Workplace Dust

Risks, Control Measures and Monitoring Exposure

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The RISKS!

Different Risks = Different Exposure



Products – Wood, Tiles, Stone

Processes – Cutting, Loading

Dusts Types – Silica, Wood



Working together to beat occupational cancer – spotlight on silica

iosh

BOHS
The Chartered Society for Worker Health Protection

HSE

Silica Dust

Lung cancer deaths from silica dust exposure at work – global estimate

28,000 people die every year!



Lung cancer deaths from silica dust exposure at work – British estimate

Around **800 people die** a year – an average of **15 a week***

* 'The burden of occupational cancer in Great Britain', HSE

900 new cases of lung Cancer **every year** in UK from historical exposure to silica dust





Where is silica found?

How much silica is there in materials used in working environments?



Basalt (5%)



Limestone (5%)



Concrete (25-70%)



Granite (30%)



Red Brick (30%)



Slate (40%)



Quartzite (>70%)



Sandstone (>70%)

ARTIFICIAL STONES (up to ~ 95%)

How small are silica dust particles?

The same size as…

- a grain of salt
- a grain of beach sand
- a grain of tree pollen?



How small are silica dust particles?



1000micrometers = 1 millimeter

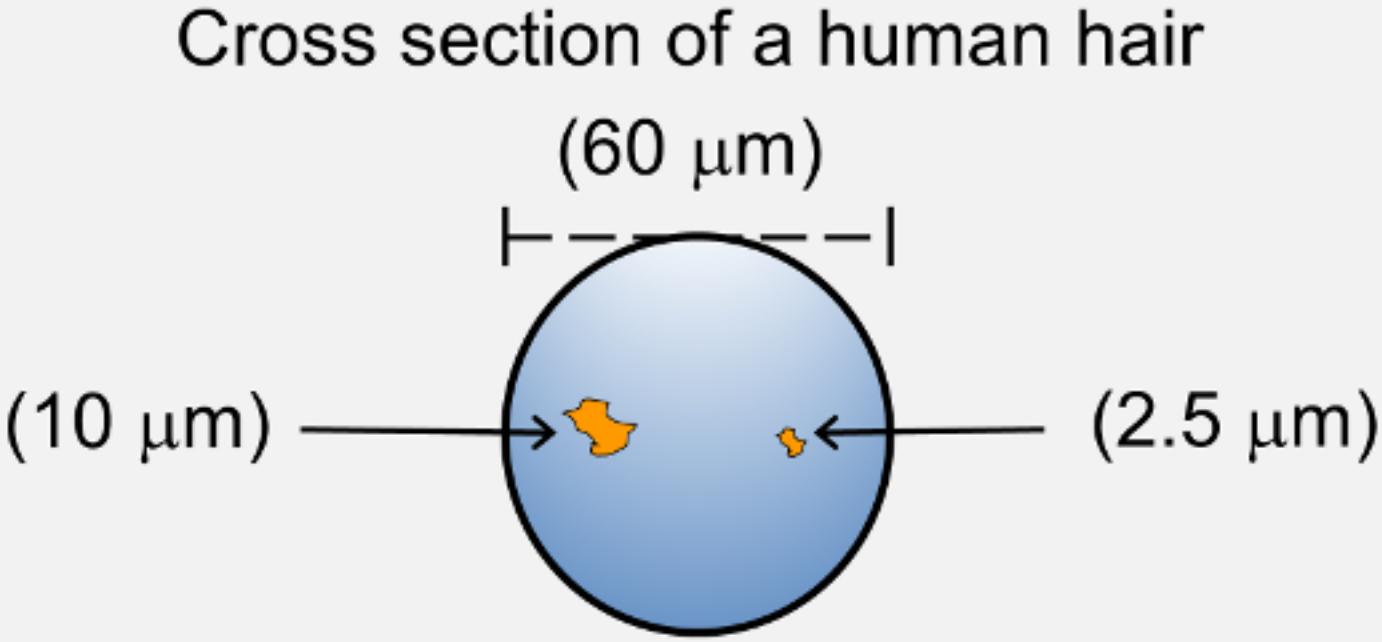
Grain of salt = 300 micrometers

Grain of beach sand = 62.5 –125 micrometers

Grain of tree pollen = 12 micrometers

A particle of respirable crystalline is <5 micrometers

60 times smaller than a grain of salt

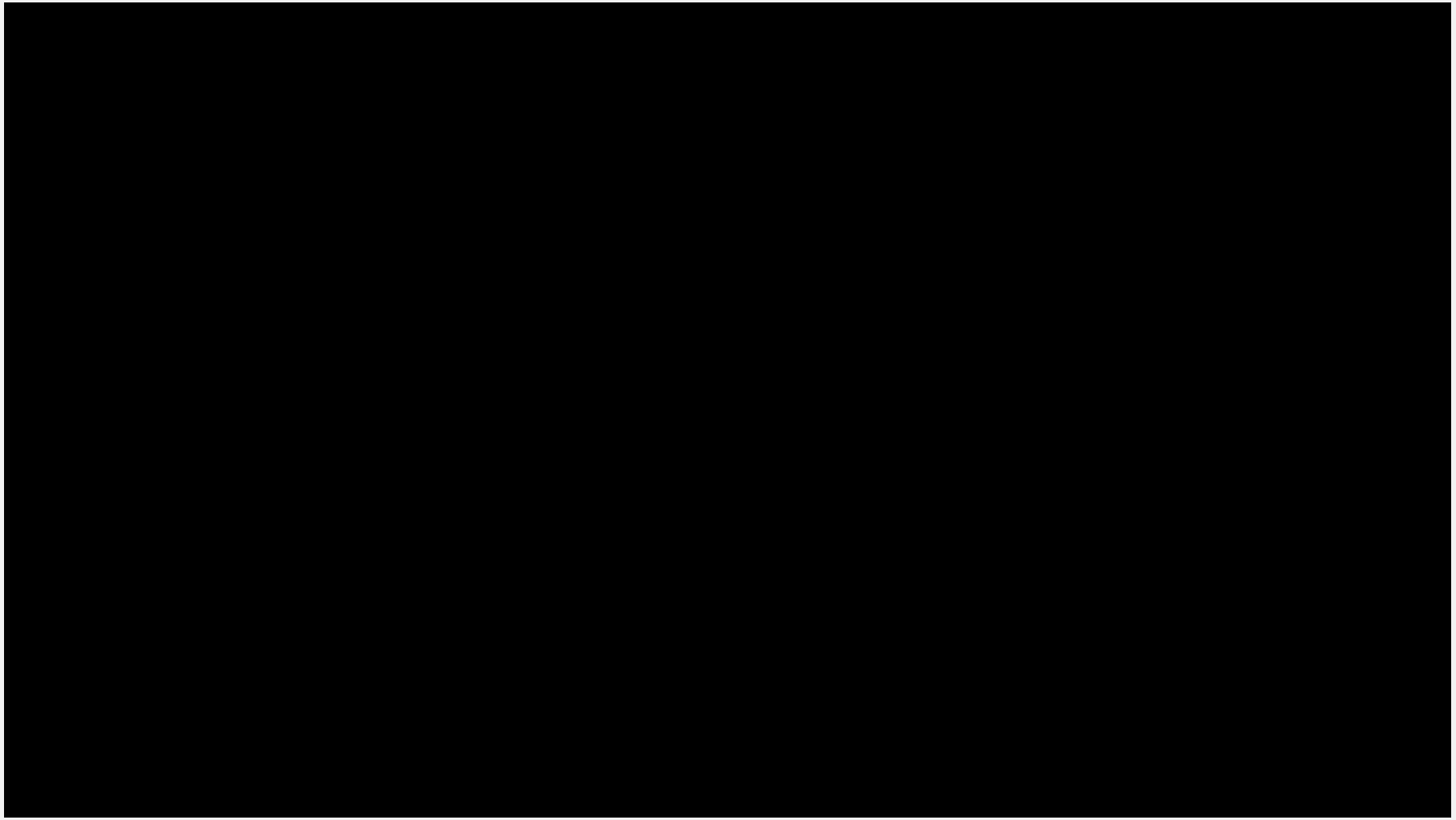


A particle of silica dust is 10 times smaller in size than the width of human hair



One 40,000th of a teaspoon of dust = 0.1mg/m3 (WEL),

Maximum daily exposure limit according to EH40:2005



© Worksafe BC



Health effects

Lung cancer - one of the most deadly forms of cancer. Symptoms could include:

A persistent cough for more than a few weeks or a change in a cough you've had for some time

Coughing up phlegm with spots of blood in it
shortness of breath

A pain in the chest or shoulder that won't go away

Appetite loss / Fatigue

Sudden or unexpected weight loss

Silicosis

Very fine silica dust particles get breathed deep into your lungs.

You can’t cough the dust particles out, and it’s difficult for your body’s natural defence cells to get rid of them.

So they stay there, and can keep making part of your lungs inflamed. This constant inflammation can lead to scarring, Silicosis.

Types of Silicosis

Acute silicosis: Develops within weeks to months after extremely high exposure.

Accelerated silicosis: Appears within 10 years of high-level exposure.

Chronic silicosis: Most common; develops after more than 10 years of lower-level exposure

Symptoms of Silicosis

Early stages may show no symptoms. As the disease progresses:

Shortness of breath

Persistent cough

Fatigue

Chest pain

Weight loss

Silicosis Exposure Statistics

Global silicosis cases in 2019 – **139,971**

An increase of **64.61%** since 1990

12,900 deaths globally per year

It is estimated that millions of employees are exposed to silica dust at work today

Here are some examples:

Silicosis Exposure Statistics

500,000 in the UK



5 million in the EU



2.2 million in the USA

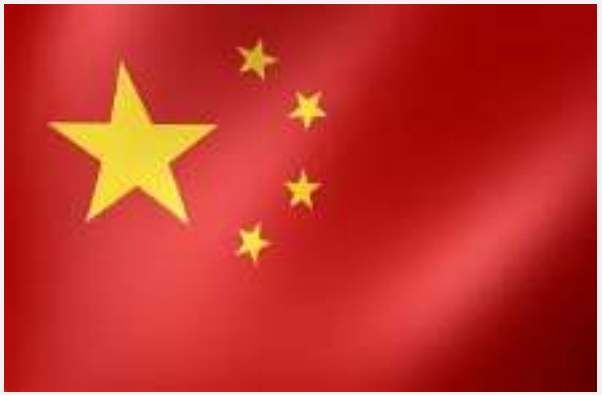


Silicosis Exposure Statistics

10 million in India



23 million in China



Silica dust at site?





Task Exposure

- Close work

Site Environment Exposure

- Dust clouds, wider dispersion, dust deposits

Silica dust in Construction Industry?



- Material Works
  - Handling dry products (cement)
  - Packing
  - Disposal
- Repairs/ preparation
- Cutting tiles
- Drilling




Silicosis Damage
Healthy Lung

Wood Dust



Wood Types



Hardwood Dusts: Deciduous trees (e.g., beech, ash, oak, mahogany, teak).

Hardwood dust is classed as a carcinogen and a sensitiser (repeated exposure can lead to allergic reactions).

Softwood Dusts: Primarily from coniferous trees (e.g., Scots pine, yew, cedar). Softwood dust is also a sensitiser.

Wood Dust Sources

Softwoods

SPF (Spruce-Pine-Fir): Standard wall framing; lightweight, cost-effective.

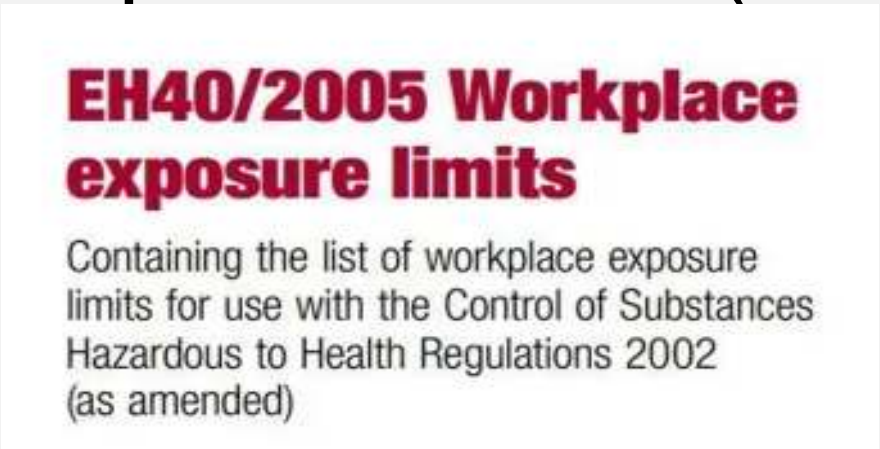
Douglas Fir-Larch: High strength and stiffness; ideal for rafters, beams, and high-load areas.

Southern Yellow Pine (SYP): Very strong; used for floor joists and long spans.

Hardwoods

Oak, Maple, Teak, Mahogany: Flooring, trim, due to density and wear resistance

Workplace Exposure Limits (WEL's)



Softwood dust: 5 mg.m-3 (inhalable fraction)

Hardwood dust: 3 mg.m-3 (inhalable fraction)

If hardwood dust is mixed with other wood dust (softwoods), the stricter WEL for hardwood dust (3 mg.m-3) applies to the entire mixture.

Wood Dust



Over 2023 / 2024 the HSE conducted over 1000 inspections for business involved with wood working

78% of businesses weren’t protecting workers effectively

402 enforcement actions

Wood Dust

"As Low As Reasonably Practicable" (ALARP) principle is paramount.

While WEL limits provide a benchmark, the HSE mandates the additional layer of protection: the ALARP (As Low As Reasonably Practicable) principle.

This means that even if monitoring shows exposure to wood dust is below the defined Workplace Exposure Limits, employers are still legally obliged to implement further control measures if they are available and reasonably practicable.

Wood Dust



Wood dust (hard wood) is a human carcinogen and an asthma hazard.

International Agency for Research on Cancer (IARC)

IARC classifies wood dust as a confirmed human carcinogen, causally linked to cancer of the nasal cavity and paranasal sinuses.

Wood Dust



Carpenters and joiners are **four** times more likely to get asthma than other UK workers.

Symptoms include: Wheezing, Coughing, Shortness of breath, Chest tightness, Nasal issues.

Control Measures for Dust



COSHH

Exposure of employees to substances hazardous to health should be prevented, or, where this is not reasonably practicable, adequately controlled.

This is a fundamental requirement of the Control of Substances Hazardous to Health (COSHH) Regulations 2002 (as amended).

Exposure Under Control?

- Risk Assessment/COSHH
  - Where is the hazard used?
  - How is it used?
  - Is dust generated?
  - Are engineering controls used – LEV?
  - Dust suppression / Water Spray on tools
  - Can systems be automated?
  - Can suitable controls reduce exposure?
  - RPE?
  - Minimising personnel exposed/ exclusion zones?
  - Measurements to determine potential exposure?

All under control?



Accurate Monitoring: Regularly monitor airborne dust levels to assess compliance with WELs.

Implement Robust Controls: Prioritise engineering controls such as local exhaust ventilation (LEV) systems, enclosed processes, and dust extraction at the source. Good housekeeping is vital!

All under control?

Portable LEV

HSG258, published by the (HSE)

Thorough Examination and Testing (TExT)

Tested every 14 months by a certified engineer – P601 cert

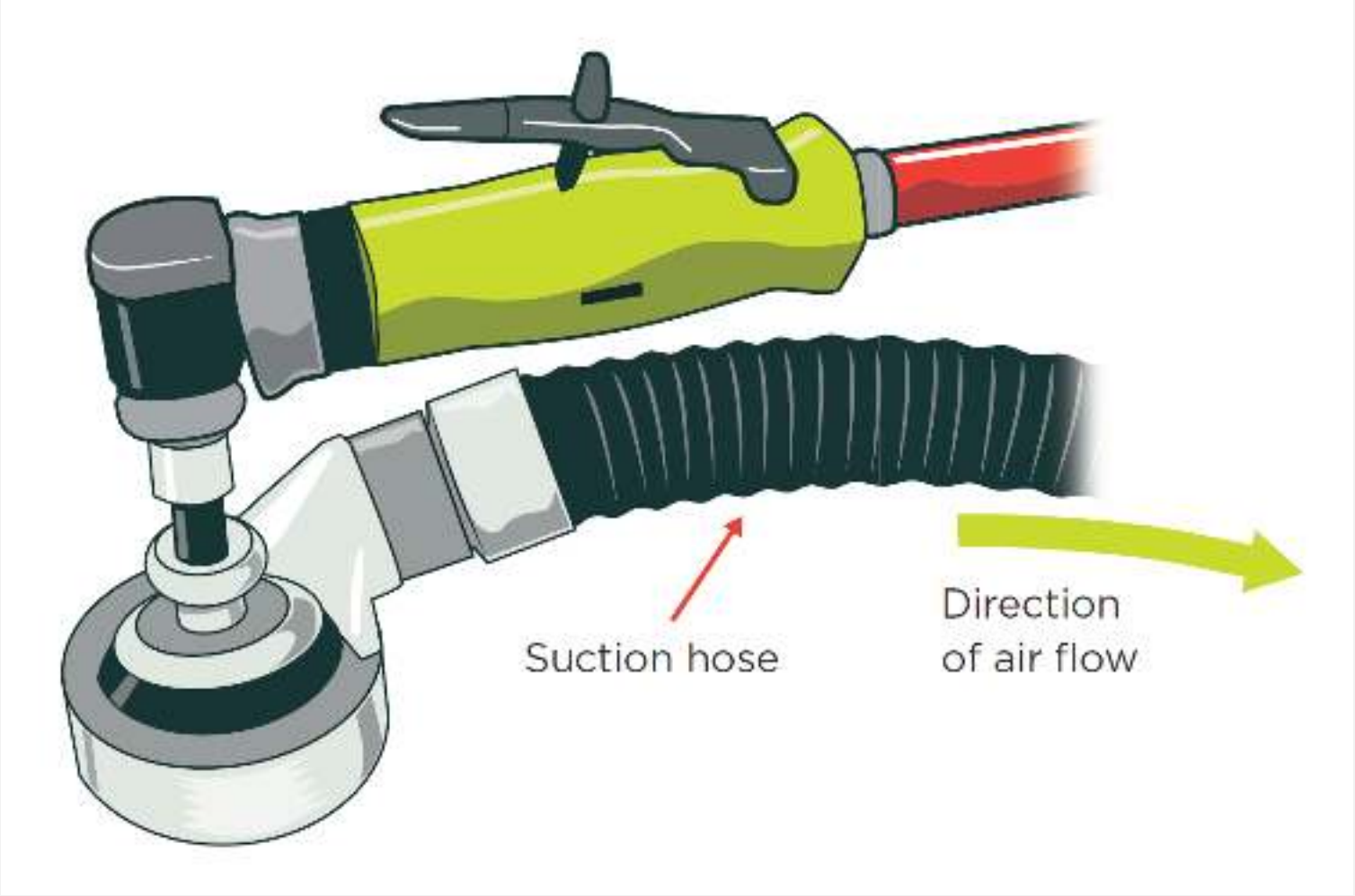


All under control?

On-Tool Extraction: Specially adapted equipment with on-tool extraction systems to capture dust at the emission source.

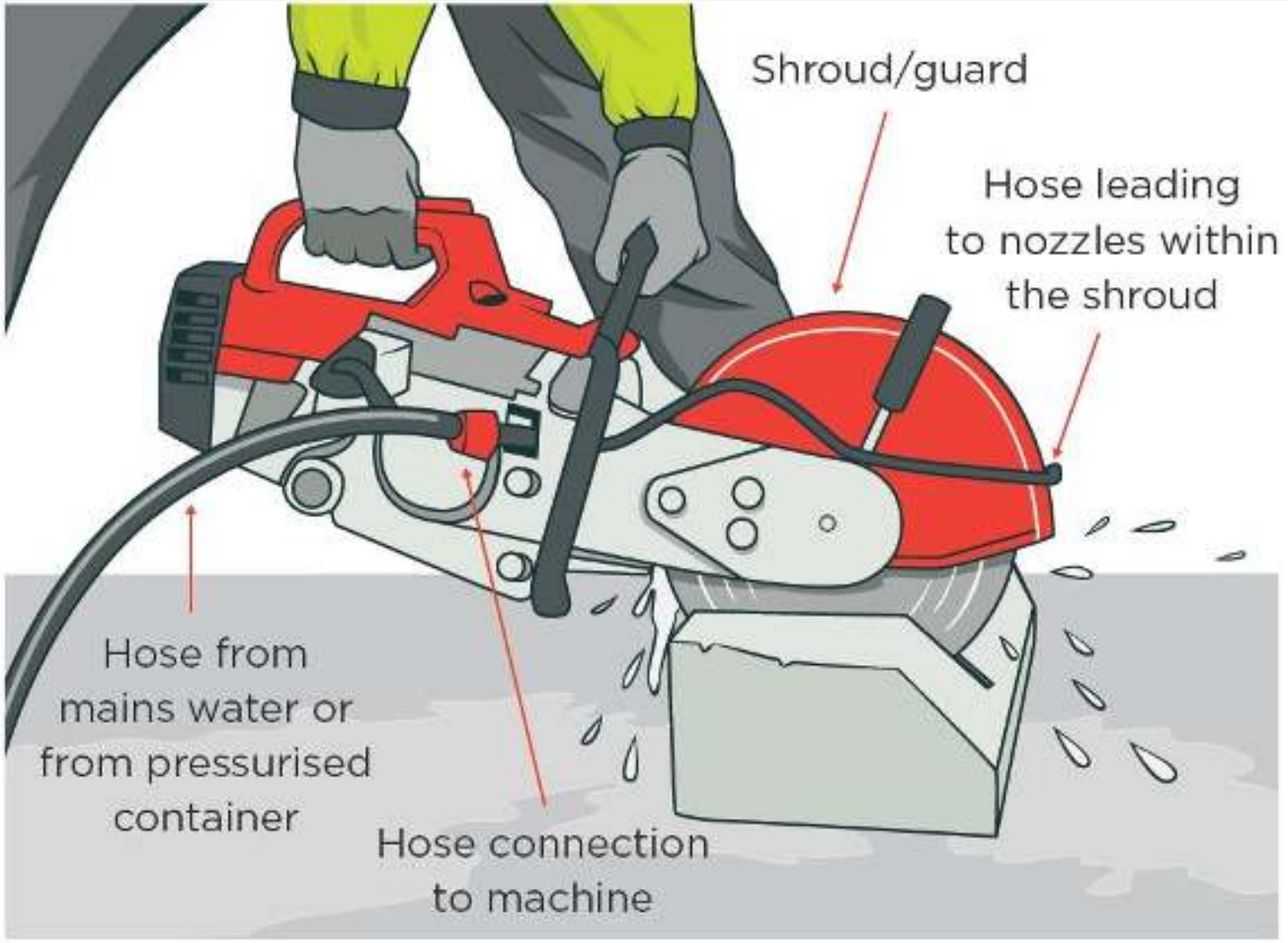
Water Suppression: Implement water suppression systems that fit directly onto tools to minimize dust generation and keep cutting blades cool.

All under control?



On tool extraction

All under control?



Water Suppression

All under control?



Personal Protective Equipment (PPE): Where engineering controls cannot eliminate the risk entirely, provide appropriate respiratory protective equipment (RPE) and ensure workers are properly trained in its use and maintenance. **RPE is always the last option for control, not the first.**

Health Surveillance: Establish a health surveillance programme for employees exposed to dust, focusing on respiratory symptoms and skin conditions.

All under control?

Regular Review: Continuously review your risk assessments and control measures to ensure they remain effective and that exposures are kept ALARP.

Training and Awareness: Educate employees about the risks of wood dust, the importance of control measures, and how to report any concerns.

All under control?



This should not be accepted as the standard!

Dust Exposure Monitoring

Calibrated air sampling pump

Personal & static samples

MDHS 14/4 is the only recognised method to assess WELs.

Representative monitoring



Dust Exposure Monitoring

Filters to be analysed at an accredited laboratory

Visual site inspection on suitability of control measures

Check on suitability of RPE

Done by a trained and certified Occupational Hygienist



SOCOTEC

- UK's leading provider of exposure assessments
- UKAS accredited for dust assessments
- 2000 UK based technical staff
- 10,000 global staff
- National coverage across range of sectors
- Noise, LEV, vibration, welding and full range of environmental and laboratory testing
- Contaminated Land