Construction Professionals

Skillnet

Protecting Workers from Silica Dust – Webinar by Catherine Healy P.h.D – 03/09/2025

Construction Professionals Skillnet is co-funded by Skillnet Ireland and network companies. Skillnet Ireland is funded from the National Training Fund and the European Union through the Department of Further and Higher Education, Research, Innovation and Science.

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General Housekeeping

- 45 mins
- Watch the recording
- Microphones muted
- Ask questions via the Q&A
- 2 min survey, Thank you!

CONSTRUCTION INDUSTRY FEDERATION

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On June 9th the Health and Safety Authority (HSA) began a two-week national inspection campaign focusing on silica dust exposure in construction.

The campaign aimed to highlight the serious risks associated with exposure to silica dust, which can occur anywhere that concrete, stone, or sand-based materials are being used.

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- HSA wanted to make employers aware that they should be identifying hazards and carrying out task specific risk assessments.

- Assessed whether appropriate control measures were in place, to eliminate exposure where possible, and then to reduce exposure.

- Proper use of RPE

Crystalline silica

- Crystalline silica is a common mineral found in the earth's crust.
- Quartz is the most abundant form of crystalline silica.
- Crystalline silica is found in most rocks, sand and clay and in products such as bricks and concrete

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Always be aware of the silica content of the stone you are working with. Stones with higher silica content are more dangerous!

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Respirable Crystalline Silica

- When rocks and other materials containing crystalline silica are cut, crushed, drilled dust particles are produced.
- These dust particles, mostly 10 µm in size and smaller, are too small to see, but can penetrate to the Aveolar part of the human lung when inhaled and cause physiological damage.
- Respirable crystalline silica is 100 times smaller than a grain of sand, allowing it to get into the lungs when inhaled.

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Health effects Overexposure to RCS

- **Silicosis**: Silicosis is a lung disease caused by inhaling RCS. It results in a hardening or scarring (fibrosis) of the lung tissue with loss of lung function.
- **Chronic obstructive pulmonary disease (COPD)**: COPD is a group of lung diseases, including bronchitis and emphysema.
- **Lung cancer**: Exposure to respirable crystalline silica increases the risk of developing lung cancer.

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Overexposure to RCS

The amounts needed to cause this damage are not large. The largest amount of silica someone should be breathing in a day after using the right controls is shown next to the penny.

The OELV for RCS in the 2024 COP for the Chemical Agents Regulations is 0.1 mg/m^3 8hr TWA.

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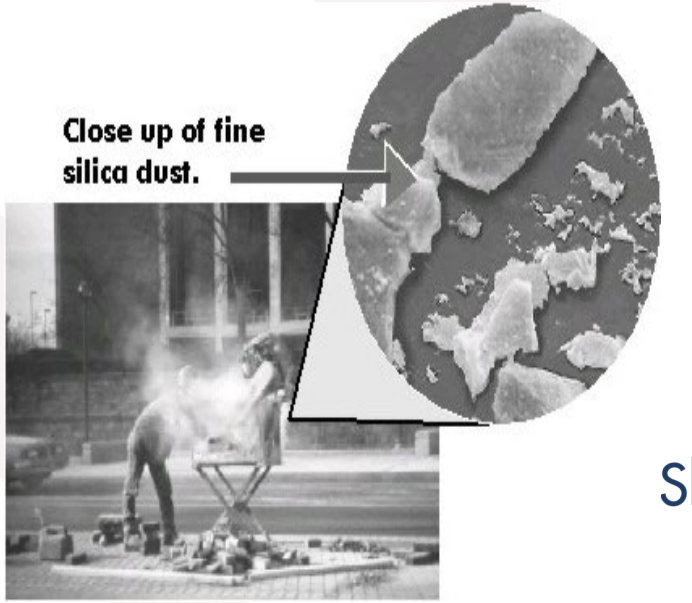
RCS in Construction

Silica is also a major constituent of construction materials such as bricks, tiles, concrete, mortar and engineered stone.

Construction tasks that cut, break, grind, abrade, or drill concrete, mortar, stone, asphalt, and brick have been associated with over exposure to respirable crystalline silica dust.



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Occupational Exposure in Construction

Demolition - 0.01 to 0.91mg/m^3

Drilling Concrete - 0.01 to 1.36 mg/m^3

Roofing - 0.04 mg/m^3 - 1.21 mg/m^3

Tuck Pointing 0.59 mg/m^3 - 2.84 mg/m^3

Concrete Milling 0.03 mg/m^3 - 1.3 mg/m^3

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Current Legislative Overview in Ireland

The OELV for RCS in the 2024 COP for the Chemical Agents Regulations (2001-2021) & the Carcinogens, Mutagens and Reprotoxic Substances Regulations (2024) is **0.1 mg/m^3 8hr TWA**.

Schedule 4, List of **Carcinogenic Substances**, Mixtures and Processes - Work involving exposure to respirable crystalline silica dust generated by a work process.

The employer has the duty to determine and assess the risks for activities in which workers are or are likely to be exposed to carcinogens as a result of their work.

In so far as **technically possible**, employers must reduce the use of a carcinogen by elimination or substitution or the next measure(s) according to the **hierarchy of preventive measures.**

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Overexposure to RCS

The health risks from RCS are almost entirely preventable when exposure to dust is adequately controlled.

Healthy lung vs the lung affected by Silicosis

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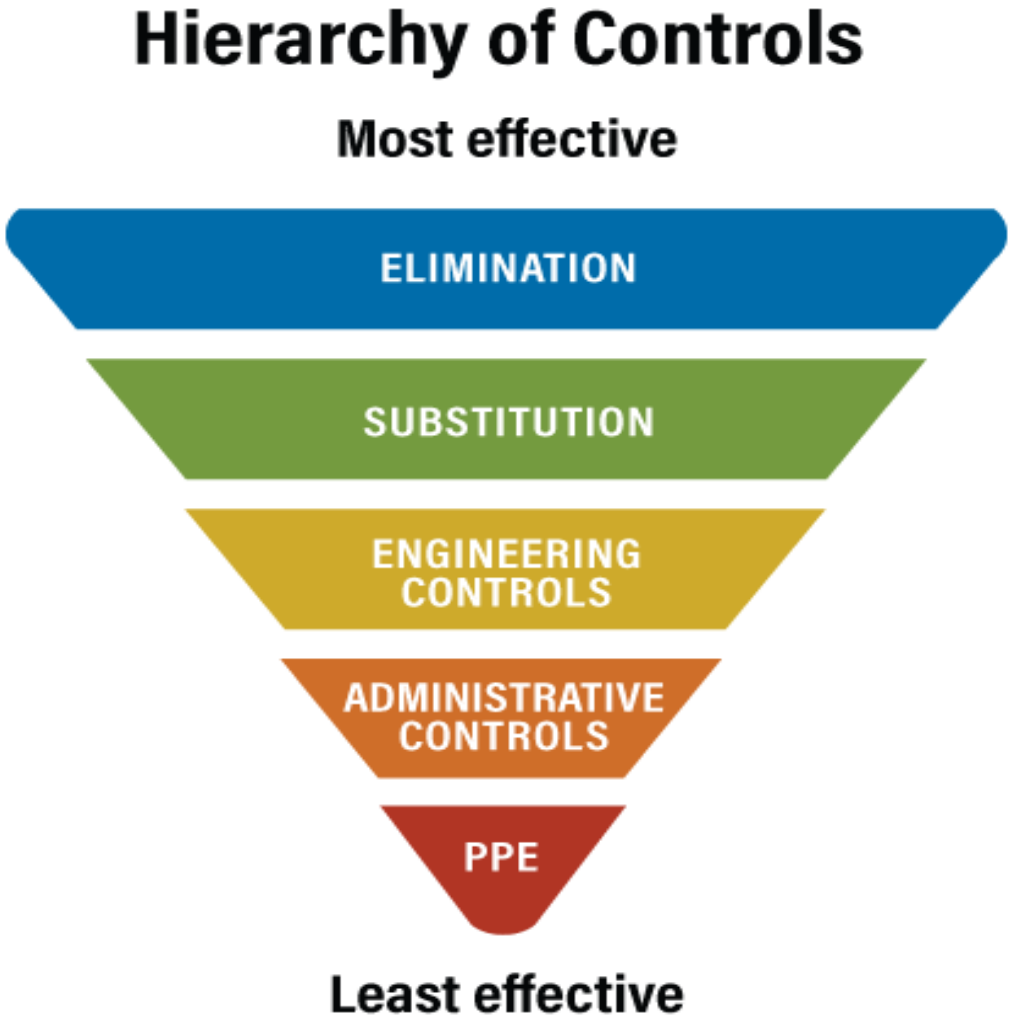
Exposure Controls

The first step to controlling any identified chemical hazard such as crystalline silica is to carry out a Risk Assessment.



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Assess the risks

- Material
- Task – the more energy the work involves, the bigger the risk. High-energy tools like cut-off saws, grinders and grit blasters produce a lot of dust in a very short time
- Work area – the more enclosed a space, the more the dust will build up. <u>However, do not assume that dust levels will be low when working outside with high-energy tools</u>
- Time – the longer the work takes the more dust there will be
- Frequency

Risk score	Risk level category
1 to 4	Low
5 to 10	Moderate
11 to 18	High
19 to 25	Critical

Severity	Likelihood				
	Rare (1)	Unlikely (2)	Possible (3)	Likely (4)	Almost certain (5)
Catstrophic (5)	Moderate	Moderate	High	Critical	Critical
Major (4)	Low	Moderate	High	High	Critical
Moderate (3)	Low	Moderate	Moderate	High	High
Minor (2)	Low	Low	Moderate	Moderate	Moderate
Insignificant (1)	Low	Low	Low	Low	Moderate

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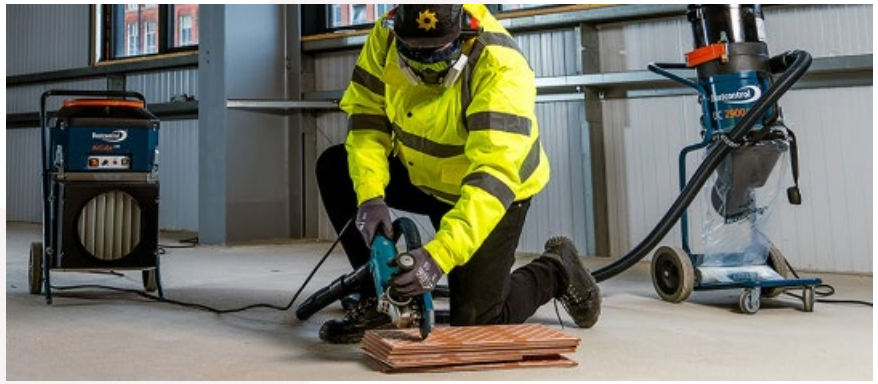
Engineering Controls

- The best way to contain and remove silica dust is at the source. Capturing the dust before it's released into the air greatly reduces the risk of silica dust exposure.

- The most common preventive measure is to add **water** to the cutting, drilling points to supress the particles, preventing them from becoming suspended.

- Where it is not feasible or sufficient to use water suppression, the dust generated at the emission source is usually collected using **local exhaust ventilation** system.

- Use paver and block splitters instead of cutting.



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Water Suppression

On-tool water suppression is a system that fits directly onto a tool and uses water to minimise the amount of dust that gets into the air. It also keeps cutting blades and grinding discs cool.

The system has several parts: a **shroud with spray nozzles** to direct it to the cutting/grinding surface, a **water source** (mains water or pressurised water bottle and a hose).

Adequate flow rate and amount of water provided to effectively dampen down.

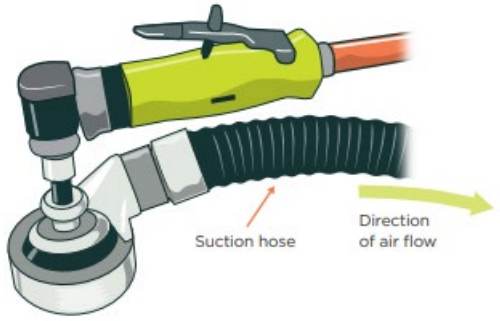
When this preventive measure is used, a system and procedure for cleaning and collection of **sludge** must be put in place to prevent the dust from going into suspension when the sludge dries. For slurry containing crystalline silica, use a Wet H-class vacuum cleaner fitted with a HEPA filter.

On tool LEV

Where it is not feasible or sufficient to inject water, the dust generated at the source of the emission is usually collected using **local exhaust ventilation system**.

On-tool extraction is a type of local exhaust ventilation (LEV) system which is fitted directly onto the tool. The system has several parts: – the tool, shroud and extraction unit.

For effective dust control, it is important to choose parts that are **compatible**.



Involve workers in selecting a system that is right for the task.

Use an H-class vacuum cleaner fitted with a HEPA filter.

The equipment's maintenance programme must take into account clogging of the filters.

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- Dust containing RCS must be cleaned up safely. No dry sweeping, use a vacuum of dust class M or H, or wet cleaning

- Accumulated dust containing RCS is ‘raised’ from the ground or other surfaces by moving vehicles and people

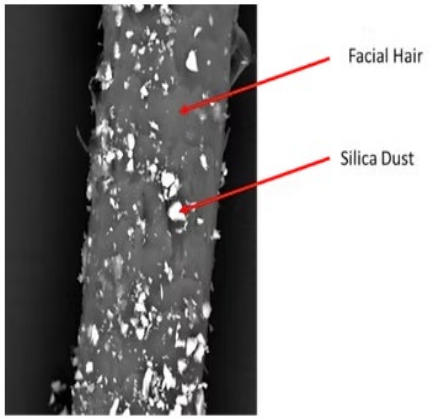
- Do not use compressed air for removing dust from clothing.

- Health Surveillance

RPE

- Nuisance-grade dust masks and face coverings do not protect your lungs.
- RPE is worn as a last resort.
- FFP3 disposable respirator or a P3 particulate filter fitted to a half or full-face mask.
- PAPR
- Any negative pressure RPE worn should be properly fit tested.

RPE and Facial Hair



- You need to be clean shaven for this tight fit type of RPE to work effectively.
- A person who is ‘unshaven’ will mean they have not shaved within the previous 8-hour period prior to the work shift.
- Protection will generally reduce as facial hair grows.
- PAPR Units.

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Occupational Hygiene

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The Occupational Hygiene Team

The Occupational Hygiene team at Shorcontrol Safety is a tight-knit and dynamic group with many years of practical experience between them. As part of Ireland's leading Occupational Hygiene Consultancy, the team addresses hazards such as chemicals, indoor air quality, and noise/vibration, serving sectors like pharmaceuticals, food and drink, aviation, tech, and medical devices both in Ireland and Europe. The team operates from a state-of-the-art head office in Naas, conducting extensive fieldwork and providing expert advice.

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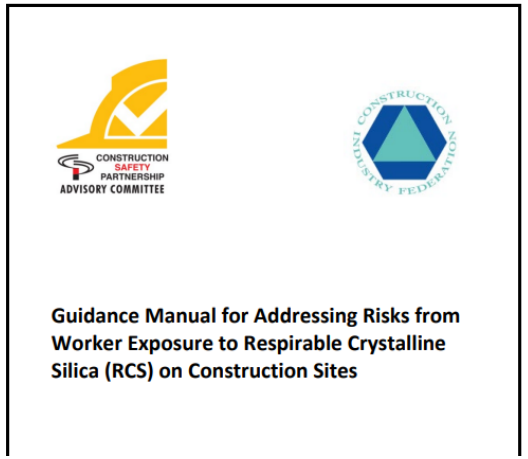
- Noise
- API
- Chemical
- Containment validation /verification
- Whole Body Vibration
- Dust
- Fumes
- Metals
- Thermal/Heat Stress

Guidance and Tools

- Guidance Manual https://cif.ie/download/guidance-manual-for-rcs-dust/?wpdmdl=35534&refresh=68b5b5299bdbc1756738857
- Toolbox Talks https://cif.ie/download/tool-box-talk-dust-prevention measures/?wpdmdl=35536&refresh=68b5b50148c241756738817

- The Construction Safety Partnership Advisory Committee was involved in the Construction Workers Health Trust' Construction Sector Clean Air on Sites Campaign: https://www.cwht.ie/clean-air-campaign/



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Our Training Courses

- Level 8 Leadership
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- Modern Methods of Construction (MMC)
- Excel Skills
- Coaching & Mentoring
- Mental Health Awareness
- Safety
- Professional Skills Development and more…

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