



Hazards associated with foundry processes: Fettling - noise hazards

Foundries Sheet No 6

Introduction

The Noise at Work Regulations 1989 deal with the legal obligations of employers to prevent damage to the hearing of workers from noise at work.

This information sheet was produced by HSE in conjunction with the Foundries Industry Advisory Committee through its sub-committee on noise and vibration. It deals only with noise hazards arising from fettling activities.

Fettling and dressing of castings

Fettling and dressing (or trimming) are the terms traditionally given to the finishing of castings to remove excess unwanted metal, eg flashings, risers etc. It can include processes such as grinding, chipping and shot blasting.

Hand-held tools such as grinders and chipping hammers, or fixed tools such as pedestal grinding machines, finishers and bandsaws are traditionally used to remove the unwanted metal. Automated fettling is becoming more common today in a variety of ways although until recently applications have been limited.

Very high noise levels are produced during fettling and may exceed 117 dB(A). Personal noise exposure levels of 100 - 110 dB(A) have regularly been measured during routine fettling operations in both ferrous and non-ferrous foundries. Exposure to dust (including free silica) and vibration are also significant in many cases.

The risk to hearing at a noise level of 110 dB(A) is high. Only five minutes' exposure is required at this level for the daily personal noise exposure of an unprotected operator to exceed the 90 dB(A) second action level of the Noise at Work Regulations 1989.

Hierarchy of noise reduction measures

The following hierarchy should be followed to prevent hearing damage: elimination of the noise producing part of the process; implementation of adequate engineering controls to reduce noise levels; provision and use of suitable personal hearing protection as an interim measure or to supplement the above.

NB In many cases measures used to reduce or control the risks to hearing from fettling noise will also improve product quality and productivity. Other health risks, such as those due to exposure to vibration and dust, may also be reduced.

Examples of measures

Elimination

A thorough reappraisal may enable noise exposure to be reduced by improved design and control of the casting process. For example, improved mould design can eliminate or at least significantly reduce the amount of excess metal required to be removed after casting, thus reducing the need for fettling.

Engineering controls

Purchasing policy

Companies should operate a positive purchasing policy for new machinery and ensure that noise levels are acceptable before introduction into the factory. For example, low-noise or noise-reduced grinding discs are now available and can reduce noise levels by around 5 dB(A). Exhaust silencers can be fitted to some pneumatic tools. Low-noise blow guns are also available.

Manufacturers and suppliers should now supply information on noise levels with their machinery under the Supply of Machinery (Safety) Regulations 1992.

Automation

The introduction of automatic or semi-automatic fettling, eg fettling robots, CNC grinding machines, cropping etc, will remove employees from risk. Where these techniques are used noise levels can often be further reduced by fitting acoustic guards or enclosures. Whether such engineering controls are reasonably practicable will depend on the volume of product, the nature of the process involved, and the types of castings produced. Automation or mechanisation of fettling is steadily becoming a more practicable and cheaper option although mechanical fettling is still likely to be required for intricate castings and where a variety of castings are produced in small numbers.

Process modification

In some cases it may be possible to substitute rough or even finish machining for hand fettling processes.

Example: Chipping hammers can be replaced by grinders or finishers to achieve significant noise reductions. One of the commonest noise sources is the air exhausts in pneumatic systems. Fitting suitable - and low cost - silencers can significantly reduce this noise. Metal on metal noise can be avoided by covering fettling bench worksurfaces with abrasion resistant rubber and by reducing impact noise from castings falling into

stillages by means of lined chutes, for example, or devices to break the castings' fall. The ringing of castings being fettled can be reduced by clamping workpieces, by using rests on pedestal grinders, or by the use of damping devices. Finally, noise-reduced grinding discs are available.

Process control and maintenance

Good process control is not only important for product quality and production efficiency but also as a means of controlling noise exposure. Careful attention to the maintenance of machinery and training of operators will make a significant difference to noise levels - for example: keeping cutting tools sharp; regularly dressing grinding wheels; replacing worn parts, damaged patterns, mould boxes etc; maintenance of enclosures; repair of air leaks; tightening of loosened machinery panels.

Enclosure and separation

Acoustic enclosures or acoustic guards can be fitted to some existing machinery to reduce noise levels.

Example: The use of separate fettling booths, acoustically lined with 75 mm mineral wool, will assist in reducing the personal noise exposure of individual operators and can give reductions of up to 5 dB(A) in the additive effects of noise from adjoining booths.

Other measures

Further measures are available such as the rotating of the fettling work among employees to keep personal noise exposures at a controlled and reasonably low level. For example, halving an operator's exposure time will reduce exposure by 3 dB(A) so halving the risk to the operator's hearing.

Personal hearing protection

The selection and use of suitable hearing protection should be based on the results of the noise assessment required under the Noise at Work Regulations 1989.

In practice most manual fettling operations **will** require suitable hearing protection **in addition to** the use of the other measures referred to above.

Further reading

Introducing the Noise at Work Regulations Leaflet INDG75 (Rev) HSE Books 2001 (single copy free or priced packs of 15 ISBN 0 7176 0961 8)

Noise at work: Advice for employees Leaflet INDG99 (Rev) HSE Books 1995 (single copy free or priced packs of 20 ISBN 0 7176 0962 6)

Sound solutions – techniques to reduce noise at work HSG138 HSE Books 1995 ISBN 0 7176 0791 7

Health Surveillance in noisy industries Leaflet INDG193 HSE Books 1995 (single copy free or priced packs of 10 ISBN 0 7176 0933 2)

Ear Protection: Employees' duties explained Leaflet INDG298 HSE Books 1999 (single copy free or priced packs of 5 plus 5 posters MISC185 and 30 pocket cards INDG299 ISBN 0 7176 2484 6)

Protect Your Hearing! Pocket card INDG299 HSE Books 1999 (single copy free or priced packs of 25 ISBN 0 7176 1924 9)

Some of the techniques which can be used to reduce hand-arm vibration can also be used to reduce noise during fettling. The booklet *Hand-arm vibration in foundries* (ISBN 0 7176 1798 X) gives further advice on methods such as improving casting quality in order to reduce the amount of fettling, correct selection of abrasives etc.

Further information

HSE priced and free publications are available by mail order from HSE Books, PO Box 1999, Sudbury, Suffolk CO10 2WA Tel: 01787 881165 Fax: 01787 313995 Website: www.hsebooks.co.uk (HSE priced publications are also available from bookshops.)

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This information sheet 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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