

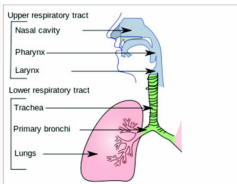
Respiratory protection in industry: Fighting against unseen danger

By Claire Deacon, Occupied cc

Breathing is part of life. Difficulty in breathing must surely be one of the most frightening of experiences. Yet millions of people around the world have experienced asthma, serious colds and flu, and even more serious illnesses that affect the respiratory system.

The respiratory system is simply made up of the nose, the throat, and lungs. The mouth is also used for breathing, as we snore; breathe in smoke from cigarettes, and when we talk. The system is split up into an upper and lower respiratory tract, with the upper section including the nose, mouth, throat and to just above the lungs. The lower respiratory tract makes up the rest and includes the lungs themselves (see Figure 1).

Figure 1. Upper and lower respiratory tract (Wikipedia, 2010).



Each day we breathe in millions of different types of dust particles, some are dangerous, and some are not. When you use that hair spray or deodorant, walk down a dusty road; pat your pet; enjoy your garden or print at your office, you are exposed to dust. Depending on the health of the individual, the reaction to the type of dust will be different. Those that have underlying allergies may have an allergic response, with runny noses, itchy eyes; some may experience an asthmatic response with a tight, wheezy chest.

So what is the problem then with dust? Yes, it all relates to size. The smaller the particle, the further into the lungs it is likely to go. Particles smaller than 5 micrometers (those we can't see with the naked eye) enter the lungs directly. Obviously when the particles enter the lungs it is difficult for the body to get rid of. Generally, the dust clouds we see contain large particles, and cause the sneeze/cough reaction to rid us of the dust.

In a recent report published by the Health and Safety Executive (HSE) (HSE, 2013) in the United Kingdom (UK), an inspector visited a construction site and stopped the work, as workers were being exposed to asbestos without health and safety (H&S) measures being taken into consideration.

Asbestos is the single greatest cause of work-related deaths in the UK, responsible for approximately 4,500 deaths annually (HSE, 2013). Asbestos is present in many buildings around the world, and any work likely to disturb the asbestos generally has many rules regarding the prevention of exposure.

Silicosis is another dreadful disease caused by exposure to silica dust. Silica is found in many products such as sandblasting, grinding, cutting concrete, and working in mining and construction. As with asbestos exposure, silicosis takes many years to develop, so it is often missed until symptoms are well advanced.



Figure 2. Asbestos storage.



Figure 3. Dust caused by mining activities. (Deacon 2012)

Obviously dusts are not the only things we inhale. We also inhale mists, vapours, and fumes caused by various operations at work, such as welding, painting etc.

Most of the mists, vapours and fumes that occur in the working environment will go straight to the lungs, and could also enter the body via the skin.

The critical issue of dusts etc., causing by products (welding fumes, organic and inorganic vapours etc.) caused by the type of work done need to be addressed and workers appropriately protected.

The UK and United States of America (USA) are very aggressive in dealing with those that don't comply with their laws.

Is South African legislation any different?

No. We have excellent legislation in place, but the follow through, and reporting and recording of exposure and incidents leaves much to be desired.

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The H&S culture in SA is like an ostrich, ignoring the real issues, and many workers aren't compensated.

Respiratory PPE is only as good as the quality of the product, its appropriateness and quality.

From page 04 The H&S culture in SA is like that of an ostrich - pretending or ignoring the real issues, the result, sadly, is that many workers who have various forms of exposure to the thousands of products and hazards in their daily work don't get the benefit of being compensated.

The HSE further states that exposure to risk is an inescapable reality, and part of the job. The comment is true, yet largely unnecessary and risk can be reduced or eliminated with the correct actions and hierarchy of control.

The critical issue in dealing with dusts and other dangerous respiratory hazards is prevention. Why should workers be exposed in the first place, and what should be done to protect them? Prevention starts with planning. Planning includes understanding of processes, the plant and materials to be used in a process, and any by-products formed.

Workers can only be adequately protected when planning is turned into action. Action needs to be taken by a range of people, not only the H&S Officer or the Occupational Medicine Practitioner (OMP), or the Occupational Health Nurse Practitioner (OHNP). Actions to manage appropriate protection is wider and involves procurement and production teams to ensure that identified risks are managed appropriately.

My previous articles have dealt with the hierarchy of control, and the management of risk for exposure to products affecting the respiratory system is no different. The supply, wearing and management of personal protective clothing (PPE) can only be described as laborious, time consuming, expensive, and complex to manage. Not to mention that the worker is often, hot, uncomfortable and may have seriously limited vision, resulting in decreased productivity.

Respiratory PPE as with any other, is only as good as the quality of product, its appropriateness and quality. Furthermore, the PPE must be worn properly, and not as shown by Figure 4, where the worker does not have the mask on correctly.



Figure 4. Incorrect wearing of respiratory protection (Deacon, 2004).

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Selection of the correct type of respiratory protection is imperative. PPE could be a simple dust mask to a complex range of full-face respirators, with add on cartridges, or even self-contained breathing apparatus (SCBA). The selection of the correct type of PPE depends on the type and size of dust or other material, as well as identification of all of the processes that could affect the worker.

Once the risks of the processes have all been identified, the hierarchy of control needs to be applied. Engineering out of the risks, limiting access or persons to do the work need to be addressed first. Environmental monitoring in accordance with the Regulations for Hazardous Chemical Substances (HCSs) and international standards will identify the level of risk. In SA only specialized Occupational Hygienists who have been appointed as approved inspection authorities (AIAs) with the Department of Labour can do such monitoring. The report provided will detail what the levels of exposure are, and what the type of PPE is that should be worn for the type of exposure. Policies, procedures and the management of PPE need to be clear, and training given to procurement in terms of purchasing, as well as to workers who have to wear the PPE.

Cleaning and care of equipment is very important, as lack thereof shortens the life span and could cause infections. Medical surveillance would be required where the AIA has identified respiratory risks, as the failure to protect the worker will result in occupational disease and claims against your compensation fund. In larger organizations the OMP, OHNP and H&S Officer should be part of the team that identifies what needs to be done and at what frequency.

There are a number of resources available to determine the type of PPE required and selection requirements. The US Department of Labor has a 'respiratory e-tool site: https://www.osha.gov/SLTC/etools/respiratory/respirator_selection.html that could assist as a guide. Levels of exposure will vary from one country to the next. Exposure levels in SA that are 'acceptable' are very out of date, as the Regulations for HCSs were promulgated in 1995. Assessing other countries levels is advised, and the US and Canadian standards are generally more up to date and excellent resources.

Workers do not deserve to die from exposure to dusts and other respiratory hazards. Most of us just wish to provide for our families and enjoy the fruits of a long working life. - [Tel +27 (0)41 8 11 2 4 7 8, e mail Clair@ocumed.co.za, website www.ocumed.co.za]

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