



Australian Council of Trade Unions

**Submission to the
Senate Community Affairs Committee:
Inquiry into workplace exposure to toxic dust**

Contact

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Summary and Recommendations

The health impacts of exposure to toxic dusts such as silica include lung cancer, and silicosis, as well as chronic bronchitis, chronic obstructive pulmonary disease (COPD), coal and mixed dust pneumoconiosis, auto-immune diseases, such as systemic sclerosis, systemic lupus erythematosus, rheumatoid arthritis, and end-stage renal disease or glomerulonephritis. The outcomes of exposure range from mild through to severe incapacitation and potential death.

- The ACTU recommends that the jurisdictions should adopt a 0.05 mg/m³ exposure standard for all forms of crystalline silica with an action level of 0.025 mg/m³ and maintain the prohibition, across all states, of the use of crystalline silica in abrasive or other processes which could give rise to silica dust;
- The ACTU recommends more rigorous enforcement of exposure standards across the jurisdictions;
- The ACTU recommends a national community education campaign be developed by NOHSC and public health and OHS authorities to alert the public and workers to the adverse health effects of exposure to toxic dust including crystalline silica and sources of exposure, including an information/help line;
- The ACTU recommends governments adequately fund research into improving medical tests for dust diseases, particularly silica and asbestos related diseases with the focus on early detection;
- The ACTU recommends a government initiative to screen all former workers from the sandblasting industry for dust diseases at no cost to the workers;
- The ACTU recommends improvements in data collection across the jurisdictions, including establishing national medical registry of dust diseases cases;
- The ACTU is concerned that workers exposed to toxic dust such as silica are losing their workers' compensation claims, despite medical reports that show causal links between toxic exposure and their illness. Workers' compensation claims in industries where it is known that workers were exposed to toxic dust should be measured on a presumptive basis. That is, due to the nature of the industry it is probable that the worker's disease was caused by exposure to the toxic dust and the onus must be on the employer to prove that it was not.
- The ACTU recommends the Australian government hold a National conference before the end of 2005 on nanotechnology as an emerging issue;
- The ACTU recommends urgent regulation of nanomaterial manufacturers and importers and regulate nanoparticle exposure levels to the lowest equivalent internationally;
- The ACTU recommends urgent research into the risks posed to workers and the public by nanomaterials and research into techniques to eliminate the risk of exposure.

a. The health impacts of workplace exposure to toxic dust including exposure to silica in sandblasting and other occupations;

The health impacts of exposure to toxic dusts such as silica include lung cancer, and silicosis, as well as chronic bronchitis, chronic obstructive pulmonary disease (COPD), coal and mixed dust pneumoconiosis, auto-immune diseases, such as systemic sclerosis, systemic lupus erythematosus, rheumatoid arthritis, and end-stage renal disease or glomerulonephritis. The outcomes of exposure range from mild through to severe incapacitation and potentially death.

Silica

Initial exposure to silica dust will cause irritation of the eyes, nose and throat like most other dusts. However, if excessive amounts of silica dust are breathed into the lungs over a period of time, it can cause damage to the lung tissue. Other than some breathlessness during exercise, the disease can remain free of symptoms for 10-20 years after exposure.

The most common form of silicosis develops after long exposure to relatively low concentrations. Once the disease has begun, it will continue to progress even if the worker is removed from further exposure. There is no medical treatment for silicosis. People with silicosis are also at greater risk of developing lung cancer. In 1996 the International Agency for Research on Cancer classified crystalline silica dust as a human carcinogen (Group 1).

The size of the silica particles is important in causing the disease. Larger particles are usually prevented from reaching the lung's small air sacs, it is the smaller particles (less than five thousandths of a millimetre) that are the most dangerous.

The development of silicosis depends on a number of factors including:

- the amount and kind of dust inhaled
- the percentage of free silica in the dust
- the form of silica
- the size of the silica particles
- the duration of exposure
- the individual's natural body resistance
- the presence or absence of complicating factors (such as infection).

Keeping in mind the boom in construction, towns built on sandstone, such as Sydney, present particular hazards. Workers on construction sites around Sydney are at high risk of developing *silicosis*, a serious lung disease caused by the accumulation of silica dust in the lungs. The scarring of the lungs causes stiffening that will obstruct breathing and cause shortness of breath. This can lead to permanent heart and lung disease.

Common building products such as clay bricks, concrete, tiles and fibro cement products contain silica. Silica dust is usually created when such building products, sandstone or rocks are cut, drilled or worked on in a way that creates fine particles



of silica in the air. It is breathing in this crystalline form of silica that causes silicosis.

Workers who are most at risk include those engaged in tunneling and excavation work, road building, demolition work and explosive blasting work, as well as those in slate, granite cutting and glass manufacturing industries, brickmaking and some manufacturing processes.

Synthetic Mineral Fibres (SMF)

SMF are generally a series of products made from fibreglass, rockwool and ceramic. These fibrous products are widely used in buildings for thermal insulation and sound protection and are therefore handled in large amounts by ladders, plumbers and carpenters.

Larger fibres can cause irritation of the skin, eyes, nose and throat while there is a possible risk of lung cancer from some SMF, for example fibreglass.

Custom Wood and Wood Dust

Construction workers doing flooring and wall paneling handle large amounts of particleboard or fibreboard. These custom woods contain **formaldehyde**, which is a chemical that can possibly cause cancer in humans. Machining operations such as sawing, drilling and sanding can generate large amounts of airborne wood dust with this hidden hazard. Inhaling formaldehyde can cause burning sensations in the eyes, nose and throat and a range of other symptoms if higher levels are in the air.

Large wood dust particles can be trapped easily in the nasal passage and are known to cause nasal cancer among woodworkers. Inhaling wood dust also causes chronic lung disease by reducing lung function. Many types of wood (such as oak, western red cedar, blackwood) are known as the cause of occupational asthma, while allergic diseases may be caused by handling and working with timber contaminated with fungi (moulds).

Asbestos

Asbestos is a carcinogenic substance. Health risks arise from the inhalation of asbestos fibres into the lungs. Larger fibres are usually cleared by normal physiological processes but smaller fibres (less than 3 microns) may cause serious health effects, such as asbestosis, mesothelioma, lung cancer and pleural disease, that can take up to fifty years to develop. The risk is greater with increased exposure and even minor exposures can have serious health effects and can cause death.

Despite the ban on the importation, production and use of asbestos in 2003, asbestos containing materials remain in many buildings, plant and vehicles. Workers continue to be exposed the airborne asbestos fibres where inadequate control systems are in place.

Other

Other areas of concern include the Ranger Uranium mine at Jabiru where workers are exposed to dust from Uranium ore and the Groote Eylandt Manganese mine where the toxic effects of Manganese dust is a concern.

b. The adequacy and timeliness of regulation governing workplace exposure, safety precautions and the effectiveness of techniques used to assess airborne dust concentrations and toxicity;

The International Agency for Research on Cancer (IARC) has listed silica [14808-60-7], (inhaled in the form of quartz or cristobalite from occupational sources) as a Group 1: Carcinogenic to humans, (Vol. 68; 1997).

As there is *no safe level of exposure* to carcinogens, occupational and public exposure must be reduced as far as is possible. Based on the adverse health consequences of acute and/or chronic exposure to crystalline silica - it is imperative that public and occupational exposures are kept as low as is possible.

Therefore, the ACTU recommends:

- a prohibition on the use of crystalline silica in any abrasive or other processes which could give rise to silica dust,
- a single exposure standard of 0.05 mg/m^3 for all forms of crystalline silica, including cristobalite, quartz and tridymite, and
- an *action level* of half the national exposure standard ie., at 0.025 mg/m^3 be implemented in state and territory legislation / regulations.

How to control silica dust at work

The only effective protection against silicosis is to prevent silica dust in the air. There are a number of simple control measures that can be taken.

- Substitution
Where possible, less toxic substances should be substituted for silica sand:
 - Olivine and zircon sand should be used in moulds and cores in foundries.
 - Metallic shot, slag products or grit should be used for abrasive blasting (It is now illegal to use sand for abrasive blasting).
 - Alumina should be substituted for flint in china placing in pottery.
 - In some building work, silica dust problems can be eliminated by using pre-built materials for plumbing and wiring.
- Engineering Controls
Tools causing dust for example grinders and saws should be fitted with dust extraction devices. Where possible, dusty processes should be fully enclosed and have an exhaust hood attached. Where this is not possible a local ventilation system should be in place with hoses as close as possible

to the head of cutting tools.

Use tools fitted with a water attachment to suppress dust for example on power saws, jackpicks and scabbling picks. Spraying with water in processes such as grinding or drilling can reduce the amount of dust by as much as 75%.

An American study of foundries showed that overexposure to silica dust resulted from poorly designed and/or poorly maintained ventilation systems.

Regular vacuuming and wet sweeping of floors and machinery to remove settled dust is particularly important to stop dust being kicked back into the air. Work clothing should be vacuumed before removal. Under no circumstances should dry sweeping take place in areas where silica dust could be present.

Posters and signs warning of the presence of free silica should be prominently displayed.

- Respiratory Protective Equipment

This should be looked at as a last resort when all other preventative solutions possible have been put in place. Respiratory Protective Equipment can vary from a simple disposable mask to a full respirator supplying clean air for particularly high concentrations of dust.

In all cases, the equipment should fit properly and be regularly cleaned and checked. Dust masks are unsuitable for use with a beard, and in these cases, an air supplied respirator with a hood or a helmet and visor should be used.

All these preventive measures should not be looked at in isolation but in combination with each other. It is very important that workers potentially exposed to silica dust have a chest x-ray every two years, to allow for early diagnosis. Employers should provide workers with adequate training on the risks of exposure to dust diseases.

Dust levels in the air should be monitored by a competent person. However, exposure levels in settings like construction sites are highly variable and air sampling alone is not enough to indicate the health risks from airborne silica dust.

Enforcement

Regulators must do more to enforce toxic dust exposure levels. This includes regular inspections of workplaces known to generate toxic dust and significant penalties for employers found to be failing their duty of care to provide healthy and safe workplaces.

c. The extent to which employers and employees are informed of the risk of workplace dust inhalation;

Poor or negligent work practices have exposed workers to dust disease hazards. It is the employer's duty of care to provide a healthy and safe workplace. Legislative requirements and guidance notes on controlling dust hazards at work are available throughout the jurisdictions online and from government information centres. No employer can claim that the information is not available.

However, the ACTU would support a national community education campaign be developed by NOHSC and public health and OHS authorities to alert the public and workers to the adverse health effects of exposure to toxic dust including crystalline silica and sources of exposure, including an information/help line.

d. The availability of accurate diagnoses and medical services for those affected and the financial and social burden of such conditions;

Haydn Walters, Director of Medicine at Royal Hobart Hospital told The Australian in the article "Worksite silica dust 'the next asbestos', 18th Jun 2005 that "he believed many former sandblasters suffering from silica-induced injuries had not been diagnosed and their respiratory difficulties were attributed to other causes."

A miner who has been exposed to silica dust for five years can take little comfort from a normal chest film, as it provides no guarantee that they will be free of silicosis in another five years. The best assurance lies in knowing that the airborne silica levels are within safe limits. (*Richard T Gun, Senior Lecturer in Occupational and Environmental Health, University of Adelaide, SA*)

Silicosis is difficult to detect in its early stages because of the absence of symptoms. Frequent dry coughing, shortness of breath, wheezing and increasing tiredness are possible early indicators.

There are three main methods of diagnosis:

1. **Chest x-rays** are the most reliable and the earliest means of detection. An x-ray can show the presence of fibrous tissue.
2. **Work history** is particularly useful in differentiating silicosis from other dust related diseases with similar symptoms and formation, such as asbestosis.
3. **Lung function tests** performed using a *spirometer*, assess the performance of the lungs.

The ACTU recommends governments adequately fund research into improving medical tests for dust diseases, particularly silica and asbestos related diseases with the focus on early detection. Other areas of essential research include improved treatments and work towards finding a cure for dust diseases.

The ACTU recommends a government initiative to screen all former workers from the sandblasting industry in Australia for dust diseases at no cost to the workers.

e. The availability of accurate records on the nature and extent of illness, disability and death, diagnosis, morbidity and treatment;

In NSW, the Dust Diseases Board registers 200 silica related dust diseases per year however that is a very conservative figure based on workers compensation figures only. Dr Thomas Faunce, senior lecturer in medicine and law at the ANU estimates thousands of workers would be directly affected by silica dust caused by sandblasting based on a community register of former employees at Dimet.

The ACTU recommends improvements in data collection across the jurisdictions, including establishing a national medical registry of dust diseases cases.

f. Access to compensation, limitations in seeking legal redress and alternative models of financial support for affected individuals and their families;

Workers' compensation claims in industries where it is known that workers were exposed to toxic dust should be measured on a presumptive basis. That is, due to the nature of the industry it is probable that the worker's disease was caused by exposure to the toxic dust and the onus must be on the employer to prove that it was not.

Statutory benefit schemes must be adequate to compensate workers for loss of income, medical expenses and ongoing care, dependants' support, travel, funeral and other expenses as well as projected superannuation entitlements up to retirement age.

It is necessary for each statutory scheme to enable a claim to be made against the last employer in time and to deem the date of injury (for statutory compensation purposes only) to be the date last worked in potential exposure.

The provisions contained in statutory schemes ought to ensure that a claimant is entitled to weekly payments of compensation for total incapacity in situations where a worker may have some residual capacity for work like activity but is genuinely unable to obtain suitable employment.

In addition most schemes provide for lump sum payments for permanent impairment. It is critical to ensure that the assessment methods utilised by Compensation Schemes adequately assess the extent of impairment and disability. Most schemes rely on the various editions of the American Medical Association Guides for the Evaluation of Permanent Impairment. These Guides are notorious for under assessment of respiratory conditions (other than for advanced conditions). Modification of the Guides, as is currently under consideration in Victoria, may be necessary.

Workers ability to seek common law outcomes must not be restricted by statutory schemes.

g. The potential of emerging technologies, including nanoparticles, to result in workplace related harm.

Nanotechnology is engineering at the atomic scale. One nanometre is a billionth of a metre, or about 1/80,000 the width of a human hair. Nanotechnology works on a scale of up to 100 nanometres. A grain of sand is a million nanometres across. A red blood cell is 10,000 nanometres.

Physical properties of chemicals change at this scale, which creates new possibilities for products and applications. It also creates new and unknown hazards.

Two factors could make nanoparticles a particularly serious occupational risk. Firstly their size alone could present hazards; secondly their massive surface area may adsorb other toxins that can then be transported into the body.

Professor Ken Donaldson of the University of Edinburgh warned that "the development of nanotechnology is predicted to improve our lives, but these very small nanoparticles look to have considerable potential to cause harm to the lungs."

According to the 24 July 2003 issue of *Rachel's Environment and Health News* "current research shows that nanoparticles in the lung cause the formation of free radicals, which in turn, cause lung disease, and cardiovascular disease. Furthermore, nanoparticles carry metals and carcinogenic hydrocarbons deep into the lung, where they exacerbate asthma and other serious breathing problems."

There are concerns that nanoparticles may also cause lung fibrosis and possibly Alzheimer's. *Rachel's* warns of the risks of ramping up the industrial production of nanoparticles similar to those old-style ultrafines already established to be prolific killers. It concludes: "Clearly, in the case of nanoparticles, we have reasonable suspicion of harm, and we have some remaining scientific uncertainty. There we have an ethical duty to take preventive (precautionary) action. If there ever was a proper time to invoke the precautionary principle, this is it."

In May 2004, the European Commission put the industry's value today at Euro 2.5 billion worldwide. By 2011, it could hit the US\$1 trillion mark.

A US Senate hearing in 2003 heard that most of the Fortune 500 companies now have nanotechnology programmes. Household names and major employers in the UK - IBM, ExxonMobil, DuPont, Hewlett Packard - all have had major programmes operational for years.

Already hundreds of nanotechnology-based products are on the market, from new computer displays to self-cleaning windows, from wrinkle creams to wrinkle-resistant pants.



The 29 July 2004 report from the Royal Society and Royal Academy says there are uncertainties about the potential effects on human health and the environment of manufactured “nanoparticles” and “nanotubes” – ultra small pieces of material – if they are released.

Professor Dowling from the Academy said: “There is a gap in the current regulation of nanoparticles. They have different properties from the same chemical in larger form, but currently their production does not trigger additional testing. It is important that the regulations are tightened up so that nanoparticles are assessed, both in terms of testing and labelling, as new chemicals.”

The report says as a precautionary measure releases to the environment be minimised until the effects are better understood. The report recommends that the Health and Safety Executive should review existing regulations and consider setting lower exposure levels for manufactured nanoparticles, in order to provide the proper protection for workers in, for example, university laboratories.

John Howard, head of the US government's safety research body NIOSH told a May 2004 conference: "Very little is known currently about how dangerous nanomaterials are, or how we should protect workers in related industries. Research over the past few years has shown that nanometre-diameter particles are more toxic than larger particles on a mass basis. The combination of particle size unique structures, and unique physical and chemical properties, suggests that a great deal of care needs to be taken to ensure adequate worker protection when manufacturing and using nanomaterials."

The ACTU is concerned about the increasing number of workers exposed to nanoparticles and the lack of regulation of nanoparticle manufacturers.

The ACTU recommends the Australian government hold a National conference before the end of 2005 on nanotechnology as an emerging issue.

The ACTU recommends urgent regulation of nanomaterial manufacturers and importers including regulating that ingredients in the form of nanoparticles undergo a full safety assessment by a tripartite advisory body before they are permitted for use in products.

Urgent regulation of nanoparticle exposure levels must be developed.

The ACTU recommends urgent research into the risks posed to workers and the public by nanomaterials and research into techniques to eliminate the risk of exposure.