

COSHH ESSENTIALS – REDUCING SILICOSIS

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A new approach

Evidence gathered in Britain¹ suggested that small and medium size enterprises (SMEs) were having difficulty understanding occupational exposure limits (OELs) and do not monitor exposure to assess compliance. The majority wanted to control workplace exposure to their employees but lacked the necessary skills or knowledge.

COSHH essentials

As a result of these concerns, the Health and Safety Commission's Advisory Committee on Toxic Substances (ACTS) set up a Working Group of industry, trade union, government and independent experts in the mid-1990s to develop a solution. The group observed that the designed specification of most control systems are not sensitively linked to reductions in exposure. Rather, changes in basic control approaches, such as changing from local exhaust ventilation to containment, result in large step changes in exposure. It is possible, therefore, to band risks. To be accessible to SMEs, the challenge was to develop a tool that would function using readily available information. The first step was to simplify the basic risk assessment process:

Hazard + Exposure potential > Risk assessment > Control approach

Within COSHH essentials², hazard is defined by the R-phrases assigned to the substance by suppliers under the EU classification system. The Globally Harmonised System (GHS) for classification, when this is implemented, could serve the same function. The approach allocates R-phrases into five groups of increasing severity, A to E. The substances within each individual group present a roughly equivalent level of hazard and require control to within a narrow occupational exposure range. Exposure potential considers the ability of the substance to become airborne and is represented by the physical properties of the substance (dustiness for solids, volatility for liquids) and the amount used in a unit operation (grams, kilograms or tonnes).

Using this information, COSHH essentials identifies the appropriate control approach for that operation. There are four control approaches. Three of these can be implemented by the user - general ventilation, engineering control (typically, local exhaust ventilation) or containment. The fourth control approach identifies those high-risk activities where a more detailed site-specific risk assessment is required; the user is advised to seek expert help. General information on how to apply each control approach is contained in a short series of control guidance sheets. Task-specific control guidance sheets that give details of how to apply the control approach to specific common industrial tasks complement these. The technical basis for COSHH essentials has been published separately².

COSHH essentials was launched as a free, internet-based tool (www.coshh-essentials.org.uk) in 2002. When first launched, COSHH essentials concentrated on a generic solution for the greatest number of hazardous chemicals. For those hazards

associated with more serious health effects, such as asthma or cancer, and for those hazards generated by the process, such as rubber fume or foundry dust, the user was advised to seek expert help. A generic solution was not considered feasible for asthmagens and carcinogens because they have no threshold of effect and exposure needs to be reduced as low as possible. Process-generated hazards do not have an R Phrase or label, so generic COSHH essentials was not suitable. However, more recent additions are task or substance-specific. They are based on a consensus of good control practice. As such, guidance is now available for process-generated hazards, such as rubber fume, and for processes associated with exposure to asthmagens, such as spraying isocyanate paint. Because much is known about the hazards of these materials, the process and typical exposures, it is possible to give specific guidance on control measures to be applied. The new control advice sheets require no detailed data input from the user: instead, the user selects the appropriate activity, such as rock drilling, fettling castings, dry cleaning, hairdressing, soldering, flour mixing, screen printing or paint spraying. The appropriate control advice can be accessed direct and downloaded for implementation.

Many thousands of on-line risk assessments have been completed since the launch of COSHH essentials. HSE is building on this success to develop advice to reduce lung disease from silica in many industries, including quarrying, construction and brick making. Other priority sectors include printing, welding and agriculture. This task-based guidance is the result of extensive consultation with industry, academia and experts in control.

Adequate control

The main legislation for workplace control of chemicals in Britain is the Control of Substances Hazardous to Health Regulations (COSHH) ⁴. Recent amendments to COSHH introduce a new approach for controlling hazardous substances. The key changes shift the emphasis towards using good control practice: control is only considered adequate if:

- a) the principles of good control practice are applied,
- b) any workplace exposure limit is not exceeded and
- c) exposures to agents which cause asthma and cancer are reduced as low as is reasonably practicable.

The principles of good control practice are defined in a new Schedule to the Regulations.

Disease Reduction Programme

In 2002, Britain's Health & Safety Commission agreed a new Chemicals Strategy that includes a Disease Reduction Programme (DRP). One of the primary thrusts of this strategy is to place more emphasis on those activities that have a direct impact in the workplace. Interventions will be focussed more on improving control at the point of use. DRP aims to deliver a 3% reduction in the incidence rate of chemically induced ill health by 2007/8, by targeting the three priority areas of skin disease, respiratory disease and cancer. The respiratory disease strand involves projects for reducing

asthma and long-latency diseases. The latter focuses on Chronic Obstructive Pulmonary Disorder (COPD), a term that encompasses illnesses such as bronchitis and emphysema. The target substances for this part of the programme include silica and welding fume.

Silica essentials

Crystalline silica, as quartz, is ubiquitous in British industry. It is found in varying amounts in almost all types of rock, sands, clays, shales and gravel and is a major constituent of construction materials such as bricks, tiles and concrete. Many common workplace activities such as cutting, drilling, grinding and polishing, produce fine dust containing respirable crystalline silica (RCS). As a result, there is very widespread occupational exposure to RCS in a diverse range of industry sectors including mining and quarrying, construction, ceramics, heavy clay, foundries and stonemasonry. HSE estimates that at least 100,000 workers are regularly exposed, but many more workers may be exposed on a less regular basis

Research carried out for HSE⁵ indicates that the risk of silicosis begins to increase steeply when average daily exposures to RCS exceed 0.1 mg.m^{-3} .

Table 1. Risks of developing silicosis

15 years exposure to respirable crystalline silica (8-hour TWA) mg.m^{-3}	Predicted risks of developing silicosis* within 15 years following exposure. * normally associated with some breathing impairment
0.02	0.25%
0.04	0.5%
0.1	2.5%
0.3	20%

These risk estimates are based on findings in workers who breathed in dust containing RCS that was produced by mechanically cutting into sandstone. Sandstone is almost pure quartz. The surfaces of the RCS particles to which the workers were exposed had been freshly cut (fractured) and were relatively uncontaminated by other minerals.

In 2002, the European Scientific Committee on Occupational Exposure Limits (SCOEL) issued a recommendation stating that to protect against silicosis, an occupational exposure limit for RCS would need to be below 0.05 mg.m^{-3} . HSE is currently reviewing the OEL for silica. To assist employers comply with their duties, specifically for RCS, particularly those employers in small to medium sized enterprises where there may be a lack of in-house expertise in occupational hygiene, HSE is producing specific control guidance sheets under the direct advice route of its electronic COSHH essentials package. This guidance covers approximately 50 tasks / processes in which exposure to RCS occurs. It comprises easy-to-understand, step-by-step control advice, which is consistent with the principles of good control practice. All contribution to the Disease Reduction Programme, such as silica essentials, will be evaluated to assess their impact in the workplace.

References

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