

# Road Worker

## HAZARDS AND RISKS

There are a number of significant respiratory health hazards linked to road construction, in particular, work associated with cutting/drilling/breaking paving blocks, kerbs, flags, concrete and rock; laying and repair of asphalt; and any work carried out adjacent to diesel-emitting generators and site vehicles.

### Silica dust

Silica occurs in many types of stone and concrete. It will be released as a dust during drilling and cutting processes. Inhaling fine silica dust (Respirable Crystalline Silica or RCS) can lead to serious lung diseases, including fibrosis, silicosis, Chronic Obstructive Pulmonary Disease (COPD) and lung cancer. The WHO\* and the ILO\* estimate that approximately 30 people die annually in Ireland from occupational exposure to respirable crystalline silica (RCS).

### Bitumen/asphalt fumes

Bitumen (aka asphalt) is commonly used for road surfacing. Hot bitumen work releases fumes containing Polyaromatic Hydrocarbons (PAHs) particulate, which, when inhaled, can cause irritation of the respiratory tract, eyes and skin, burns, and possibly lung cancer.

### Diesel Engine Exhaust Emissions (DEEEs)

DEEEs contain a complex mix of gaseous components (e.g. nitrogen dioxide, carbon monoxide) and various particulates. Exposure to these substances is more likely when working near to the emissions sources, such as generators and site vehicles like excavators, planers and lorries. When inhaled, DEEEs have been linked to a long term increased risk of lung cancer, as well as a definite risk of respiratory tract irritation causing symptoms such as coughing, breathlessness, rhinitis and wheezing.

\*The WHO is the World Health Organisation and the ILO is the International Labour Organisation. They are both United Nations agencies.

## CONTROL OPTIONS

### Elimination/prevention

#### Silica dust:

- Buy in ready cut materials where possible.

#### DEEEs:

- Use alternative fuels for equipment where possible. For example, substituting diesel fuel with a safer fuel or alternative technology where practicable, eg compressed natural gas, battery powered vehicles or equipment.

#### Bitumen/asphalt fumes:

- Do not exceed the recommended operating temperature for the asphalt mix whilst road laying, as this may cause excessive fumes.

### Engineering controls

#### Silica dust:

- Use power tools with integrated or "on-tool" dust extraction.
- Use water suppression where possible.

#### DEEEs:

- Use diesel exhaust gas 'after-treatment' systems such as catalytic converters.
- Provide mechanical ventilation to prevent accumulation of emissions.

### Safe working methods

Implement job rotation for all tasks to limit one person's exposure.

#### Silica dust:

- Reduce dust generation: use non-electrical saws with water suppression; use block splitters rather than cut off saws; minimise the number of cuts/ breaks.

#### Bitumen/asphalt fumes:

- Keep workers and others not directly involved in the task as far away from the source of the fumes as possible.
- Keep workers away from exhausts.
- Choose vehicles with low level exhausts if possible.
- Locate generators / plant in open areas and clear of confined spaces or provide mechanical ventilation to prevent accumulation of emissions.
- Keep engine idling and revving to a minimum.

### PPE

#### Silica dust:

- RPE should be compatible with any other PPE. Wearers of tight fitting RPE must be face fit tested to ensure the RPE affords each individual the anticipated level of protection.
- RPE selection should be made in line with the risk assessment and with advice from the supplier sought if needed.
- Typically, for road laying activities, this may require either FFP3 rated disposable respiratory protective equipment (RPE) or a reusable half mask RPE with P3 filters with minimum APF20 protection rating.

## MANAGING THE RISK

### Training & communication

Supervision, maintenance and testing of controls and air monitoring are all vital aspects of managing the risk, in addition to health surveillance which can be a requirement in certain circumstances.

### Air monitoring

Air monitoring is a specialist activity. It may be required as a result of a chemical agents risk assessment, as a periodic check on control effectiveness and to assess compliance with relevant Occupational Exposure Limit Values (OELVs), or where there has been a failure in a control (for example if a worker reports respiratory symptoms). A qualified occupational hygienist can ensure it is carried out in a way that provides meaningful and helpful results.

Refer to the current Health and Safety Authority's 'Code of Practice' for relevant OELVs.

To obtain the most accurate and up-to-date information, it is recommended to visit the Health and Safety Authority (HSA) website or contact the HSA directly. The website may have the latest versions of the relevant code of practice, guidelines, and regulations.

<https://www.hsa.ie>

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## OCCUPATIONAL EXPOSURE LIMITS (OELV)

Agent or substance	Control/Exposure Limit	Exposure Levels
Silica - RCS	0.1 mg/m <sup>3</sup> (8-hr reference period)	Different types of stone contain different amounts of silica, with sandstone (70 - 90% silica) and concrete (anything from 25 - 75% silica) typically containing the most, granite, slate and brick at around 30% and limestone and marble 2% silica. All dust exposure levels are affected by the frequency and duration of the work and are likely to be higher in poorly ventilated spaces. Dry working without extraction control is likely to produce the highest levels of dust.
Asphalt/petroleum fumes (benzene solubles) (PAHs)	0.5 mg/m <sup>3</sup> (8-hr reference period)	There is no current OELV for total PAHs although occupational exposure limits are available for some PAHs. Biological monitoring may be carried out for PAHs;  Guidance value: 4 µmol 1-hydroxypyrene/mol creatinine in urine.  Typical airborne levels of benzene solubles to which road workers are exposed have been shown to be 1.3mg/m <sup>3</sup> over an 8 hour shift.
Diesel engine exhaust emissions (DEEEs)	An overall OELV is not set of DEEE. Although the European Commission is considering 0.05 mg/m <sup>3</sup> for elemental carbon which represents the particulate fraction or 'soot' component of DEEE (which is thought to link to the ill-health effects due to PAH absorption onto the soot). The OELV for gaseous components are as follows:	Concentrations of respirable particulates from bitumen fumes and DEEEs during road construction work over an 8 hour shift have shown to be typically 1.5mg/m <sup>3</sup> .
Carbon Monoxide	20ppm/23mg/m <sup>3</sup> (8-hr reference period) and 100 15 /ppm/117mg/m <sup>3</sup> min STEL	
Nitrogen Monoxide	2 ppm (8-hr reference period)	
Nitrogen Dioxide	0.5ppm (8-hr reference period) 0.96mg/m <sup>3</sup> (15min STEL)	

### Further Information:

[Current Chemical Agents Code of Practice 2024 - Health and Safety Authority \(hsa.ie\)](#)

[Control of Chemical Agents: Your Steps to chemical safety \(2011\). A guide for small business - Health and Safety Authority \(hsa.ie\)](#)

[Guidelines on Occupational Asthma - Health and Safety Authority \(hsa.ie\)](#)

[Guidelines on Occupational Dermatitis - Health and Safety Authority \(hsa.ie\).](#)

[A Guide to Respiratory Protective Equipment - Health and Safety Authority \(hsa.ie\)](#)

[Guidance on Isocyanates - Health and Safety Authority \(hsa.ie\)](#)