

# CN8

## COSHH essentials in construction: Silica



This information will help employers (including the self-employed) comply with the Control of Substances Hazardous to Health

Regulations 2002 (COSHH), as amended, to control exposure to respirable crystalline silica (RCS) and protect workers' health.

It is also useful for trade union safety representatives.

This sheet describes good practice using RPE and water suppression.

In larger tunnels, use a filtered air supply to the control cabin.

It covers the points you need to follow to reduce exposure to an adequate level.

It is important to follow all the points, or use equally effective measures.

This sheet does not cover other air contaminants, work in compressed air, or in confined spaces.

### Main points

- Depending on the type of ground, high dust levels result from tunnel excavation.
- Keep the cabin clean - keep dust out.
- Breathing in dust may cause silicosis.
- Keep exposure as low as possible using all the controls in this sheet. Make sure the controls work.

# Tunnelling and shaft sinking

## Control approach R

### Respiratory protective equipment (RPE)

#### Hazard

- ✓ Construction work can produce airborne respirable crystalline silica (RCS).
- ✓ All RCS is hazardous, causing silicosis. This is a serious lung disease causing permanent disability and early death.
- ✓ Silicosis is made worse by smoking.
- ✓ 'Respirable' means that the dust can get to the deepest parts of the lung. Such fine dust is invisible under normal lighting.
- ✓ Keep inhalation of RCS as low as possible.
- ✓ When all controls are applied properly, less than 0.1 mg/m<sup>3</sup> RCS is usually achievable (based on an 8-hour time-weighted average).
- ✓ Tunnelling activities that generate the most dust include: rock excavation by tunnel boring machine (TBM); cutter boom or roadheader; muck handling; blast hole drilling; and rock bolting.

#### Crystalline silica concentrations in common materials

- ✓ See table in sheet CNO.

#### Access and premises

- ✓ Use a permit-to-work for access.
- ✓ Make sure you know who is underground at all times.

#### Equipment

- ✓ RPE is normally needed to reduce exposures to an acceptable level.
- ✓ Arrange for ventilation to dilute and remove harmful substances. You may need a controlled recirculation system with air filtering.
- ✓ You need an air speed above 0.5 metres per second to clear dusty air.
- ✓ Use equipment fitted with water suppression to minimise the amount of dust created.
- ✓ Suppress dust at source with a water spray delivered directly to the cutting heads.
- ✓ In smaller tunnels, ensure that workers wear RPE.
- ✓ In larger tunnels, provide a machine operator's cabin with a clean air supply. See sheet CN11.
- ✓ Fit a manometer or pressure gauge to show that the clean air supply is working properly.
- ✓ Mark the acceptable range of readings.
- ✓ Fit an indicator or alarm to show if filters have blocked or failed.

**Caution: If methane is present you must control explosion risks in the ventilation system.**

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### *Procedures*

- ✓ Check that there is adequate water for dust suppression.
- ✓ Make sure that workers check that their RPE works properly every time they put it on.
- ✓ Always confirm that the control cabin air supply is turned on and working before starting work.
- ✓ Make sure you can get spares easily.

### **Maintenance, examination and testing**

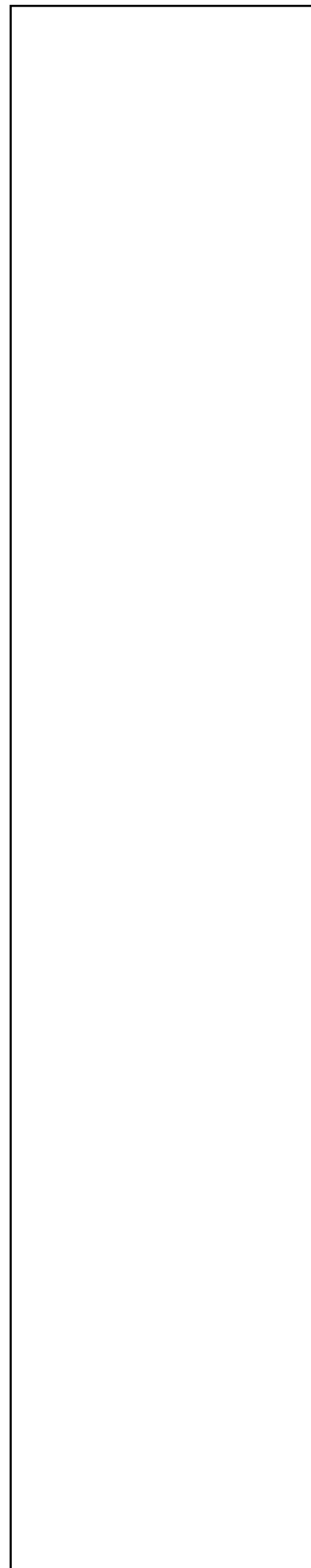
- ✓ Minerals and silica-containing dusts are very abrasive. Plan regular maintenance.
- ✓ Keep auxiliary ventilation systems up close to the tunnel face - extend it regularly.
- ✓ Follow the manufacturer's maintenance schedules - keep equipment in effective and efficient working order.
- ✓ For control cabins and cabs, see sheet CN11.
- ✓ Keep cutters sharp.
- ✓ If the water suppression is faulty, stop work until it is repaired.
- ✓ If the filtered air supply is faulty, stop work until it is repaired.
- ✓ Test alarms at least once a week.
- ✓ Daily, look for signs of damage and stagnant air.
- ✓ At least once a week, check that air filtration works properly. Check the gauge.
- ✓ Keep this information in your testing log-book.
- ✓ Get a competent engineer to examine the system thoroughly and test its performance regularly.
- ✓ Examine and test RPE thoroughly at least once every three months.
- ✓ Keep records of all examinations and tests for at least five years.
- ✓ Review records - failure patterns show where preventive maintenance is needed.
- ✓ Carry out air sampling to check that the controls are working well. See sheet G409.

### **Personal protective equipment (PPE)**

- ✓ Use the company health and safety advisor to get the right PPE.

### *Respiratory protective equipment (RPE)*

- ✓ RPE should not be needed inside the cabin if the filtered air supply is working properly and the doors and windows are shut.
- ✓ RPE is often needed for work outside the control cabin.
- ✓ Powered or air-fed RPE is more comfortable to wear.
- ✓ Select RPE that suits the wearer, the job and the work environment.
- ✓ Decide the level of protection from air sampling data. Otherwise, use RPE with an assigned protection factor (APF) of at least 40. See sheet R4.
- ✓ Make sure all RPE is properly fit-tested - get advice from your supplier.
- ✓ Replace RPE filters as recommended by the supplier.
- ✓ Keep RPE clean.



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### Other protective equipment

- ✓ Provide coveralls that do not retain dust. Use synthetic fabrics - not cotton or knitted.
- ✓ Skin creams help in washing contamination from the skin. After-work creams help to replace skin oils.

**Caution: Never allow use of compressed air for removing dust from clothing.**

### Health surveillance

- ✓ You need health surveillance unless exposure to RCS is well below the limit. See sheet G404.
- ✓ Consult an occupational health professional - see 'Useful links'.

### Cleaning and housekeeping

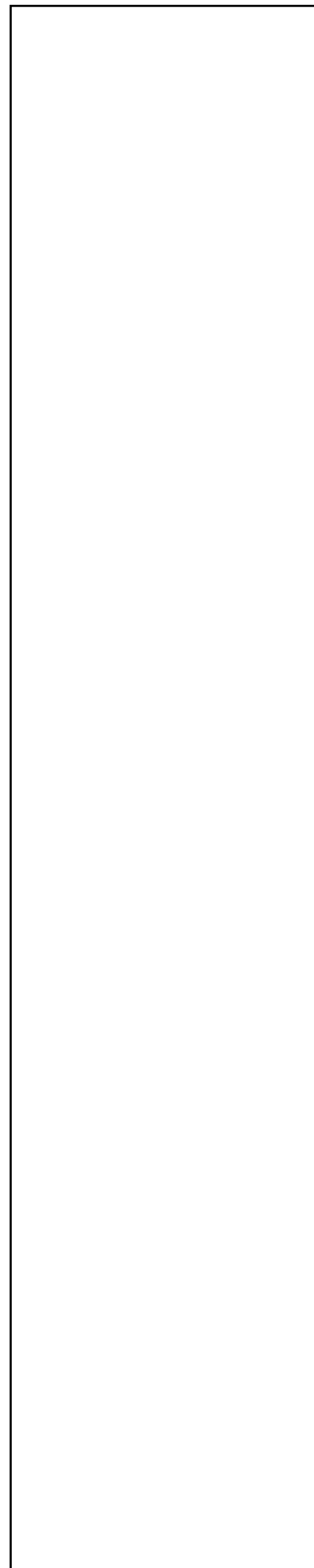
- ✓ Clean the control cabin at least once a week. Fine dust on internal surfaces suggests poor control. See sheet CN11.

### Training and supervision

- ✓ Tell workers that silica dust can cause serious lung diseases.
- ✓ Working in the right way and using the controls correctly is important for exposure control. Train and supervise workers. See sheet CN0.
- ✓ Workers need specific training for tunnel work.

### Further information

- *Respiratory protective equipment at work: A practical guide* HSG53 (Third edition) HSE Books 2005 ISBN 0 7176 2904 X
- *Code of practice for safety in tunnelling in the construction industry* BS 6164:2001 British Standards 2001
- *Permit-to-work systems* Leaflet INDG98(rev3) HSE Books 1997 (single copy free or priced packs of 15 ISBN 0 7176 1331 3)
- For environmental guidelines see sheet CN0



### Useful links

- Construction trade associations may advise on health and safety consultants and training providers.
- For information about health and safety, or to report inconsistencies or inaccuracies in this guidance, visit [www.hse.gov.uk/](http://www.hse.gov.uk/). You can view HSE guidance online and order priced publications from the website. HSE priced publications are also available from bookshops.
- British Standards can be obtained in PDF or hard copy formats from BSI: <http://shop.bsigroup.com> or by contacting BSI Customer Services for hard copies only Tel: 020 8996 9001 email: [cservices@bsigroup.com](mailto:cservices@bsigroup.com).
- Contact the British Occupational Hygiene Society (BOHS) on 01332 298101 or at [www.bohs.org](http://www.bohs.org) for lists of qualified hygienists who can help you.
- Look in the Yellow Pages under 'Health and safety consultants' and 'Health authorities and services' for 'occupational health'.
- Also see [www.nhsplus.nhs.uk](http://www.nhsplus.nhs.uk).

### Employee checklist

- Are you sure how to use all dust controls?
- Check your RPE works properly every time you use it.
- Is the cabin clean air supply working? Are the doors and windows shut?
- Is the water suppression working?
- Look for signs of leaks, wear and damage every day.
- If you find any problems, tell your supervisor. Don't just carry on working.
- Make suggestions to improve the effectiveness of dust control.
- Co-operate with health surveillance.
- Use, maintain and store your protective equipment in accordance with instructions.
- Use skin creams provided as instructed.

**This document contains notes on good practice which are not compulsory but which you may find helpful in considering what you need to do.**

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