GRAB CARD 01

WHAT'S THE DAMAGE?

This card is a good introduction if your group is struggling to see beyond the obvious, visible risks associated with their work.

Start by asking people what could go wrong with the scenarios on the card. For example:

- drilling – immediate physical injury from the tool (moving parts, sharp components), electrocution, vibration-related condition, noise-induced hearing loss
- kerb-cutting – immediate physical injury from the tool (moving parts, sharp components), vibration-related condition, noise-induced hearing loss
- cement bags – manual handling injury, slips or trips
- sweeping up – slips or trips

What do they all have in common? In every scenario, silica dust can be released into the air. If operatives breathe in silica dust, it can eventually result in serious health conditions. Make it clear to participants that these long term health risks can be as severe as the more obvious short term safety risks they probably picked up quite quickly from the pictures.

The long term health effects associated with silica dust are irreversible. Grab card 8, 'How can silica dust harm our health?' goes into more details.

GRAB CARD 02

WHERE IS SILICA FOUND?

Silica is a natural mineral that makes up a large part of materials like sandstone and granite. It's also found in many common products such as concrete and mortar.

Here's a list of some of the materials and products that contain silica:

- stone, such as limestone, sandstone, ironstone, marble, granite
- plastic composites like fillers or composite panels
- concrete
- aggregate
- mortar
- bricks
- tiles
- slate
- shale
- rail ballast

Hand out our 'How much silica?' infographic which shows the percentage of silica contained in typical materials.

Undisturbed silica is safe – it's the dust that's dangerous.

GRAB CARD 03

WHAT IS SILICA DUST?

Silica is a natural mineral that makes up a large part of materials like sandstone and granite. It's also found in many common products such as concrete and mortar.

Silica dust is created when silica is broken down. This very fine dust (known as 'respirable crystalline silica' or 'RCS') is released into the air when people carry out tasks such as cutting, drilling or grinding. The small silica dust particles float in the air for longer than larger dust particles – so there's more chance to breathe them in.

Breathing in silica dust can damage people's lungs, and can lead to serious diseases, including cancer, silicosis and chronic obstructive pulmonary disease.

GRAB CARD 04

WHAT MAKES SILICA DUST?

Anything that disturbs a product or material that contains silica will create dangerous dust:

- breaking, crushing, grinding or milling materials like concrete, aggregate or mortar
- drilling, cutting or sanding things like bricks, slates, concrete or plastic composites
- dealing with cement
- excavating, mining, quarrying or tunnelling
- abrasive blasting or sandblasting
- laying, maintaining or replacing ballast
- handling, mixing or shovelling dry materials that include silica
- using silica, sand or products that have silica when glass and other non-metallic mineral products are made
- using sand as a moulding medium in foundries
- using silica flour (finely ground crystalline silica)
- dry sweeping up after a task where silica dust has been created

GRAB CARD 05

WHICH OF THESE IS RIGHT?

- You won't get lung damage if you blow your nose after breathing in dust
- I'm OK if I'm working outside
- The work I'm doing only takes a short time so I'll be fine
- The dust will clear quickly

They are all wrong.

- Silica dust particles are so tiny that they can get deep into your lungs and damage them – you can't just blow the dust out
- Even when you're outside, you can still breathe in the dust you create when working with materials like stone, bricks and concrete
- A quick task can result in dangerous dust exposure levels
- The very small dust particles float in the air for longer – so there's more chance to breathe them in. Remember that clearing up after a task will disturb the dust again too

Remind participants that even if they decide to take the risk of dust exposure, think about the colleagues they're working with. The dust doesn't stop with the people who make it.

GRAB CARD 06

ARE ALL DUSTS THE SAME?

This is your chance to spell out that some dusts are more dangerous than others. Do some mythbusting around different dusts, especially making it clear that domestic dust is not comparable to stone and other dusts.

Household dust

Breathing in common household dust is unlikely to cause serious health effects. Some people suffer from asthma triggered by an allergy to the house dust mites which are found in domestic dust.

Wood dust

Wood dust can lead to serious health problems. It can cause asthma – carpenters and joiners are four times more likely to get this condition compared with other UK workers.

Hardwood dust can cause cancer, particularly of the nose.

Settled dust contains the fine particles that are most likely to damage the lungs.

Silica dust

Silica is a natural mineral that makes up part of materials like sandstone and granite. It's also found in many common products such as concrete and mortar. The silica is broken into very fine dust (known as 'respirable crystalline silica' or 'RCS') when people carry out tasks such as cutting, drilling or grinding.

Breathing in silica dust can damage people's lungs, and can lead to serious diseases, including cancer, silicosis and chronic obstructive pulmonary disease.

Other common dusts

There are lots of other types of dust that people may be exposed to at work. You can find a list of some of them here, including metallic dusts and moulds and spores: **www.who.int/occupational_health/publications/airdust/en**

GRAB CARD 07

HOW SMALL IS SILICA DUST?

The same size as…
- a grain of salt
- a grain of beach sand
- a full stop at the end of a sentence
- a grain of tree pollen?

This is a trick question – it's actually smaller than all of these. The nearest answer is a grain of tree pollen. Pollen can be a wide range of sizes, but a grain of sweet chestnut pollen is about 12 micrometers. A particle of respirable crystalline silica is smaller still, at less than 5 micrometers. Another way of looking at it is to say that a single grain of table salt, at 300 micrometers, is 60 times bigger than one particle of silica dust.

These very small dust particles float in the air for longer than larger particles – so there's more chance to breathe them in. And it's the tiny size of the silica particles that makes them difficult for your body to deal with when they get breathed deep into the lungs.

GRAB CARD 08

HOW CAN SILICA DUST HARM OUR HEALTH?

Silica dust can be harmful if you breathe it in. Silica dust can cause these diseases:
- lung cancer
- silicosis
- chronic obstructive pulmonary disease – including bronchitis and emphysema
- asthma

Even though some diseases can take a long time to develop, don't forget that they can result in anything from permanent disability to early death.

Lung cancer

Lung cancer is one of the most deadly forms of cancer.

Symptoms 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

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 and, for some people, eventually end with serious lung diseases, including cancer.

According to Cancer Research UK, survival statistics for lung cancer are very poor:
- a third of people diagnosed with lung cancer survive for at least one year after diagnosis
- 5 per cent of people diagnosed with lung cancer survive for at least 10 years
- lung cancer has one of the lowest survival outcomes of any cancer because over two thirds of patients are diagnosed at a late stage when curative treatment isn't possible.

FACILITATOR NOTES

Silicosis
Silicosis is a lung fibrosis caused by inhaling silica dust. There's no cure.

Once inside the lungs, the silica dust particles are attacked by the immune system. This causes swelling and gradually leads to areas of hardened and scarred lung tissue – fibrosis. The scarred lung tissue doesn't function properly.

Symptoms usually take years to develop and you may not notice any problems until after you've stopped working with silica dust. The symptoms can continue to get worse, even if you're no longer exposed.

In most cases, people are exposed for at least 10–20 years before they get the condition, although in a few cases it can develop after 5–10 years of exposure. In rare cases, it can develop after only a few months of very heavy exposure.

The main symptoms are:
- a persistent cough
- shortness of breath
- weakness and tiredness

Silicosis can be fatal if the lungs stop working properly or serious complications develop.

It's a myth that you need to contract silicosis before getting lung cancer, but because breathing in silica dust causes both diseases there is likely to be a higher risk of lung cancer for people with silicosis.

Chronic obstructive pulmonary disease
Chronic obstructive pulmonary disease – often known as 'COPD' – is the name for a collection of lung diseases including chronic bronchitis, emphysema and chronic obstructive airways disease.

COPD is a common respiratory disease. People with COPD have trouble breathing in and out, due to long term lung damage, including narrowing of their airways. It usually only starts to affect people over the age of 35, although most aren't diagnosed until their 50s.

Typical symptoms of COPD include:
- increasing breathlessness when active
- a persistent cough with phlegm
- frequent chest infections

Asthma
Asthma can be a serious health problem.

Symptoms include severe shortness of breath that can stop you from doing the simplest tasks like walking up the stairs or carrying your shopping. Some sufferers are unable to work again.

Other symptoms include:
- wheezing
- coughing
- chest tightness

The symptoms can develop right after exposure to a workplace substance. But sometimes symptoms appear hours later, making any link with workplace activities unclear.

'Occupational asthma' is an allergic reaction that can occur in some people when they are exposed to substances like flour or certain dusts at work. These are called 'respiratory sensitisers' or asthmagens. They can cause a change in people's airways, known as the 'hypersensitive state'. Not everyone who becomes sensitised gets asthma. But once your lungs become hypersensitive, repeat exposures to the substance, even at low levels, may trigger an attack.

GRAB CARD 09

HOW MANY PEOPLE DIE FROM CANCER CAUSED BY SILICA DUST A YEAR IN BRITAIN?

It's estimated that nearly 800 people die a year from lung cancer caused by silica exposure at work in Britain – that's 15 a week. There are thought to be around 900 new cases of lung cancer a year in Britain attributed to past exposure to silica dust at work.

Bring home the statistic about the 15 weekly deaths to lung cancer by comparing it to the participants in your session – is it the same number? Double?

Silicosis – another serious lung disease caused by exposure to silica dust – can also be fatal. Globally, silicosis claimed the lives of more than 46,000 people in 2013.

You can also talk about the millions of people across the world who could be exposed to silica dust at work right now. Here are some examples:

- 500,000 in the UK
- 5 million in the EU
- 2.2 million in the USA
- 10 million in India
- 23 million in China

You may want to share or show our 'Silica dust: fast facts' infographic.

GRAB CARD 10

HOW CAN WE CONTROL EXPOSURE?

1. Use an enclosure or hood to contain the dust and local exhaust ventilation to suck dust away as it's created
2. Wet down the work to keep dust levels lower
3. Use a safer product, for example olivine in abrasive blasting
4. Wear a suitable mask to stop dust getting into your lungs
5. Cut down on how much silica dust is produced in the first place, for example by planning in recesses for pipework and wiring on a new building
6. Fit and use on-tool dust extraction devices to hand-held tools to keep dust out the air

Ask participants to put these control measures in what they think is the best order, with the most effective control first.

This is the correct hierarchy of control for these measures:

1. Cut down on how much silica dust is produced in the first place, for example by planning in recesses for pipework and wiring on a new building
2. Use a safer product, for example olivine in abrasive blasting
3. Use an enclosure or hood to contain the dust and local exhaust ventilation to suck dust away as it's created
4. Fit and use on-tool dust extraction devices to hand-held tools to keep dust out the air
5. Wet down the work to keep dust levels lower
6. Wear a suitable mask to stop dust getting into your lungs

You can ask people to discuss why we would prioritise controls in this way.

Bear in mind that:
- it's difficult to place controls 3, 4 and 5 in a strict hierarchy as the most suitable control measure will depend on the type of work being done
- personal respiratory protection is last in the hierarchy, as engineering and other controls are usually ranked ahead of personal protective equipment. But in the case of controlling dust exposure such as silica, suitable masks will often be needed on top of other measures if air sampling shows there is still too much dust where people are working.

Stress that in some situations a variety of control measures should be used together to control exposure – it's not a case of picking one option.

Talk about the controls used in your organisation.

Removing or reducing dust from the work process should be the first priority, so extend the discussion by getting participants to think about how this can be done, with their knowledge of the job. We've given the example of a new building design that plans in recesses for pipework and wiring but there are lots more. For example, can you get materials cut to size off-site in an environment where exposure can be controlled more easily? Can you change designs or lay-outs so that fewer cuts are needed? Can you use lower energy equipment to work on materials so that less dust is created?

Use our 'Visual standards' photography to illustrate some of the control measures.

GRAB CARD 11

WHY DO WE HAVE TO WEAR A MASK?

Your discussion should tease out points such as:
- operatives need to wear masks while they're carrying out certain activities as we may be unable to control silica dust effectively in another way, for example via ventilation
- operatives have to wear masks, because although other engineering controls are in place, they may not be enough on their own to protect their health

Don't forget to cover other tasks that create dust – for example, clearing up after a dusty job.

You could also talk about using and looking after masks – choose Grab Card 12.

Some people wear powered respiratory protective equipment, either because the work they're doing lasts longer, or because it can be more comfortable.

Do you need to remind operatives that 'nuisance' dust masks won't stop them from breathing in silica dust?

GRAB CARD 12

WHAT DO WE NEED TO DO WITH OUR MASK?

Stress that if participants have been asked to wear a mask, it's to protect them from breathing in dangerous dusts. Remind them that masks are often issued even where there are other control measures in place, for example on-tool extraction – this is because engineering controls aren't always enough on their own.

Key points to consider are:

- make sure that you're wearing the right type of respirator for the job
- have a 'face-fit' test for a tight-fitting respirator to make sure it fits OK
- get trained in how to use, check and clean your respirator
- change the filters regularly – or the respirator itself if it's disposable
- store the equipment in a clean place
- tell your boss if there's a problem with your respirator or if it doesn't fit properly, is dirty or has an old filter

The day-to-day 'takeaways' are:

- check and clean your respirator regularly and store the equipment in a clean place
- change the filters regularly – or the respirator itself if it's disposable
- tell your boss if there's a problem with your respirator, or if it doesn't fit properly, is dirty or has an old filter

Do you need to remind operatives that 'nuisance' dust masks won't stop them from breathing in silica dust?

GRAB CARD 13

WHAT IS A 'WORKPLACE EXPOSURE LIMIT'?

Exposure limits are the maximum allowable concentration in workplace air, usually averaged over an 8-hour working day.

If people are struggling with this question, explain that it's usually what's specified as a maximum under the law – the most they can be exposed to 'safely' over one day. Prompt them to think about what it means in practice.

Explain that the tiny amount of dust next to the coin shows the British workplace exposure limit for silica (it varies from country to country). This is the **most** dust people should breathe in during a single day **after** they've used all the right controls. It's one 40,000th of a teaspoon of dust*.

Use a real coin to help participants visualise the tiny exposure limit for silica. If you're showing this grab card on a screen, remember that the coin and silica dust image will not be life-sized.

*Based on a teaspoon of silica dust weighing 4g. One 40,000th represents 0.1 mg/m^3, the British workplace exposure limit for silica dust. Limits vary from country to country.

Silica exposure limits around the world

Limits are not the same in every country, for example:

- in British Columbia and some other states in Canada – 0.025 mg/m^3
- in Ireland, Italy, Finland and Portugal – 0.05 mg/m^3
- in the Netherlands – 0.075 mg/m^3
- in Britain – 0.1 mg/m^3
- in Poland – 0.3 mg/m^3

There is a trend to reduce exposure limits in many countries. In the US, the American Conference of Governmental Industrial Hygienists has recommended a limit of 0.025 mg/m^3 and the government's Occupational Safety and Health Administration has proposed cutting the limit to 0.05 mg/m^3.

You'll find a list of limit values in Europe at **www.nepsi.eu/media/2307/oel_table_dustqct_may_2010_jan09.pdf**

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www.notimetolose.org.uk/networkrail

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GRAB CARD 14

WHAT CAN WE DO TO MAKE THINGS BETTER?

Remind participants that it's their job and their health. They know more about the task than anyone else.

- Talk about any problems participants have had with controls or equipment
- Get them to suggest solutions based on their own experience

GRAB CARD 15

IS SILICA DUST CONTROLLED PROPERLY HERE? IF NOT, WHY?

Find out if there are any barriers at your business – what's the problem? For example, if feedback from your workforce suggests that the extraction system you have in place doesn't work effectively, then tackle that first to get results.

People are more likely to follow workplace or site procedures if they understand why they are important – so getting this message across is critical. Involving operatives in equipment trials or choosing respiratory equipment means there will be a higher probability of them using it properly too.

GRAB CARD 16

WHAT ARE WE GOING TO DO DIFFERENTLY?

Use this as an opportunity to quickly recap on what's been discussed, and to capture any solutions or recommendations from participants.

Go over learning points from the session. For example:

- if a problem with routinely using on-tool extraction devices has come up, with operatives only using the kit for longer tasks, and ignoring it for shorter jobs, then the 'takeaway' should be: 'Use the extraction device all the time, every time'
- if operatives are using all the right controls each time they carry out a specific task, but are forgetting when it comes to cleaning up after the job, then the 'takeaway' should be: 'Don't forget dangerous dust will still be in the air – and you will disturb it again when you clean up, so use the control measures, including your respirator'

If you're using this grab card to close your session, test participants' understanding of the points you've covered.

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