Why Protect Your Lungs

Evette Boyes
HSENI Scientific Services

Exposure to Respirable Dust & Crystalline Silica causes Lung Disease

- **Silicosis – progressive, irreversible, scarring of the lungs**
- **Acute silicosis – rapidly progressive, often fatal**
- **Lung Cancer**
- **COPD Chronic Obstructive Pulmonary Disease- bronchitis, emphysema, severe breathlessness, prolonged coughing and chronic disability**
- **Tuberculosis, Kidney disease, Arthritis – increased risk of developing disease.**

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Estimated Deaths per year – www.hse.gov.uk

18 – Silicosis *(2013 with similar numbers over the previous 5yrs)*

600 – Lung Cancer related to silica exposure

4000 – related to COPD

Reference - HSE statistics 2014/2015

Workplace Exposure Limit 'WEL'

set in order to help protect the health of workers

WELs = concentrations of hazardous substances in the air, averaged over a specified period of time, long-term (8 hours) or short-term (15 minutes)

Respirable Crystalline Silica WEL = 0.1 mg/m^3

Respirable dust WEL = 4 mg/m^3

Both of these limits are based on an 8-hour reference period

The COSHH Regulations require employers to prevent or control exposure to hazardous substances.

www.hse.gov.uk/coshh.

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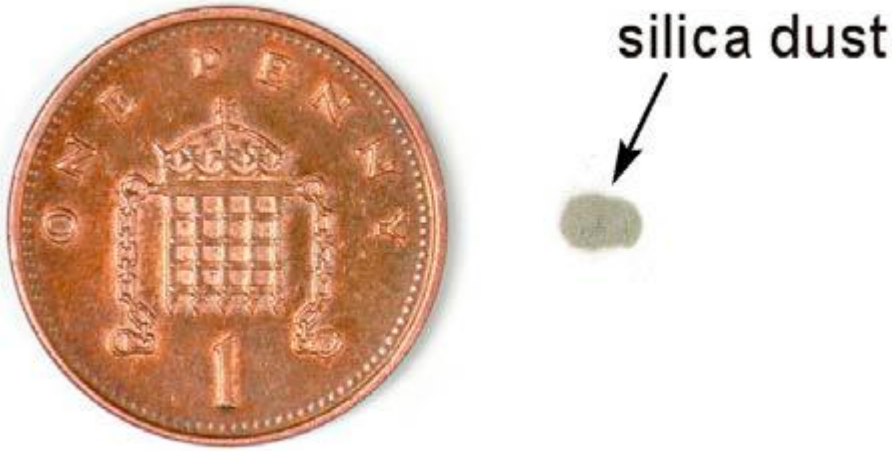

The maximum daily silica exposure is tiny when compared to the size of a penny

Respirable dust sampler

100 µm - thickness of a coat of paint

80 µm - average width of human hair (ranges from 18 to 180 µm)

40 µm - Lower limit of visibility (naked eye)

0.1-10 µm - Respirable dust range

0.1 µm — 90% of particles in wood smoke are smaller than this (ranges from 0.007 to 3 micrometres)

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Range of exposures for job types
Calculated as an 8-hour time weighted average concentration in mg/m^3

Job Title /Description	Respirable dust mg/m^3	Respirable Crystalline silica mg/m^3
Quarry Manager / Site Foreman	0.25 to 1.27	0.05 to 0.22
Plant / Crusher operator Quarry fitter	0.05 to 5.92	0.06 to 1.32
Operator – Shovel, Excavator, Dumper truck	0.09 to 0.32	<0.02 to 0.08
HSENI Inspector	0.22 to 0.44	0.05 to 0.10

Specific Activities – Quarry Manager / Site Foreman

Job Title /Description		Time period measured (minutes)	Respirable dust measured mg/m³	8-hour TWA Respirable dust mg/m³	Respirable Crystalline silica measured mg/m³	8-hour TWA Respirable Crystalline silica mg/m³
Quarry Manager	Involved in a conveyor repair	181	0.24	0.25	0.05	0.05
Site Foreman	General plant maintenance & repairs	136	1.54	1.27	0.20	0.22
	Crusher plant	**126**	0.59		**0.18**	

Specific Activities – Plant / Crusher operator

	Time period measured (minutes)	Respirable dust measured mg/m³	8-hour TWA Respirable dust mg/m³	Respirable Crystalline silica measured mg/m³	8-hour TWA Respirable Crystalline silica mg/m³
1. Control room, operational checks cleaning up spillages. Approx 60 minutes spent cleaning inside crusher on second sample period	148 **118**	0.21 **10.41**	5.92	0.09 **2.27**	1.32
2. As above Approx 60 minutes cleaning outside crusher on second sample period	143 **120**	0.33 **0.10**	0.28	0.13 **0.08**	0.13
3. Crusher & screen plant attending broken conveyor	151	1.21	1.18	0.27	0.26
4. Crusher plant Control room, not remote & not air tight	**145**	**1.04**	1.01	**0.22**	0.21

Specific Activities – Excavator & HSENI Quarry Inspection

Job Title /Description		Time period measured minutes	Respirable dust measured mg/m³	8-hour TWA Respirable dust mg/m³	Respirable Crystalline silica measured mg/m³	8-hour TWA Respirable Crystalline silica mg/m³
Excavator	Air conditioned cab Crusher broken for part of the time and operator Carried out rock transfer and loading during this time	270 *(116-310)*	0.28	0.32 *(0.09 – 0.32)*	0.07	0.08 *(<0.02)* *(0.03 – 0.05)*
K Logan Quarry Inspection	Crusher & screen house plant inspection	141	0.71	0.22 (x1 Visit) 0.44 (x2 Visit)	0.16	0.05 (x1 Visit) 0.10 (x2 Visit)

The COSHH Regulations

require employers to

prevent or adequately control exposure to hazardous substances.

The Principles of good control practice are set out in the Regs - Schedule 2A.

They must all be applied to obtain effective and reliable control.

- Minimise emission, release and spread
- Consider routes of exposure
- Choose control measures proportionate to the risk
- Choose effective control options
- Personal protective equipment & Respiratory Protection – the final control option
- Review the effectiveness of controls
- Provide information instruction and training
- New measures should not create new risks

www.hse.gov.uk/coshh/detail/goodpractice.htm

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Realistically there will always be dust generated through quarrying activities:-

- drilling, blasting, crushing, screening
- disturbance of settled dust
- cleaning or maintenance
- walking / vehicle transport
- natural air movement & windblown dust

Protect the worker from the dust –

Minimise & suppress the dust – work methods, process control

Remove the requirement for the worker to be in the area - design and automate the process

Isolate the worker – refuges and control rooms, remote from the working area

Clean and maintain plant, working area, refuges, vehicle cabs – remove dust use a vacuum with high efficiency particle (HEPA) filter or wet cleaning methods

Respiratory Protective Equipment – RPE is a last resort and may be needed in addition to all of the above

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Respiratory Protective Equipment – must be

Adequate for the amount of dust

P3 Filter or greater if required

- **FFP3 disposable or half mask gives a protection factor of 20**
- **Full face P3 filter respirator = PF40**
- **Powered respirator masks or hoods with helmets = PF40**
- **Constant flow airlines with mask, hoods, helmet = PF40**

Suitable for the purpose & compatible with other PPE

Face fitted for the individual operator (clean shaven)

Worn Correctly - Filters and disposable masks changed regularly

Kept clean, maintained & stored to prevent contamination

Regularly examined and tested and records kept

Training - to use, check & clean the respirator

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FFP3 disposable or half mask gives a protection factor of 20

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Full face P3 filter respirator = PF40

Powered respirator masks or hoods with helmets = PF40

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Constant flow airlines with mask, hoods, helmet = PF40

Constant flow airlines with Full Suit = PF10 to 200

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Health Surveillance – for those exposed to respirable crystalline silica

must be provided for –

- Workers who are regularly exposed to RCS dust and there is a reasonable likelihood that silicosis may develop.

- Where there is reliance on RPE as an exposure control measure

- Employees who have been exposed to RCS for 15 years (working for one or more employers) should be given a PA Chest X-ray.

COSHH Essentials : General Guidance G404

Health Surveillance for those exposed to respirable crystalline silica (RCS)
Supplementary guidance for occupational heath professionals
(amended January 2016)

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HSE Web Communities – Quarry and Stone Workers

'STOP DUST BEFORE IT STOPS YOU'

HSE – Video

Introducing and Managing Respiratory Protective Equipment in the Workplace

HSE - HSG53

Respiratory Protective Equipment at Work

HSE - INDG 463

Control of Exposure to Dust

www.hse.gov.uk

COSHH Essentials in Quarries - Silica

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Thank You