

Foundries Table 1: Established alternative processes to avoid/reduce use of vibrating equipment

Activity or process	Example vibration magnitude (m/s ²)	Corresponding time to reach:		Alternative methods	Further information (links on HSE website)
		EAV	ELV		
<p>Knock-off, cut-off and fettling castings using:</p> <p>Large angle grinders</p> <p>Large straight grinders</p> <p>Chipping hammers</p> <p>Pedestal grinders</p>	<p>4 (best) 8 (the rest)</p> <p>-</p> <p>10 (best)</p> <p>18 (typical)</p> <p>10 (typical)</p>	<p>3 h 45 m</p> <p>-</p> <p>30 m</p> <p>10 m</p> <p>30 m</p>	<p>12 h 3 h</p> <p>-</p> <p>2 h</p> <p>40 m</p> <p>2 h</p>	<p>Eliminate or reduce the need for manual knock-off/cut-off or fettling using, where appropriate:</p> <ul style="list-style-type: none"> • good foundry practice and investment casting (lost wax) or lost foam casting techniques to improve casting precision • design castings to minimise fettling (number of joint lines etc.) • decrease ingate/feeder size and reduce cut-off time • design castings suitable for direct machining • challenge inappropriate customer specifications for high standard of finish <p>Substitute alternatives to manual fettling using, for example:</p> <ul style="list-style-type: none"> • robot fettling machines • automated grinding and manipulators • semi-automatic cut off • cropping machines • jig-mounting for grinder or castings <p>Design casting and runner systems should allow for these methods.</p> <p>Note: These methods for elimination and substitution will usually be reasonably practicable for large production runs; some may also be appropriate in jobbing foundries.</p>	<p>Hand-arm vibration in foundries (FIAC 2001) Example: eliminate fettling by improving casting quality.</p> <p>Example: machining as a substitute for fettling.</p> <p>Example: automatic fettling Example: jigs for hands free grinding Example: semi-automatic cut-off Example: isolated cut-off machine Example: hydraulic cropping</p>
Knocking off ceramic mould shells with chipping hammer:	18 (typical)	10 m	40 m	<p>Hands-free alternative processes:</p> <ul style="list-style-type: none"> • Frame-mounted breaker 	<p>Example: shell knockout 1 Example: shell knockout 2</p>
Furnace/cupola descaling/lining removal with breaker or chipping hammer	<p>8 (lowest) 15 (typical) 25 (highest)</p>	<p>45 m 15 m 5 m</p>	<p>3 h 1 h 20 m</p>	<p>Eliminate the use of hand-operated tools:</p> <ul style="list-style-type: none"> • water-cooled cupola without lining (for capacity >9 tonnes/hr) • hydraulic lining “push-out” for furnace lining • hydraulic machine-mounted breaker; <p>Reduce the frequency of lining renewal or slag chipping by:</p> <ul style="list-style-type: none"> • Maximising life of lining through good cupola operating practice • Reduce build up of slag by control of impurities 	<p>Foundries Information Sheet 11</p> <p>Example: hydraulic push out Example: ladle slag chipping</p>

Activity or process	Example vibration magnitude (m/s ²)	Corresponding time to reach:		Alternative methods	Further information (links on HSE website)
		EAV	ELV		
Ramming moulds with: sand rammers	10 (lowest) 50 (highest)	30 m 1 m	2 h 5 m	In jobbing foundries, where hand-ramming of moulds cannot be eliminated, the risk can be controlled by; <ul style="list-style-type: none"> mounting an electric hammer in a frame on a balancing rig mounting a pneumatic rammer in a semi-rigid balancing arm (See HSE guidance for the cast stone industry)	Information Sheet MISC493
electric demolition hammers	15 (typical)	15 m	1 h		

Note 1: The vibration magnitudes, and associated trigger times to exceed EAV/ELV, are indicative only and will vary depending on equipment type and conditions of use.

Note 2: Changes of process to eliminate or reduce vibration may introduce other hazards to safety or health or safety (e.g. chemical, fume, spatter, noise, dust) which must be addressed and managed.

**PLEASE FAX COMPLETED FORM TO: 020 7717 6681
Alternative Processes for Foundries – Feedback Form**

Your views are important to us so that we can improve the way we communicate information on managing the risks from hand arm vibration. We would be grateful if you could spare a couple of minutes to fill in this form and fax it back to us at the above number. Any information you provide will be treated in confidence and will only be used for research purposes. You do not have to give your contact details.

Please rate the following statements by ticking the box which most closely represents your level of agreement or disagreement with each statement.

	Strongly Agree	Agree	Don't Know	Disagree	Strongly Disagree
The activities/processes listed include those that I was concerned with					
The information given was useful in helping my organisation decide whether it should be taking action					
I was able to understand the information on alternative working methods					
I found the alternative working methods were relevant/realistic					
The information in the linked references and related guidance was helpful					
My organisation intends to take action to apply the alternative working methods					

If you have any comments you would like to make, please do so in the space below:

About you:

Please tick the primary business of your organisation

Foundries	Construction	Manufacturing
Quarry/masonry		
Agriculture/forestry	Engineering supplier	Other <i>Please specify</i>

What is your role/job in your organisation?

Employee	Middle Manager	Senior Manager
Supervisor/Foreman	Health & Safety Professional	Union representative
Self employed	Other <i>Please specify</i>	

How many people work in your organisation?

Less than 50 employees	Between 51 and 250	Between 251 and 500
Between 501 and 1000	More than 1000	

Thank you very much for your feedback. Please fax this to the number given at the top of the page

HSE are always looking for new ideas and solutions to hand-arm vibration problems. If you are willing to share your experience with others please give your details below so that we can discuss this with you.

Name: **Company:**

Telephone number:..... **Email:**