



Shoe manufacturing operations can generate harmful vapours and dust.

CREDIT: FOTO INFOT / SHUTTERSTOCK.COM

Ensuring worker safety

JOHN HUBBARD, SATRA

Operatives in footwear factories are potentially exposed to a number of risks during the manufacturing process, both physical and chemical. Responsible employers can take steps to control these risks and so create a safer working environment. This in turn will not only contribute to the long term well-being of their employees but also have an economic benefit by reducing the number of days lost through ill health and injury. Employers will also be able to demonstrate their commitment to staff welfare, often a key factor for encouraging brands to invest in new supplier factories.

Responsibility for managing health and safety in a factory should fall to a specific individual who has sufficient authority to make changes and

recommendations. They should also be able to report directly to the senior management such that health and safety is always given sufficient attention at executive level. Depending on the size of the organisation, the health and safety manager may be supported by a number of representatives from different departments.

Observing factory operations and talking to the operatives concerned will prove useful as operatives who have been performing the task in question will have an insight that may not be understood by an outsider. It is nevertheless important to be wary of attitudes of complacency that can come from doing a particular job for a long period which results in risky behaviour and the possibility that this behaviour will be passed on to other staff.

The level of risk can be quantified for many parameters by carrying out appropriate monitoring and comparing the results against legislative or best practice guidelines. This may indicate that some action is required to be taken to limit the exposure in particular workplaces. The steps that can be taken should be as follows:

- Elimination – is this step necessary?
- Substitution – is an alternative process or substance available?
- Containment – creating a barrier between operation and operative if practical.
- Extraction – removal of the risk at source; chemical hazards for example such as dust, solvents or isocyanates.
- The use of personal protective equipment (PPE).

PPE should only be used when all other options have been carefully considered as it only protects an individual and requires that it is used correctly and properly maintained. The PPE issued needs to be appropriate for the hazard involved and suitable for the individual. For example, breathing masks need to fit tightly around the face.

Whereas many physical hazards such as unguarded machinery and noise can be obvious to the operative and the effect dramatic and immediate, many of the potential chemical hazards are associated with insidious long term health effects following prolonged exposure. Measurement of these hazards, therefore, is important in order to understand the risk posed to workers using these substances and processes.

MONITORING FOR CHEMICAL HAZARDS

The different chemical species that can be present on the footwear production line will demand different monitoring techniques to determine if the levels in the atmosphere will pose a risk to operatives who are regularly exposed to these levels.

Exposure to solvent vapours can result from the use of adhesives, primers, cleaners and polishes. In many cases water-based alternatives are available but, where solvent-based chemicals are used, there are some key steps that can be taken to avoid exposing the operative to excessive solvent vapour levels. These include using covered pots to apply the adhesive, good housekeeping of contaminated materials and good extraction and ventilation in work areas. Under no circumstance should operatives use their fingers to apply adhesives, even to samples with difficult topography.

Different solvents will have different hazards associated with them which translate into different limits for the workplace explosive limit (WEL). The acceptable limit for acetone for example is fifteen times higher than that for toluene which is a recognised carcinogen.

Measurement of solvents is carried out using passive sampling badges which can be sent out to factories and

given to operatives for a typical working shift and returned to the laboratory for analysis. No additional sampling is required.

In the production of polyurethane, polyols are reacted with isocyanates to form the urethane linkage in-situ. Isocyanates can cause irreversible allergic reactions in the lungs if breathed in, even in very small amounts, therefore the control of isocyanates is important. Where possible, isocyanates are supplied in closed systems or in a form which limits the need for heating during use. Monitoring of isocyanates requires a complex pump impinger method followed by HPLC laboratory analysis.

Dust together with rubber fumes is measured using a gravimetric filter. Air is drawn through the filter by a calibrated pump and the weight gain of the filter measured and related back to the volume of air. Exposure to dust, including leather dust, can have a detrimental effect on the respiratory system. Particularly fine dust can be drawn into the lungs, so there is a lower workplace exposure limit for these respirable dusts than for general dusts.

Dust is normally controlled by local exhaust ventilation (LEV) equipment. A useful indicator for whether there may be an issue with dust is the accumulation of dust on horizontal surfaces in the factory; if these are observed then it is worth carrying out monitoring on representative selection of operatives. Key footwear production tasks that will generate dust are those involving cutting, scouring or abrading as shown in the title image.

Where LEVs are used they need to be efficient enough to control the hazard and therefore monitoring should be carried out after installation to demonstrate the effective control. However, it is also important to maintain and monitor the performance of the LEV itself so that the level of control does not diminish over time either through damage to the ducting or by blocking of the vent face. Each item of LEV should have a full check annually and be visually monitored on a daily basis. The exact requirements for each item will depend on the amount and type of substance to control.

PHYSICAL HAZARDS

As well as chemical hazards there are a range of physical hazards which should also be addressed within the workplace; these include:

- Noise
- Light
- Mechanical safety
- Electrical safety
- Manual handling
- Fire
- Slips, trips and falls

Many of the issues surrounding the physical risks may become obvious when tasks are observed. A common approach is for a scheduled walk round by different health and safety representatives on a regular basis. This will identify damage to equipment, poor housekeeping and incorrect utilisation of machinery. If changes are required it is often worth taking exposure readings before and after the remedial action to demonstrate to staff and management the positive impact investment in health and safety can bring.

Accidents and near misses that occur within the factory will reveal what the areas of concern are, so these should be recorded and investigated as a matter of routine. In order to ensure a full level of reporting of such incidents, the reporting scheme should avoid attributing blame and concentrate on what can change in the work place to prevent a similar or worse event occurring.

Everyone in an organisation has a role to play in promoting health and safety in a factory environment from the senior executives and managers through to the factory operatives. Cleaning staff and workers should also be encouraged to take a level of personal responsibility with their behaviour and attitude to risk. It has often been observed that in organisations where there is a strong culture of commitment to health and safety, workers will be more motivated and there is a positive correlation with production efficiency. In conclusion, health and safety should not be seen as an additional requirement for factories but as a demonstration of the commitment to a lean and efficient working environment. 🔄