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Abrasive Systems

A guide to abrasive safety in the workplace

SAFETY BUILT IN

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Contents

Introduction

Like all industrial processes, the use of abrasives involves certain risks, both for equipment operators and personnel nearby. A grinding wheel or disc may routinely operate at 10,000rpm, its edge travelling at speeds of up to 180mph.

In the short term, those risks include the potential for injury from accidental contact with moving components or flying debris and burns from sparks or hot workpieces. Over the long term, they include damage from exposure to dust, noise and vibration.

Managing and minimising these risks forms part of the statutory responsibility of every organisation that uses abrasive tools and equipment. It is also good business practice, as a safe, healthy workforce is critical to quality and productivity. This guide provides an overview of risk management in abrasives operations, highlighting some common hazards and the approaches available to mitigate them.

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Key industry concerns

At 3M's Abrasive Systems Division, our mission is to boost quality, efficiency and productivity through the use of advanced surface finishing products and technologies. A key part of that mission is helping our customers to make their workplaces safer, quieter and more comfortable.

To understand the primary safety issues faced by our customers, 3M commissioned an independent survey of 150 interviews across Europe in four key industry sectors:

- **Fabricated Structural Metal**
- **General Metal Fabrication**
- **Machinery & Equipment**
- **Finer Products & Composites**

Companies taking part in the survey used a range of abrasive tools and equipment, with the most common being right-angle grinders, disc sanders and random orbital sanders. We asked survey participants to highlight the major safety concerns associated with the use of this equipment within their organisation.

The biggest safety risks they highlighted were cuts and similar wounds (41% of respondents) and eye injuries (37%). Fewer respondents mentioned the potential longer-term health risks, such as dust and airborne particulates (25%), hand-arm vibration (11%) and excessive noise (7%).

The majority of respondents felt that the overall level of risk faced by their staff was constant or falling, with many citing improvements in training, education and the use of personal protective equipment (PPE) as important mitigating factors.

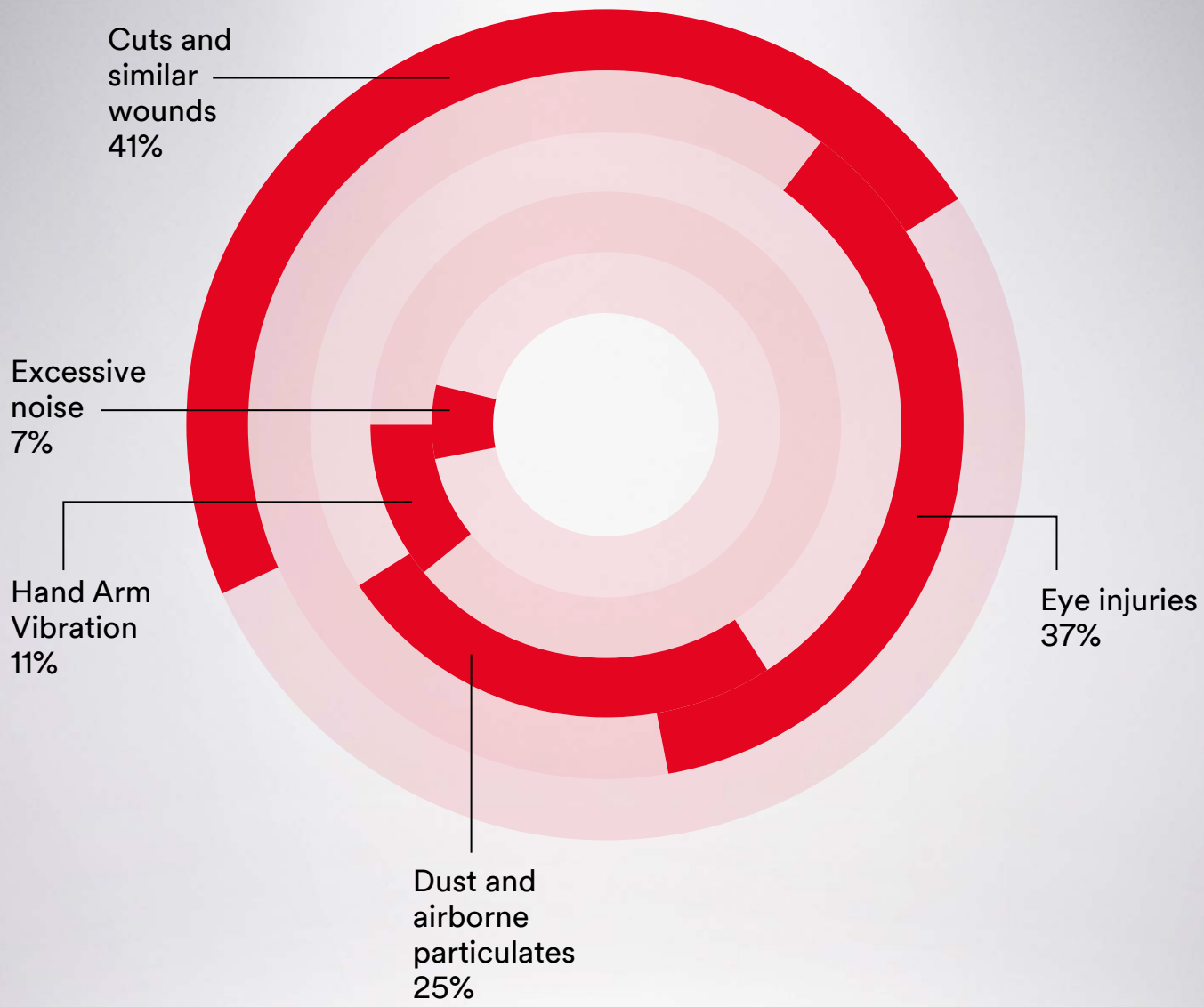
Significantly, however, some respondents noted that hazards with long-term consequences, including noise, dust and vibration, had been underestimated in the past. The relatively low number of respondents who cited these hazards in our research suggests there is still a need to improve their awareness, and for companies to take additional steps to protect their personnel.

Where are abrasives used?

Abrasive products can contain very sharp and hard minerals. They are used to remove material in a controlled manner in order to cut, shape or smooth a workpiece's surface. Abrasives are used in hundreds of applications, including grinding, cutting, weld removal, polishing and finishing, and on many different materials, from metals to fibre reinforced composites. They are an intrinsic part of manufacturing and maintenance processes in a number of industries, from general metal fabrication and construction to high-precision grinding operations in the manufacture of the most advanced aerospace and automotive parts.

Abrasive materials are manufactured in many forms, the most common are sheet materials, discs, belts and wheels. These abrasives are used on a variety of machinery. Common abrasive tools used in many industries include: right angle grinders, disc sanders, random orbital sanders and bench-mounted wheel grinders.

Safety concerns by percentage



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Risk management

Effective risk management in all environments where abrasives are used requires a systematic approach. While the use of appropriate personal protective equipment (PPE) is the most immediately visible part of a workplace safety strategy, it should be considered an organisation's last line of defence, not its first.

Best practice in health and safety management begins with a thorough risk assessment, in which each company identifies hazards: i.e. equipment and activities with potential to cause harm, the nature of the potential harm, the extent of exposure and the people who might be affected.

Where hazards and risks that need to be reduced have been identified, the next step is the design and implementation of appropriate controls to eliminate, or minimise those risks.

There are five fundamental types of controls that can be used in risk management, and these should be applied in a hierarchical manner. The idea behind this hierarchy is that the control methods at the top of the graphic are potentially more effective and protective than those at the bottom. Following this hierarchy normally leads to the implementation of inherently safer systems, where the risk of illness or injury has been substantially reduced.

1
ELIMINATION
Modify the task or workplace so that the hazard is no longer present. *E.g. altering product design, material selection or upstream manufacturing so abrasive equipment is no longer required.*

2
SUBSTITUTION
Replace the hazardous material, equipment or activity with a less hazardous one. *E.g. replacing an abrasive material removal process with a chemical one, using paints, coatings or coverings to provide the desired surface finish.*

3
ENGINEERING CONTROLS
Modify the design or specification of tools or equipment to lessen the exposure to the hazard. *E.g. introducing automation to replace the use of hand-held equipment, ensure guards are used on the tools, installation of appropriate workstation ventilation. Replacing* ***abrasive methods, tools and products*** *to alternatives that present lower risks to operators.*

4
ADMINISTRATIVE CONTROLS
Introduce working practices and procedures that lessen the risk. *E.g. reducing the time workers are exposed to the hazards, rotating workers around particular risks, training for operators, appropriate standard operating procedures, posters and other workplace information.*

5
PERSONAL PROTECTIVE EQUIPMENT (PPE)
Protect the worker with suitable equipment. *E.g. eye, hearing and respiratory protection, gloves, safety shoes.*

Source: Hierarchy of controls originates from NIOSH

Significant process or design changes are beyond the scope of this guide. Its primary focus is on opportunities to reduce hazards through the substitution of alternative abrasive methods, tools and products. In addition, this document describes some of the available PPE options and when these should be used.

Hierarchy of Controls

Most effective

Protection and reliability

Least effective

ELIMINATION

Eliminate or remove the hazard

SUBSTITUTION

Robotic & Automated processes

Replace the hazard with a less hazardous one

ENGINEERING CONTROLS

Reduce exposure, isolate people from the hazard

CUBITRON II

3M™ Cubitron™ II abrasives wheels and discs – powered by 3M Precision Shaped Grain.

ADMINISTRATIVE CONTROLS

Change, improve the way people work

PPE

Protect the worker with Personal Protective Equipment (PPE)

3M Personal Protective Equipment

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Dust

The purpose of abrasives is to cut, shape, finish, clean or remove material from a workpiece. In doing so, abrasive processes remove material in small amounts, resulting in the generation of dust particles. Dust can also be generated from wear of the abrasive material itself during operations. The finer the abrasive, the finer (smaller) the dust particles and the higher the potential risk of breathing in these particles.

What does our 3M market research say?

Our 3M market research indicates that on average 25% of respondents saw dust and airborne particles as a safety concern, however, this percentage increases to 30% in fabricated structural metal and 41% in composites and finer sanding industries.

Health effects

Dust in the air can be hazardous to operators through contact with exposed skin or eyes, or particularly by inhalation. The health effects of dust exposure are linked to the size of the dust particles involved. Inhalable dusts are invisible to the naked eye. Particles less than 100µm in diameter tend to be deposited in the mouth, nose and throat. From there, they can make their way into the digestive tract, causing irritation.

Smaller particles, down to 10µm in size can be deposited in the lungs and particles smaller than 4µm can be carried into the alveoli – the gas exchange regions deep inside the lungs. Small particles can also be transported from the lungs to other parts of the body via the bloodstream and lymphatic system. Moreover, the toxicity of materials tends to rise as particle size goes down, since the relatively high surface area of ultrafine particles increases their ability to react with cells in the body.

Dust exposure can trigger inflammation of the respiratory system and sensitisation, leading to allergic reactions such as occupational asthma. Long-term exposure to metal dusts can lead to breathing problems, with long latency periods such as Chronic Obstructive Pulmonary Disease (COPD) and Pneumoconiosis, as well as respiratory cancers including lung cancer.

What does the HSE say?

The Control of Substances Hazardous to Health (COSHH) regulations set out specific limits for workplace exposure to certain materials in dust form. Those limits are expressed in mg of material per m3 of air, averaged over an eight-hour working day. In some cases, separate limits are defined for larger inhalable dust particles and small respirable particles.

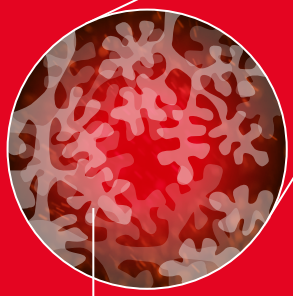
For more information, see: EH40/2005 Workplace exposure limits

Health effects of dust particles

Dust particles lower than 100µm in diameter tend to be deposited in the mouth, nose and throat

They can make their way into the digestive tract, causing irritation

Smaller particles, down to 10µm in size can be deposited in the lungs



Particles smaller than 4µm can be carried into alveoli – the gas exchange regions deep inside the lungs. They can also be transported from the lungs to other parts of the body via the bloodstream and lymphatic system

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Managing dust hazards

Local Exhaust Ventilation (LEV)

Appropriate dust extraction, transport and collection equipment can be used to divert dust and fume-laden air from operators. LEV systems take many different forms. They can be incorporated into the structure of a hand-held tool, or made large enough to accommodate an entire workpiece and several operators.

LEV installations must be designed to ensure an adequate air flow rate for the process, and that hoods or cowlings are sufficient to ensure contaminated air is directed into the system. Any system should incorporate an indicator to demonstrate that it is operating properly and worker operating procedures should include daily system checks. Consideration should also be given to dust exposure risks associated with maintenance tasks such as the changing of filters.

For more information see:
HSE
CIBSE

Appropriate abrasive materials

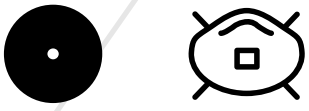
The grade and type of abrasive used for a task can have a significant effect on the quantity and size profile of the debris created. Very coarse grades will produce mostly large particles which will be airborne for a short time. Finer grades will produce small particle dust, which can remain airborne for long periods. The way the abrasive cuts and removes material is also important. Traditional crushed-grain abrasives 'plough' through the substrate, producing small particles of swarf in short chips. 3M Precision Shaped Ceramic Grain (PSG) found in 3M™ Cubitron II™ abrasive products, by contrast, slice through the substrate, producing longer chips which are airborne for less time. These products are also more efficient at removing material, therefore reducing the overall exposure time whilst increasing productivity.

PPE

If dust exposure cannot be reduced to safe levels by other control methods, it will be necessary to provide operators with appropriate PPE. Even with control measures in place, metal working including the use of abrasives can result in relatively high worker exposures to metal particles, therefore, suitable equipment can include gloves, overalls, eye protection and respiratory protective equipment. Care should be taken to ensure that the chosen PPE is both adequate and suitable for the task, fits the operator properly and is worn correctly during all periods of exposure. All respirators need to be inspected, cleaned, maintained and stored in accordance with the manufacturer's instructions.

For more information see:
HSE
Respiratory protective equipment at work – a practical guide

Minimize your workplace risks with engineered 3M solutions:



3M Abrasives & Personal Protective Equipment

In tests on stainless steel and mild steel, **3M™ Cubitron™ II** abrasives removed metal at a faster rate with less wheel wear than conventional abrasive products, therefore helping to reduce exposure to dust.

The stats from the HSE:

Estimates of self-reported 'breathing or lung problems' show 18,000 new cases each year

12,000 lung disease deaths each year estimated to be linked to past exposures at work

An estimated 41,000 people who worked in the last 12 months currently have 'breathing or lung problems' they regard as caused, or made worse by work

Source: HSE

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Noise

Abrasive operations can generate significant noise. It is important to assess the risks this noise might present to equipment operators and colleagues working nearby, and to implement appropriate control measures, such as controlling the noise level at source to ensure safe noise exposure limits are not exceeded.

Health effects

Our hearing relies on our ability to detect small changes in air pressure caused by sound waves as they enter the ear. The human ear is so sensitive that it can respond to pressure changes as small as 20[micro]Pa. Such a high level of sensitivity means the ear is susceptible to damage. A pressure change of 20Pa is sufficient to cause immediate pain. Exposure to noise at well below that level can cause temporary or permanent hearing loss, along with other distressing conditions such as tinnitus. Hearing damage can be caused by a single noise event, or by prolonged exposure to noisy environments.

What does the HSE say?

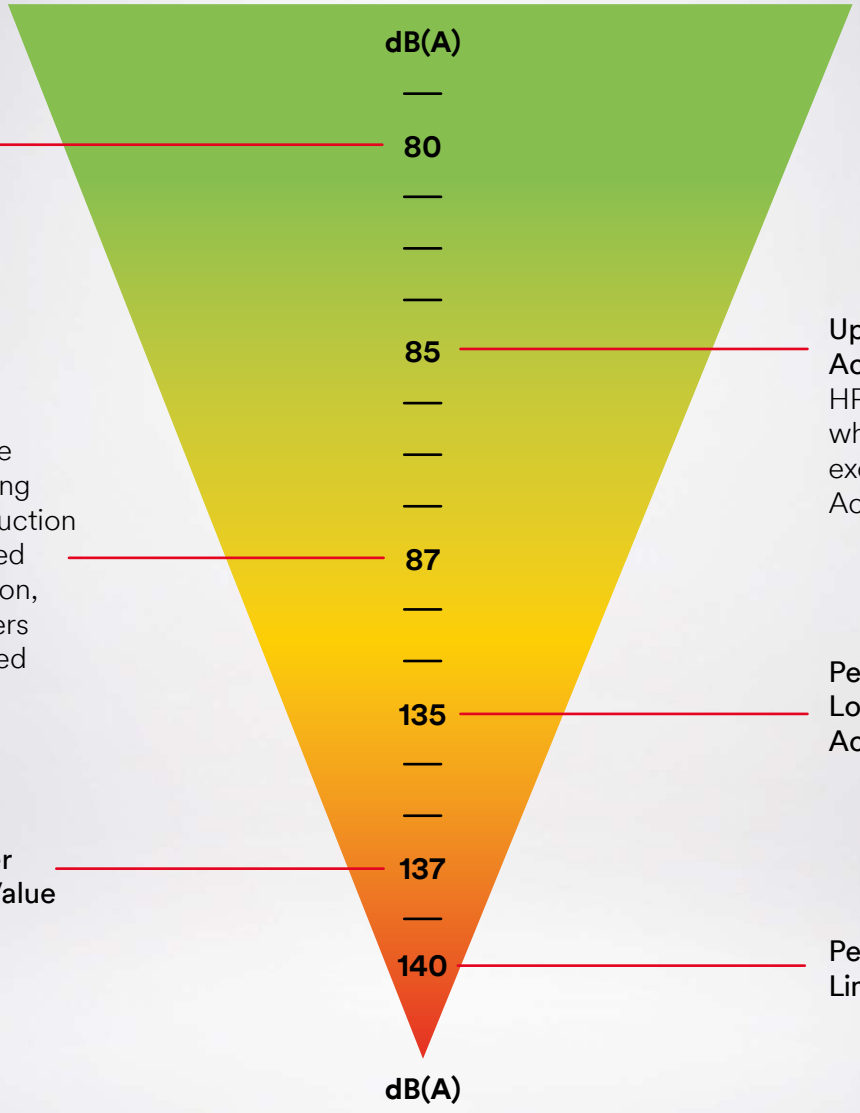
Under the Control of Noise at Work Regulations 2005, employers must prevent, or reduce, noise-related risks to their staff. The regulations set out maximum acceptable levels for average noise exposure (87dB) and peak sound pressure (140dB). They also require companies to take action to reduce the impact of noise if exposure is close to those limits.

For more information see: HSE Noise

What does our 3M research say?

Our independent survey suggests that 92% of organisations provide their staff with PPE to prevent the exposure to excessive levels of noise. A survey respondent outlined the controls they have in place to help reduce noise exposure. A respondent to the survey said “We have thought a lot about how to alleviate the risk of noise. We buy equipment that is designed to produce less noise, we alter the tooling on function machines to reduce noise level and we now only punch metal that is 2mm or thinner and laser the thicker material.”

Control of Noise at Work Regulations 2005



Lower Exposure Action Value
HPE must be provided to individual workers when Action Value is exceeded

Upper Exposure Action Value
HPE must be used where sound level exceeds the Higher Action Value

Exposure limit value of 87 decibels, taking account of any reduction in exposure provided by hearing protection, above which workers must not be exposed

Peak level at Lower Exposure Action Value

Peak level at Upper Exposure Action Value

Peak level at Limit Value

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Managing noise hazards

Limit the duration of exposure

Where noise levels are below the peak sound pressure limit, the noise hazard is related to the duration of exposure. Companies are able to ascertain safe duration exposure by measuring the sound pressure experienced by workers in their daily tasks, taking into account all the noise from tools and the wider acoustic environment to which they may be exposed. Sound level measurement can be made using a hand-held sound pressure level meter, and the HSE provides on-line calculation tools to allow overall noise exposure to be estimated from measured noise levels and typical exposure times. The working environment should then be designed to keep noise exposure within these limits.

For more information see: HSE Noise calculator

Appropriate tools and abrasive materials

The noise generated by abrasive operations depends on multiple factors, including the type of tool in use, the nature of the workpiece, the design of work-holding systems and the wider acoustic environment. The selection of tools and abrasive systems also has a significant effect. Some tools may be equipped with noise control devices, and these should be used where available.

Choosing the right abrasive products could result in differences in sound pressure. For example, replacing a bonded grinding wheel for a 3M™ Cubitron™ II fibre disc or flap disc can help to reduce noise exposure from the grinding operation.

Switching to an alternative product, where a task will accommodate their use, could help towards reducing the overall noise exposure. In many applications, the use of high performance abrasives, can help reduce overall noise exposure by allowing tasks to be completed faster, with less operator “trigger time”, helping to also increase productivity.

PPE

The HSE encourages companies to take a targeted approach to hearing protection, encouraging staff to use protective devices in specific areas and during specific tasks, rather than implementing a blanket policy. Measures can include clear markings on noisy tools to remind operators of the hazard, appropriate posters and signage labelling in noisy areas and procedures that require operators to warn colleagues before starting a noisy task.

Hearing protection can include in-ear, or over-ear designs. The type of protection used should be selected to keep noise exposure down to safe levels, but excessive protection should be avoided as it can negatively affect communication on the shop floor and leave staff feeling isolated. As with all PPE, it is important the hearing protection fits well and is properly stored, maintained and replaced when damaged.

For more information see:
HSE
Respiratory protective equipment at work – a practical guide

Minimize your workplace risks with engineered 3M solutions:

3M Abrasives & Personal Protective Equipment

Replacing a conventional bonded grinding wheel with a 3M™ Cubitron II™ Fibre Disc 982C can reduce noise

17,000 people in the UK suffer deafness, ringing in the ears, or other ear conditions caused by excessive noise at work

Source: 2008/09 Labour Force Survey

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Hand-arm vibration

The use of hand-held abrasive tools, or bench-mounted tools and hand-held workpieces, can expose the operator to vibration. Over time, excessive vibration has been shown to lead to a number of harmful conditions such as Vibration White Finger and Carpal Tunnel Syndrome.

Health effects

Prolonged exposure to vibration transmitted from tools to the body can lead to a range of conditions, collectively known as hand-arm vibration syndrome (HAVS). Vibration can damage the blood vessels in the hand, reducing circulation and creating a condition known as Vibration White Finger. It can also damage nerve endings leading to numbness in the hands and fingers.

Finally, it can cause musculoskeletal damage, affecting the tendons in the wrist and leading to a condition called Carpal Tunnel Syndrome. This leaves sufferers with limited strength and dexterity. Once these conditions take hold, they are irreversible and they tend to become more severe over time if the sufferer continues to be exposed to vibration.

What are the signs of Hand-Arm Vibration (HAV)?

- Tingling fingers
- Loss of strength
- White fingers
- Red finger tips
- Aching hands or fingers

If you experience any of these symptoms, tell your supervisor, or Occupational Health and Safety department

The stats from the HSE:

455 new claims for Vibration White Finger in 2016 in UK

240 new claims for Carpal Tunnel Syndrome in 2016 in UK

Source: HSE Statistics

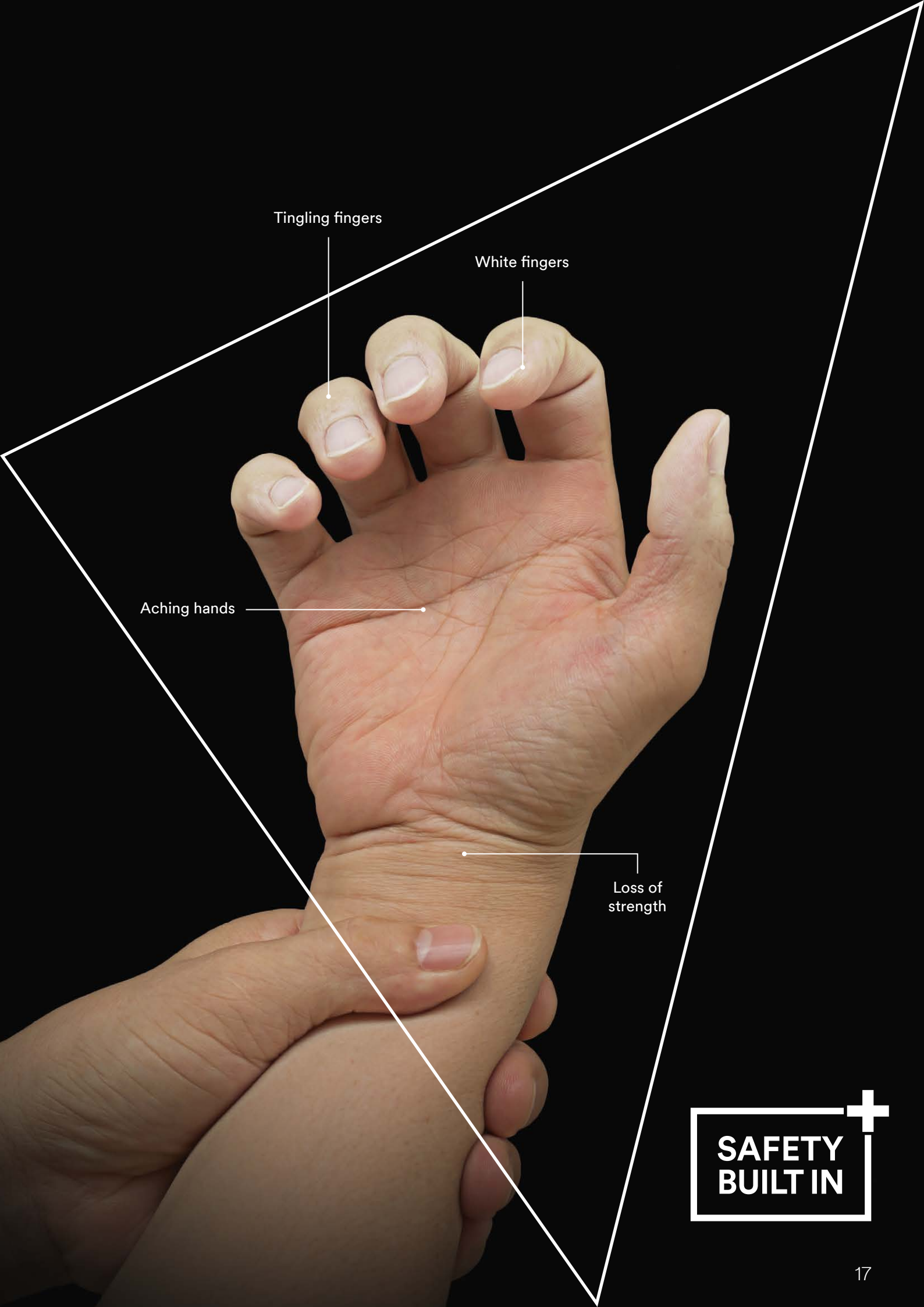
What does the HSE say?

Under the Control of Vibration at Work Regulations 2005, employers must prevent, or reduce vibration-related risks from impacting their staff. Like noise, vibration hazards are related to both the intensity of vibration and its duration. The regulations set out a maximum acceptable acceleration level of 5m/s2 for an average vibration exposure over an 8-hour work day. In addition, if staff are exposed to vibration levels above 2.5m/s2, the company must introduce organisational and technical measures to reduce exposure, along with a health surveillance programme.

What does our market research say?

It seems that the awareness of HAVS is still not as high as that for cuts, eye injuries and dust and airborne particulates. 3M research shows that across the four industries, only 14% of respondents mention HAV as a key concern. However, the issue of how to minimise HAV exposure has increased over the past five years, due to public awareness campaigns. These include the HSE's current focus on increasing the awareness of the long-term effects of HAVS in industrial applications.

HSE HAV



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Managing vibration hazards

Understanding the risks

The vibration levels experienced by an operator working with abrasives depend on a range of factors, including the design and condition of the tool and consumables in use and the way in which they grip and handle the tool. Conditions that increase the risk of vibration-related harm include tasks that require excessive bending of the wrists and work in cold conditions. Correct assessment of vibration magnitude exposure sensors and tool timers can be used to measure and record exposure levels and cumulative exposure to vibration.

Task redesign

In line with the hierarchy of controls for occupational safety risks, companies are encouraged to find ways to eliminate, or substitute tasks that involve high levels of vibration, such as switching to alternative working methods, or by mechanising or automating tasks. The use of jigs, clamps and balancers to hold workpieces and tools can allow operators to use tools with less force, reducing the level of vibration they experience. Exposure can also be reduced by alternating vibrating and non-vibrating tasks, or by sharing vibrating work among several people.

Appropriate tools and abrasive materials

Careful selection of working methods and tools can significantly reduce the levels of vibration experienced by operators. Tools should be of the appropriate size and power for the task. Reducing the weight of a tool and the distance it must be carried can reduce HAV injury risks, but an underpowered tool may encourage operators to use greater pressure, or force them to run the tool for longer, increasing exposure. A number of tools now include features, such as balancers that significantly reduce vibration.

Selecting the right abrasive products is also essential. Coated abrasive belts can produce less vibration than bonded wheels on fixed machinery. Bonded wheels can be replaced by fast cutting and long-life fibre discs on hand-held angle grinders. The use of high performance abrasives can reduce overall vibration exposure by allowing tasks to be completed more quickly, with less operator trigger time, a change that also boosts productivity.

For more information see:
HSE
Respiratory protective equipment at work – a practical guide

Minimize your workplace risks with engineered 3M solutions:

3M Abrasives & Personal Protective Equipment

3M™ Cubitron™ II Fibre Disc 982C cuts faster, with less pressure and can help to reduce vibration exposure.

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Tool setup and maintenance

Tools and consumables need to be correctly set up and maintained to minimise vibration. Ensure that the tool and consumable is configured and used according to the manufacturer's instructions. The condition of seals, bearings, cutters and other rotating elements should be regularly checked, as should the correct operation of vibration-isolating features. Spindle wear can affect tool balance, so this should also be assessed regularly. Operating speeds, powers and air pressures (if applicable) should be set at the appropriate level for each task.

For further information see: HSE

PPE

Equipment such as anti-vibration gloves that have vibration dampening properties exist. However, it is up to the individual organisations to determine what is and what isn't appropriate for them to use, to help reduce exposure to vibration.

3M helps to deliver safety for Bombardier

At Bombardier's Ilford heavy maintenance services site, the company undertook a complete refurbishment of rail carriages. The work carried out involved a combination of arduous manual tasks, often with heavy machinery, and the use of a wide range of abrasives, paints and solvents, so the company invested heavily in systems, processes and training. A particular area of focus has been to reduce HAV, as many of their workers regularly use hand grinding, drilling, sanding, polishing and spraying tools. "We set the maximum exposure limit to HAV at just a quarter of the limit recommended by the Health and Safety Executive," explains Colin McCann, Paint Shop Manager at Bombardier. "Although this protects our staff it also means that we need to be as productive as possible when using this type of equipment. That's where 3M is able to step in."

Source: 3M

Fast action, less vibration?
Switching from a conventional bonded grinding wheel to a high performing fibre disc such as 3M™ Cubitron™ II Fibre Disc 982C, allows tasks to be completed faster, therefore reducing the operator's exposure time on the tool. Vibration magnitude is also reduced due to the fibre disc's less rigid construction.

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Injury

Working with abrasive equipment can involve high speeds, powers and temperatures. If the working environment and processes are not controlled, it presents significant injury hazards.

Injury hazards

Fixed or hand-held abrasive equipment can cause injury by direct contact, at a distance via the ejection of material. Direct injuries include cuts and burns from contact with moving components, or hot parts and workpieces, as well as entanglement of the operator's body, hair or clothing. Indirect injuries include damage to the skin or eyes from contact with sparks and debris, ejected during normal operation.

Other indirect injury hazards occur as a result of abnormal operation or failures in abrasive equipment. Improperly secured workpieces can be ejected at high speed by the motion of the tool. Breakages of workpieces, abrasive discs or machine components can also result in the ejection of fragments with considerable kinetic energy. Operators who need to mount bonded wheels, a specific type of abrasive covered under EN12413, onto a machine require specific training and certification.

What does the HSE say?

Nearly half of all accidents involving abrasive wheels are due to an unsafe system of work or operator error.

Source: HSE

What does our 3M market research say?

With research showing that cuts and eye injuries are the biggest concerns across all industries, it is not surprising that 42% of respondents are planning on making tool or workplace changes to combat these injuries. For instance, applying engineering control methods such as switching from a bonded wheel to a fibre disc or flap disc can help reduce some of those risks. It is worth taking the time to review that the correct procedures are in place, to ensure that the right abrasive product is used for the job, to minimise injury risk.

In 2014-15, 2.1 million working days were lost due to handling injuries and slips and trips

Source: HSE

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Managing injury hazards

Machine guarding

Wherever possible, machines should be fitted with guards to protect the operator from sparks and material removed from the workpiece. Guards should also be designed to protect against larger debris ejected as the result of breakages during use. The use of interlocking devices to limit the speed or operation of a machine can help to reduce the risk of unguarded operation, when a moveable guard is not in position.

Correct operating procedures

Abrasive products must only be used on compatible machines and they must be installed according to the manufacturer's instructions. Force-fitting or modifying a component to fit can damage it, creating a greatly increased risk of failure in use and a potential health and safety hazard.

The operation of abrasive equipment at excessive speed is a major cause of component failure. Abrasive discs are required to be clearly marked with a maximum safe operating speed, expressed in revolutions per minute (RPM) and as a maximum acceptable surface speed for the outside circumference of the wheel. It is essential that equipment is only operated within this acceptable speed range.

Care and handling of abrasive products

Abrasive products are easily damaged if they are exposed to loads or conditions outside those for which they are designed. Care should be taken in the storage and handling of abrasive tools and consumables, with all items being inspected before use.

Most abrasives use a composite structure in which working material is held in a matrix of rubber, polymer or similar material. These materials are sensitive to extreme temperature and humidity and their mechanical properties degrade over time. Therefore, care should be taken to ensure components are stored in suitable conditions, and printed expiry dates should be checked prior to use. Any products that have passed their expiry date should be discarded immediately.

PPE

Even when engineering controls and safety systems are in place, PPE is still absolutely necessary to help reduce risk and prevent injury. The minimum requirement is for gloves, safety shoes, protective clothing such as an apron, together with face, hearing, eye and respiratory protection. Employers should always ensure that any required PPE is manufactured to an appropriate standard, fits well and is in good condition.

For more information see:
HSE
Respiratory protective equipment at work – a practical guide

Minimize your workplace risks with engineered 3M solutions: +

3M Abrasives & Personal Protective Equipment

Abrasive products from reputable manufacturers will always be labeled with maximum operating speeds, shelf life and compliance with relevant manufacturing standards.

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Conclusion

Abrasive processes using hand-held, or bench-top equipment play a critical role in many industries. Abrasives are often the fastest, most efficient, or the only possible way to complete tasks or achieve production objectives.

Abrasive equipment presents hazards to operators. Accidents or equipment failures can cause injury due to the high speeds, temperatures and power dissipation involved in abrasive processes. Moreover, routine abrasive operations generate dust, noise and vibration that can cause immediate, or cumulative harm.

By understanding and assessing the risks presented by abrasives, users can take steps to minimise or mitigate those hazards. And as the examples in this document show, an effective health and safety strategy often goes hand in hand with improved quality, higher productivity and lower costs.

So what can 3M do for your business?

For further information on how 3M abrasives can help you reduce your abrasive risks please contact your 3M representative or 3M distributor or call 0845 504 8772

Visit www.3m.co.uk/safetybuiltin


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PPE guide

Eye protection

Protect your eyes from sparks and other airborne debris

Full face visor

Protect your whole face from the added dangers of using cutting and grinding products

Apron

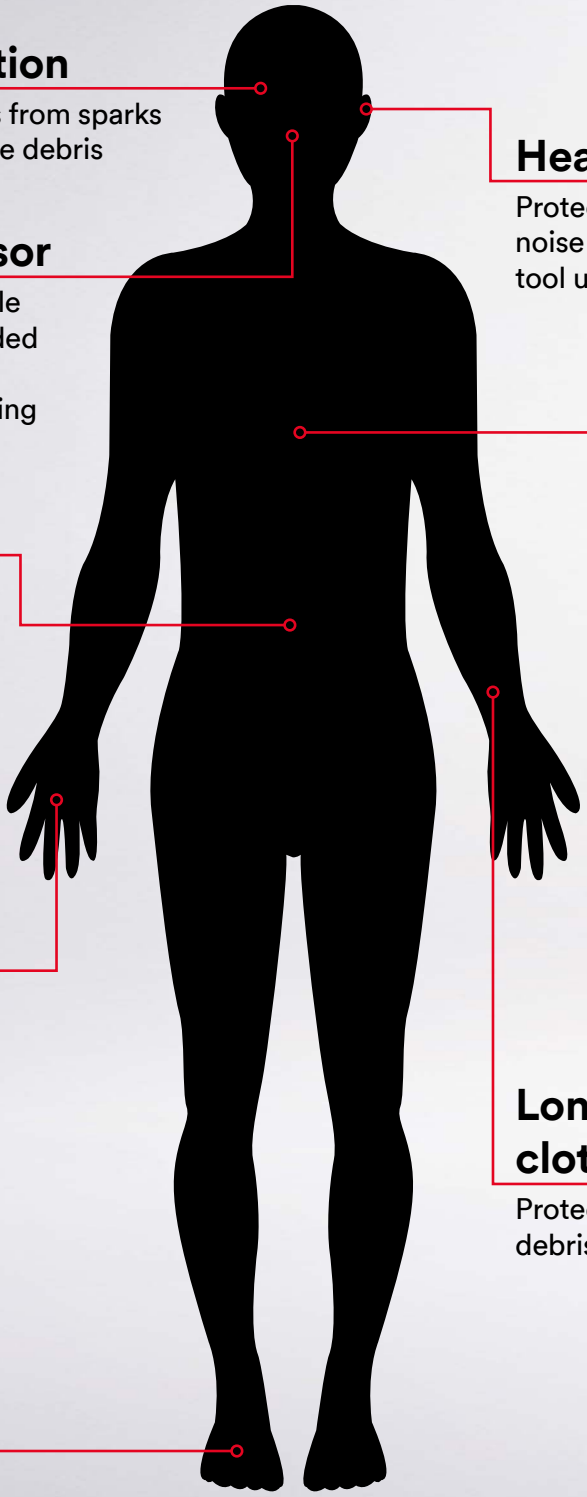
Additional protection must be worn to protect operator from sparkas created by cutting and grinding products

Hand protection

Protect your hands from sparks and other debris

Safety shoes

Protect your feet from falling heavy objects



Hearing protection

Protect your hearing from noise from machinery and tool use

Respirator

Protect your lungs from fine particles produced using abrasives

Long-sleeved clothing

Protect bare skin from airborne debris

3M™ Personal Protective Equipment

Product	Product description
	3M™ Headgear Combination, G500V5F11H51-GU (includes hearing protection)
	3M™ Versaflo™ Faceshield with Flame Resistant Poly Faceseal M-207 with 3M™ Adflo™
	3M™ Adflo™ High-Altitude Powered Air Respirator (to be combined with 3M headtops)
	3M™ SecureFit™ 400X Series Safety Glasses
	3M™ SecureFit™ 3700 Series Overspectacles
	3M™ GoggleGear™ 500 Series Goggle
	3M™ Aura™ Disposable Respirators 9300+ Series
	3M™ SecureClick™ Half Mask Reusable Respirator HF 800 Series
	3M™ E-A-R™ Flexible Fit Earplug HA 328-100
	3M™ PELTOR™ Electronic Earplug, EEP-100
	3M™ PELTOR™ Earmuff X4
	3M™ PELTOR™ X4 and Wireless Communication Accessory

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Links and further reading

Health and Safety Executive
www.hse.gov.uk

British Abrasives Federation (BAF)
www.thebaf.org.uk

Federation of European Producers of Abrasives (FEPA)
www.fepa-abrasives.com

Institute of Local Exhaust Ventilation Engineers (ILEVE)
https://www.cibse.org/Institute-of-Local-Exhaust-Ventilation-Engineers-I

Industrial noise control:
http://www.industrialnoisecontrol.com/inc-library/noise-control-faqs

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