new power plant and power house was installed at Wittenoom Mine. Electric locos were in operation and the mechanisation of mining was complete. Over 260 men were employed in the operation.

1953

Colonial Mine started. Production to 1966 is estimated at 2.66 million tons of ore for about 130 000 tons of asbestos fibre). Access roads to new mine were started.

19 August: Mines Inspector reported the installation of dust collectors should: "prevent much of the dust which is exhausted to the atmosphere and drifts down and back into the (Wittenoom) mill. The worst feature of the mill is the cloud of dust which arises from the mill and then either drifts down to the ground or blows down the gorge" (towards the settlement about 1 kilometre away).

December: A series of reports by Mines Inspectors indicated excessive dust in the mill.

- 1954** Mines Inspector Ibbotson described conditions at Wittenoom as a 'disgrace'. The following year he threatened to close the mine.
- 7 August: Production at Wittenoom Mine was increased to over 10 000 tons of ore a month. The power house was completed, output was 1800 kilowatts.
- 1955** October: The State Government requested the Federal Government subsidise the Wittenoom (asbestos) Mine at the rate of £5 (\$10.00) a short ton. Wittenoom asbestos was uncompetitive compared to supplies from South Africa.
- Dr Richard Doll in the UK produced the most comprehensive survey to date linking asbestos dust with lung disease.
- 1957** Mill workers were awarded an extra sixpence (5 cents) per hour for working in 'excessive' dust conditions by a mining board of reference.
- 1958** Closure of the Wittenoom Mine. Wittenoom Mill continued to treat ore from the Colonial Mine (12,222 tons of asbestos fibre were produced in 1957).
- Dust reducing equipment was installed in the Wittenoom mill. The dust allowance was reduced to three pence per hour for mill workers.
- 5 March: A representative of Australian Workers Union requested an unannounced inspection of the mill by the Mines Workman's Inspector, because of the dusty conditions.
- 25 March: Assistant Mines Inspector made an unannounced visit to investigate the dust problem at the Wittenoom Mill.
- 13 June: Colonial Mill opened. Wittenoom Gorge Mill was still operating. Production target was 25,000 tons.
- 1959** Annual Report of the Public Health Department expressed concern about numbers of Wittenoom men affected by asbestosis and their relatively young age and the extremely short dust exposures.
- Public Health Department WA investigated the occurrence of silicosis and asbestosis in miners employed at Wittenoom.
- February. Sleggs C. reported the presence of mesothelioma in South African crocidolite workers. Published in Johannesburg Pneumoconiosis Conference Proceedings, 1960.
- WA Health Department official Dr James McNulty discovered six cases of lung damage among Wittenoom workers. He warned the mine manager, and wrote the first of a series of warnings.

1960

January: X-ray survey by the Public Health Department indicated there was considerable silicosis/asbestosis in the Wittenoom workforce. Immediate dust suppression requested.

Closure of Wittenoom Mill. All milling was now conducted at Colonial Mill.

Dr J. McNulty of Public Health Department diagnosed the first mesothelioma case arising from Wittenoom. The patient had worked at the mine for two years in the late 1940s. (Published 1962).

14 July: WA Mines Department received a reply from the South African Acting Government Mining Engineer indicating methods of airborne dust measurement and dust control and was informed of the problems of asbestosis and silicosis in South African asbestos industry.

26 October: Dr J. McNulty informed Mines Department of results of chest X-rays taken in September 1960. Out of 199 workers, 25 showed early signs of asbestosis/silicosis, and 19 showed advanced development. Evidence indicated increasing severity with increased duration of exposure.

Wagner paper was published. A 'new' disease, mesothelioma (fatal cancer of the lining of the lungs), was discovered among people exposed to asbestos in South Africa.

Annual report of WA Commissioner for Public Health said working at Wittenoom is thirty times more dangerous than any other mining.

1961

Dr G. Oxer, CSR Medical Officer, sought Public Health Department advice regarding the danger of blue asbestos, then wrote to Mr Frank Sheehan, Clerk of Council from the Tablelands Shire Council, advising him of the dangers. His concern was aroused by an inquiry from Mr Sheehan about the danger of asbestos tailings being used for roads, driveways and children's playgrounds.

May: Production of asbestos fibre increased from 260 tons per week to 500 tons per week.

First case of mesothelioma was detected among ex Wittenoom workers. Man dies.

Britain cut the maximum exposure level of asbestos in the workplace from 176 to five particles per cubic centimetre.

October: Dr J. McNulty requested a meeting between the management of Australian Blue Asbestos Ltd and representatives of the Public Health Department and the Mines Department to discuss the problems of asbestosis in the workforce and high dust levels. There was agreement at the meeting that attempts would be made to improve the ventilation in the mine and the mill, and to institute a system of improved fibre and dust counting.

1961/65	More than 100 cases of lung disease found among Wittenoom workers and ex-workers - more than for all the other mines in Western Australia.
1962	<p>Dr J. McNulty wrote to the CSR's consultant physician warning of the dangers of exposure to asbestos. Included were results of medical examinations carried out on workers at the site, which drew attention to the significant number of men seriously affected at early ages and from short exposures.</p> <p>October 23: Major collapse occurred in the Colonial Mine.</p> <p>December 15: Dr J. McNulty of the Public Health Department published an account of the first victim of mesothelioma from Wittenoom Mine in <i>The Medical Journal of Australia</i>.</p>
1963	October 9: Long Wall Stopping suggested as a way of increasing efficiency of mining operation.
1964	Public Health Department requested an expert from NSW (Gersh Major) to measure and report on the dust concentrations in the mine and mill.
1965	<p>25 July: Mines Inspector reports continued to indicate dusty conditions in the mill and mine.</p> <p>Local council warned that the tonnes of asbestos tailings being spread around Wittenoom could even threaten tourists.</p>
1966	<p>21 August: Colonial Mine, the last operating mine at Wittenoom, closed due to the economics of mining. Total production 1943-1966 was 161 000 tons of crocidolite fibre.</p> <p>8 October: Mr Gersh Major, from the Occupational Health Unit of the School of Public Health and Tropical Medicine, commenced air sampling program at the Colonial Mill and Mine using long running thermal precipitators.</p> <p>G. Major of the Commonwealth Health Department was highly critical of dust at the mine and the mill. CSR closed the mine two weeks later.</p>
1969	On the basis of mesothelioma risk, the UK introduced an exposure standard of 0.2 fibres/cc for crocidolite, in an attempt to restrict its use.

1973

2 October: A Public Health Department Inspector reported that tailings at Wittenoom were being sold at \$15 per ton for making concrete.

27 October: Air monitoring by Public Health Department - air samples taken in and around the township by Mr Moyle. They were examined in 1975.

1974

First public warning of the dangers of blue asbestos in *Bulletin* magazine cover story, 'Is This Killer In Your Home?'

1977

July: Air monitoring by Public Health Department - Dr A. G. Cumpston and Mr D.Sykes visited Wittenoom and took air samples. Samples were taken by driving around the town in a car with a sampling head protruding from the boot of the car.

November: Air monitoring by a Mines Inspector - a sample of dust, from a personal sampler worn by a Mines Inspector for half an hour outside the school and one hour outside the hotel, was found to contain approximately 0.2 fibres/cc. This equalled the British threshold limit for occupational exposure. It was decided to embark on a more detailed sampling program.

X-rays were taken of the 146 adults at Wittenoom. No direct evidence of asbestos related disease detected in any x-ray.

Cornelius Maas became the first mesothelioma victim to sue the CSR subsidiary that ran the mine. He died before the case went to court.

1978

14 June: The Wittenoom Trust was set up by CSR to provide financial help to ex-employees affected by asbestos diseases.

August: Wittenoom Health and Works Committee formed.

September: Air monitoring by Public Health Department - a volunteer group of citizens wore personal dust samplers for periods of six hours at a time.

November: Government decided to phase out the town of Wittenoom. Decision followed the publication of a booklet, "The Health Hazard at Wittenoom", containing the results of air sampling and an appraisal of world-wide medical information.

November: Government announced the closure of Wittenoom, based on an appraisal of world wide medical information on the harmful effect of airborne blue asbestos fibres.

<p>1980</p>	<p>Hancock & Wright demolished 13 houses in the town.</p> <p>October: Long term air monitoring done in the Wittenoom Primary School grounds, using a vertical elutriator.</p> <p>December: Cabinet decided to ban connection of essential services (water and electricity) to new residents arriving in Wittenoom.</p> <p>Air monitoring by Public Health Department.</p>
<p>1980-83</p>	<p>Shire of Ashburton closed some Wittenoom streets and completed a kerbing and resealing program. Tailings were removed from town street reserves.</p>
<p>1981</p>	<p>March: The State Government, for the second time, reaffirmed the phasing out of the town and initiated planning for a new tourist resort.</p>
<p>1984</p>	<p>2 April: Air monitoring by Public Health Department.</p> <p>October: Government phasing out policy modified to ensure that State Government existing facilities and services and the Fortescue Hotel would be maintained until alternatives became available.</p>
<p>1985</p>	<p>Hancock & Wright demolish about 60 houses in the town.</p> <p>26 March: Air monitoring - Wittenoom Health and Works Committee. Wittenoom Health and Works Committee commissioned the Geraldton Building Company to undertake the Wittenoom Environmental Engineering Study, which involved air monitoring.</p> <p>18 December: Wittenoom Primary School closed.</p>
<p>1986</p>	<p>March: Air monitoring program - Department of Conservation and Environment. "Wittenoom Airborne Asbestos Study" 322 samples from 7 stations.</p>
<p>1987</p>	<p>May: State Government demolished buildings and removed asbestos tailings from 34 acquired properties.</p>

1988

First victories in court for Wittenoom mesothelioma victims. Judge ruled CSR acted with 'continuing, conscious and contumelious' disregard for its workers' safety.

25 May: First successful common law claim by an ABA employee with mesothelioma.

28 May: First common law claim by a former wharf labourer, who loaded blue asbestos from Wittenoom onto ships at Point Sampson.

June: State Government demolished buildings and cleaned up 15 acquired properties including the school.

27 September: CSR acknowledged liability for asbestos related disease at Wittenoom.

1989

January: First successful common law claim for mesothelioma from a past Wittenoom town resident who lived there as a child.

Wittenoom toll topped 500. National Health and Medical Research Council predicted the final toll would be two thousand.

1990

March: Air monitoring by Shire of Ashburton - personal samples obtained on 2 Shire workers based in Wittenoom.

1992

February: Inquiry into asbestos issue commenced.

May: Air Monitoring - NIOHS/Wittenoom Inquiry Study.

August: Nevill Report published.

September: Inquiry reports sent to Premier Carmen Lawrence MLA.

Recommendations of the Nevill Report were rejected by Cabinet.

31 October. Fortescue Hotel was closed.

4 November: Hon Ernie Bridge MLA, Minister for the North West, announced that Government would continue its policy to phase-down activity in Wittenoom and demolish all Government-owned buildings there, including the Fortescue Hotel.

1993

August: Hancock sold 74 blocks and 4 houses in Wittenoom. The blocks were sold for \$150 - \$300.

August: The Deputy Premier, the Hon Hendy Cowan MLA, visited Wittenoom and announced that he wanted to accelerate a strategy to deal with the problem of asbestos contamination in the town and surrounding areas.

17 December: WA Government appoints engineering consultants CMPS&F to assess the practicability and cost of cleaning-up asbestos from the Wittenoom town site. The issue needed to be resolved so that the tourism based around the Hamersley Ranges

	<p>and the Karijini National Park could be placed on a firmer basis.</p> <p>Decision that Wittenoom residents would not be forced to leave the town, but the Government would not encourage new residents to the town nor would the Fortescue Hotel be re-opened.</p>
1998	<p>February - Resident of Wittenoom advised 25 to 30 residents still living in the town. Telstra have installed solar powered telephone equipment outside the town, to maintain telephone service. Residents and relevant authorities are still negotiating about maintenance of power and water infrastructure.</p> <p>Shire of Ashburton does not provide any services to the town, hence residents do not pay rates. WA Tourism Commission and Shire of Ashburton discourage tourists from visiting the town</p>
2002	<p>December – the multi-agency Wittenoom Steering Committee was established by Cabinet to develop a strategy to remediate the asbestos contamination in and around Wittenoom and the mines and to accelerate the closure of Wittenoom.</p>
2005	<p>November – the resident population was around 12 persons. A gem retail business was being operated in the town and a number of former residences and other buildings were being used as backpacker and holiday accommodation.</p>
2006	<p>On 30 June 2006, the Government turned off the power grid to Wittenoom.</p>
2007	<p>A report by consultants classed the risk to visitors as medium and to residents as extreme. In June 2007 the townsite status was officially removed. The town's name was removed from official maps. Remaining residents were encouraged to accept the Government's relocation offer.</p> <p>The Department of Health, which reviewed the Report, expressed the view that the exposure and risks identified in the report pose an unacceptable public health risk.</p>
2008	<p>Department of Environment and Conservation subsequently classified Wittenoom as a contaminated site under the Contaminated Sites Act 2003 on 28 January 2008.</p> <p>Asbestos fibres are widely disseminated in the Wittenoom area, posing a risk to people visiting the area. To protect travellers, the State Government has warned against all travel to the Wittenoom area.</p>

Section 8: SAFETY LAWS IN WESTERN AUSTRALIA TODAY

8.1 WorkSafe WA legislation

The **Occupational Safety and Health Act 1984** and the *Occupational Safety and Health Regulations 1996* cover all workplaces in WA such as aircraft, boats, or vehicles, construction sites, factories, farms, forests, hospitals, offices, and any place where employees or self employed persons work. WorkSafe Western Australia administers and enforces this Act and Regulations.

The **Occupational Safety and Health Regulations 1996** include regulations specific to handling, removal, and disposal of asbestos material. These are set out in Part 5, Division 3 (Certain carcinogenic substances) and Division 4 (Further requirements in relation to certain hazardous substances - Subdivision 1 - Asbestos).

The mining and petroleum industries and Commonwealth agencies are not covered by the *Occupational Safety and Health Act 1984* and the *Occupational Safety and Health Regulations 1996*, but by separate legislation.

8.2 Mines safety legislation

When the Wittenoom mine and mill were operational, the *Mines Regulation Act 1946* and *Mines Regulation Act Regulations* applied and were administered by the Mines Department of Western Australia.

Today, the *Mines Safety and Inspection Act 1994* and the *Mines Safety and Inspection Regulations 1995* apply to the inspection and regulation of mines and mining practices for all mines including exploration activities. The Department of Mines and Petroleum administers and enforces this Act and Regulations. Part 9 of the Regulations (Ventilation and control of dust and atmospheric contaminants) includes specific regulations for removal of asbestos (9.32) and control of contaminant asbestos (9.33).

The *Mines Safety and Inspection Act 1994* and the *Occupational Safety and Health Act 1984* both contain similar provisions outlining the general duties of employers, employees, self employed persons, persons in control of workplaces, manufacturers etc. and consultative mechanisms for electing safety and health representatives and establishing safety and health committees.

8.3 Australian standards and codes

Occupational safety and health legislation often requires work practice to be in accordance with a specified Australian Standard, code of practice or guidance note.

For example, both the *Mines Safety and Inspection Regulations 1995* and the *Occupational Safety and Health Regulations 1996* require any asbestos removal work to be in accordance with the Safe Work Australia **National Code of Practice for the Safe Removal of Asbestos [NOHSC: 2002 (2005)]**.

Copies of all WA legislation can be purchased from the State Law Publisher, 10 William Street, Perth.

Section 9: CONCLUSION

Asbestos mining at Wittenoom is the greatest occupational health and safety tragedy in Australia. CSR, the Mines Department and the government of the day did not heed the advice of Dr Eric Saint and Dr Jim McNulty. They did too little, too late to save the lives of the men, women and children who lived and worked in the mine and mill at Wittenoom from 1943 to 1966.

When asbestos mining began at Wittenoom in 1943, the risks associated with asbestos were well documented. It is clear CSR and Australian Blue Asbestos, the Health Department of WA, the Mines Department and the government were aware of these risks. A fundamental principal of occupational health and safety practice is that workers have a right to a safe workplace and to know about workplace hazards.

The tragic consequences of the mining experience at Wittenoom could have been avoided if the reports from around the world and the early warnings in relation to Wittenoom were heeded.

Today the employer's duty of care is clearly defined in safety legislation for all workplaces and the level of enforcement is higher.

Your feedback

WorkSafe is committed to continuous improvement. If you take the time to complete the online Feedback Form at the SafetyLine Institute website you will assist us to maintain and improve our high standards.

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