Many employers buy local exhaust ventilation (LEV) to protect workers' health, but it doesn't work. As Mark Venables discovers, this may be because it's the wrong type or not properly installed, used or maintained.

Every **breath**

Thousands of British workers contract occupational asthma and other lung diseases each year. Many people die or are permanently disabled by these conditions and are unable to work. People develop these diseases because they breathe in too much dust, fumes or other airborne contaminants at work, often on account of control measures not working well enough. Most industries are affected by this issue, including woodworking, welding, paint-spraying, stonemasonry, engineering and foundry work.

A large proportion of processes in the UK have some sort of local exhaust ventilation (LEV) system for dust or fume extraction. In 2006, the HSE estimated only 60% of the processes had LEV to control the respiratory risk. A large percentage of these will not be adequately designed, tested or maintained, resulting in exposure to harmful dusts and fumes. This causes respiratory ill-health, which is preventable.

Respiratory health is not appreciated, because the harm is often not immediately obvious. Like hearing, respiratory symptoms from exposure to harmful dusts and fumes are mainly long latency. This means that symptoms are likely to appear some time after exposure. It often takes years of repeated exposure, breathing in the harmful dust and fumes, before symptoms appear. Unfortunately, when the symptoms appear the damage is often irreversible. The frustrating thing is that with well designed, tested and maintained LEV, respiratory ill-health can be prevented.

"There are several problems with the LEV industry," Louise Wood, LEV engineer with Airducts Design & LEV Engineering, says. "Firstly, employers do not understand enough about LEV to know if they are buying a suitable solution. In addition, many off-the-shelf salesmen are driven by targets, resulting in selling the wrong equipment for the problem. This is made worse by unrealistic expectations of the LEV system's capabilities, allied with a poor standard of testing, design and

maintenance." In order to promote and improve the overall understanding of LEV systems, Wood manages a website: www.levcentral.com. This is a voluntary project and a free-to-use website for anyone affiliated with LEV. It offers a growing library of resources, guidance on professional development, details of training courses, a forum and a supplier directory.

When it comes to responsibilities, Wood explains that employers, employees and suppliers share the burden. "The employer has a duty to protect the employees and any visitors who may be on their site," she explains. "The

you take

Control of Substances Hazardous to Health (CoSHH) Hierarchy of Control should be considered, in order to determine if other control measures are required to protect employees' health and lower exposure as low as reasonably practical."

When it comes to operators, Wood explains that they have a duty to use the control measures that the employer supplies. "They also have a duty to advise any faults with the controls and are normally responsible for carrying out the routine weekly checks.

How often you check the LEV and how you do it will depend on how complicated the system is, how likely it is to fail, and the consequences if it does. Complicated LEV that will have serious consequences if it goes wrong needs more frequent checks and maintenance. As you gain more experience in running the LEV system, you may need to change the frequency of your checks in the user manual.

Checks and maintenance tend to cover four types of parts: moving parts that may wear, such as fan bearings or filter shakers; non-moving parts, such as hoods, ductwork and seals (which can suffer physical or chemical damage and wear); parts that deteriorate with use, such as filters or flexible ducting; items that need regular attention, such as filters that need replacing or removing; and sludge from a wet scrubber.

Most LEV systems need a thorough examination and test once each year. Legally, you are allowed 14 months between tests to make sure it works well and continues to protect employees. Some LEV systems, such as those controlling more critical or high-hazard processes, need more frequent thorough examination and testing. The CoSHH Regulations require more frequent testing for some processes.

The thorough examination tests the LEV against the performance recorded in the commissioning report. It should include airflow and pressure measurements, checks on control effectiveness and, possibly, exposure measurement. If you don't have the design performance data, you will not know whether your system is working »

UK Regulations

CoSHH Regulations

Control of Substances Hazardous to Health (CoSHH) Regulations 2002 are the regulations that control the way substances hazardous to health are used, stored and handled in a premises.

Regulation 6 - Suitable & sufficient risk assessments: This is assessing the risks and deciding if the controls are adequate.

Regulation 7 - Hierarchy of control: This is a step-by-step guide to follow to help ensure that exposure to harmful contaminates is prevented or adequately controlled.

Regulation 8 - Use of control measures: The employer must ensure that the employee is using the controls correctly. The employee also has a duty to use the control measures correctly and report any defects.

Regulation 9 - Maintenance, Examination & Testing of Controls: All LEV should be thoroughly examined & tested at least once in a period of 14 months by a competent person. This is to ensure that your system remains effective at control.

ATEX

ATEX is the name commonly given to the two European Directives; 99/92/EC & 94/9/EC. They are the minimum requirements for controlling explosive atmospheres to protect the workers who are potentially at risk.

DSEAR

The Dangerous Substances and Explosive Atmospheres Regulations 2002 (DSEAR) place duties on employers to eliminate or control the risks from explosive atmospheres in the workplace.

HSG258

This is the UK's HSE guidance that describes the principles and good practice of deciding on, designing, commissioning and testing cost-effective LEV.

The guidance is written for suppliers of LEV goods and services, but will also be helpful for employers and managers in medium-sized businesses, and trade union and employee safety representatives. All of these groups need to work together to provide, maintain and use effective LEV and to reduce exposure from inhalation of hazardous substances.

The book contains information about: the roles and legal responsibilities of suppliers, and of their clients as employers; competence; principles of good design practice for LEV hoods and their classification; ducts, air movers, air cleaners; and system documentation.

According to the HSE, only 60% of processes in the UK had local exhaust ventilation (LEV) systems in place to control respiratory risk to workers

correctly, so you may need to have your system commissioned. If your system has already been commissioned, but you have changed the process or layout since then, you need to re-commission it. A professional advisor can help you work out what you need to do.

The examination and test needs to be done by a 'competent person'. It isn't normally something you can do yourself. You and your employees will need to co-operate with the examiner. Give them the: LEV commissioning report; LEV user manual; and logbook with details of checks and maintenance activities.

The examiner will attach a 'tested' label to all hoods. This will include the name of the examiner and the date of the next test. If a hood has clearly failed, then a red 'fail' label will be attached instead, and urgent action will be necessary. The examiner will give you a report of the examination and test, which should include a prioritised action plan listing anything that you need to do.

If the examination and test show that the LEV isn't adequately controlling people's exposure to airborne contaminants, stop the work and repair the LEV. If you want work to continue while you arrange repair, employees will need further protection, such as suitable personal protective equipment and respiratory protection. The system should carry the red 'fail' label until it has been repaired.

If the thorough examination and test report action plan contains long lists of repairs and poor performance, this tells you that your checking and maintenance is not good enough. Use the test report as an audit of your procedures and an opportunity to review all your exposure control measures. Improve them if you can. ■

Forms of substances

Air contaminants are particles, gases or vapours and combinations of these. 'Particles' include dusts, fumes, mists and fibres.

Gases: Gases are an air-like fluid substance which expands freely to fill any space available at room temperature. They are usually invisible and are controlled using low transport velocities. It must be noted that when gases are released into the workplace environment that they can only be controlled with general dilution ventilation. Examples: Chlorine and carbon monoxide.

Vapours: Vapours refer to a gas phase of a liquid or solid at room temperature. The process where some substances convert directly from the solid to the vapour phase, without going through a liquid phase, is known as sublimation. Examples include styrene, petrol, acetone, mercury and iodine.

Dusts: Dust is fine dry solid particles of matter with a particle size range of 0.01 to 150µm. Can be supplied or process generated and are either organic or inorganic depending on where the dust has originated from. Organic derive from plants or animals and examples include grain dust and flour dust. Organic dusts can also contain fungi and microbes. Inorganic dust is often finely powered. Inorganic dusts originate mainly from grinding metals, minerals, rocks or soil together and examples include aluminium and cement dusts.

Fibres: Fibres are solid particles where the length is several times the diameter. They are a similar particle size for dust. Examples include Asbestos and glass fibre.

Mists: A cloud of tiny liquid droplets suspended in the atmosphere. Mist is usually process generated, e.g. by spraying. Mists are similar in size to dusts (particle size range 0.01-100µm) only they are spherical and alter in size; i.e. increase in size due to the absorption of water or decrease through evaporation. Examples include electroplating, spray painting and steam.

Fume: Fumes are a vaporized solid that has condensed. Particle sizes 0.001 to 1µm. Fume clouds tend to be dense and partially visible. Examples include rubber fume, solder fume and welding fume.