

Construction 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		
<u>Tunnelling</u> by hand with clay spade or jigger pick.	16 (typical)	10 m	45 m	Mechanised tunnelling methods, to eliminate hand digging. This is expected for all but the smallest tunnelling jobs.	British Tunnelling Society code of practice on hand-arm vibration Tunnelling and Pipejacking: Guidance for Designers
<u>Breaking</u> concrete, asphalt, etc. with hand-operated breakers in ground work, road maintenance, etc.	5 (lowest) 12 (typical) 20 (highest)	2 h 20 m 10 m	8 h 90 min 30 min	Plan construction work (e.g. casting-in ducts, detail box-outs) to minimise breaking through new concrete/masonry. Use alternative method/equipment as appropriate: <ul style="list-style-type: none"> • machine-mounted hydraulic breakers • floor saws • directional drilling/pipe jacking to avoid trenching • hydraulic crushers • hydraulic bursters • diamond core drilling • diamond wire cutting • hydro-demolition (UHP water jetting) 	Construction Industry Council guidance Example: mounted breaker
<u>Demolition</u> of concrete/masonry using hand-held hammers/breakers	8 (lowest) 15 (typical) 25 (highest)	45 m 15 m 5 m	3 h 1 h 20 m		Example: directional drilling Example: crushing concrete Example: Bursting concrete Example: diamond wire cutting Example: water jetting Codes of Practice from the Waterjetting Association
<u>Pile cropping</u> using hand-held hammers/breakers	8 (lowest) 15 (typical) 25 (highest)	45 m 15 m 5 m	3 h 1 h 20 m	Pile cap removal using hand-operated breakers is not acceptable . Use alternative method as appropriate: <ul style="list-style-type: none"> • Elliott method • Recipieux method • suspended hydraulic pile cropper • the above alternatives to hand-operated breakers, especially machine-mounted breakers • design pile spacing and pile re-bar for mechanised cropping <p>Note: some dressing using hand-operated tools may still be required.</p>	Pile cropping. A review of current practice (HSE Inspector information leaflet, Aug 02) Information from Loughborough University

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<u>Scabbling</u> using: needle scalars hammer type scabblers pole type scabblers	5 (lowest) 18 (highest) 40 (highest) 10 (lowest) 40 (highest)	2 h 10 m 2 m 30 m 2 m	8 h 40 m 8 m 2 h 8 m	Scabbling purely for architectural aesthetic effect is not acceptable . Specify finishes that do not require scabbling. (Some finishes can be designed into shuttering using special moulds or chemical retardants and water jetting.) Surface preparation to ensure a good concrete bond. Use alternative methods where technically appropriate: <ul style="list-style-type: none"> grit blasting (wet or dry) use of chemical retarders and pressure washing cast in proprietary joint formers e.g. mesh formwork UHP water blasting (refer to CoP for safety guidance) 	Example: grit blasting Example: paint-on retarder Example: special formwork Codes of Practice from the Waterjetting Association
<u>Wall chasing</u> using hand-held breakers	8 (lowest) 15 (typical) 25 (highest)	45 m 15 m 5 m	3 h 1 h 20 m	<ul style="list-style-type: none"> in new buildings, specify built-in ducting in existing buildings, consider overcoating existing plaster and building in the ducts 	Construction Industry Council guidance
<u>Drilling</u> masonry/concrete using: electric hammer drills or “combiammers”	6 (lowest) 9 (typical) 25 (highest)	1½ h 40 m 5 m	5½ h 2½ h 20 m	Design and plan to avoid unnecessary drilling. Use, where appropriate: <ul style="list-style-type: none"> jig-mounted drilling diamond core drilling (clamped in rig) cast-in anchors and channels for wall fixings instead of drill-and-fix types use of direct fastening tools 	

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 health (e.g. noise, dust) or safety which must be addressed and managed (e.g. hazards associated with lifting operations in some mechanised methods for pile cap removal).