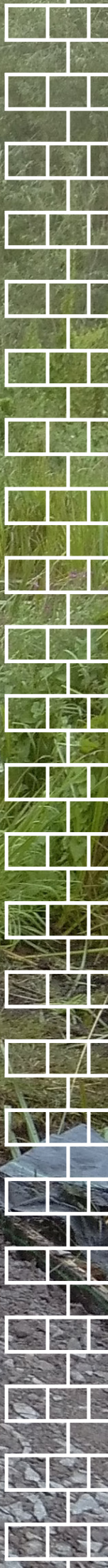
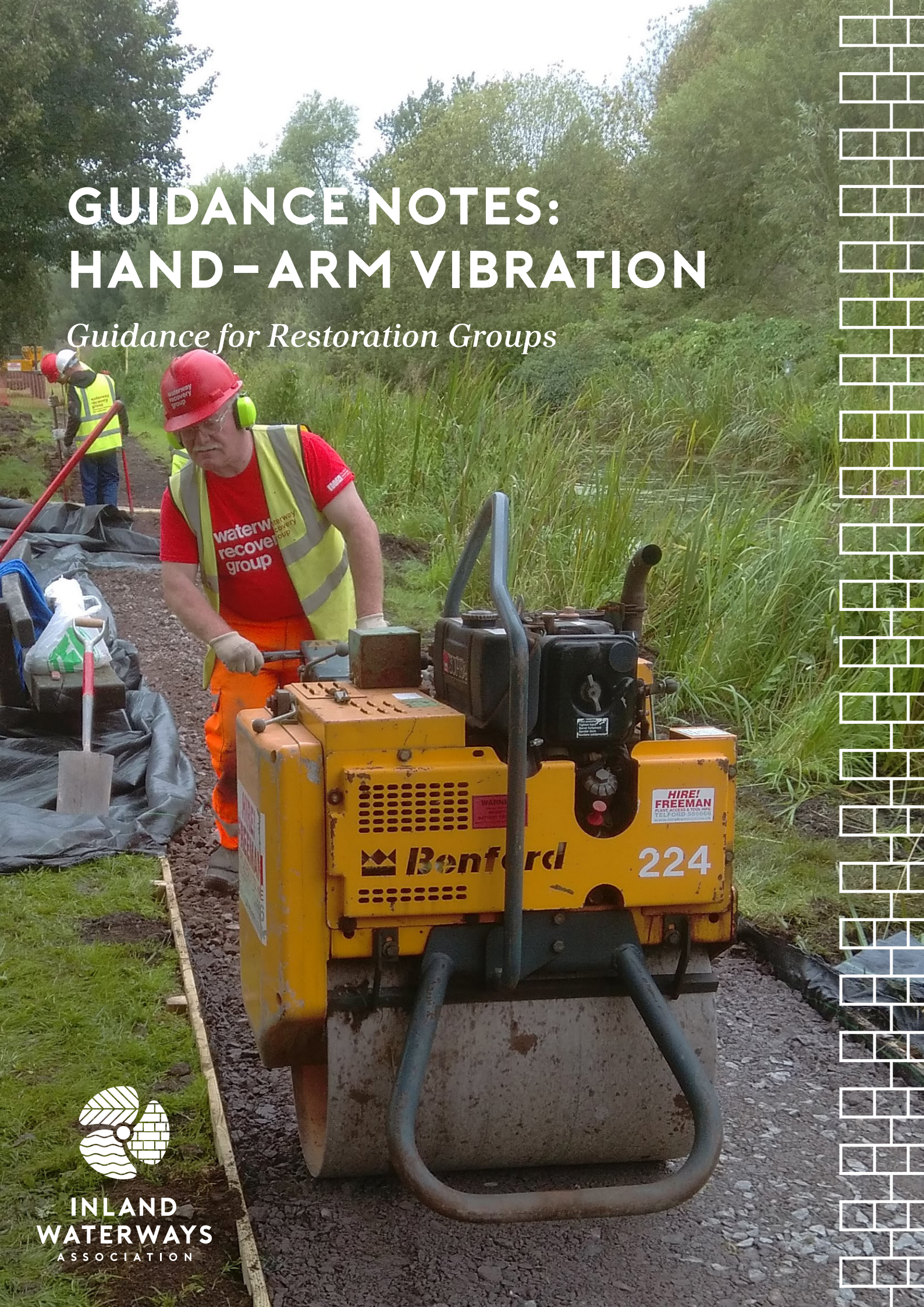


GUIDANCE NOTES: HAND-ARM VIBRATION

Guidance for Restoration Groups



GUIDANCE NOTES: HAND-ARM VIBRATION

Hand-Arm Vibration is vibration transmitted into hands and arms when using handheld power work equipment or work pieces which vibrate, such as pedestal grinders and bench saws.

It can cause Hand-Arm Vibration Syndrome (HAVS), which affects nerves, blood vessels, muscles and joints of the hand, wrist and arm. It can become severely disabling if ignored and includes a condition called 'vibration white finger'. The symptoms are, tingling and numbness in fingers, which can result in an inability to do or everyday tasks (fastening buttons), loss of strength in the hands and fingers going white and becoming red and painful on recovery reducing ability to work in cold or damp conditions. Once contracted there is no cure.

It can also cause Carpal Tunnel Syndrome (CTS), which is a nerve disorder and may involve pain, tingling, numbness and weakness of the hand. It can interfere with work and everyday tasks and might affect the ability to do work safely.

Control of Vibration at Work regulation 2005 (the Vibration Regulations) is the regulation which makes sure that risks from vibration are controlled. It requires that employers provide information, instruction and training to employees.

The regulations include an Exposure Action Limit (EAL) of $2.5\text{m/s}^2\text{A}(8)$ at which control measures are required. The meaning of ' $2.5\text{m/s}^2\text{A}(8)$ ' is a measure of the vibration over an eight hour period. If the EAL is exceeded the employer is required to provide health surveillance.

The regulations set an Exposure Limit Value (ELV) of $5.0\text{m/s}^2\text{A}(8)$, which must not be exceeded.

Manufacturers and suppliers are required by the regulations to provide information in equipment guide books and to list the vibration emissions of their equipment.

The intention of the regulations is to prevent disability by reducing the risk to the lowest level reasonable.



EXAMPLES OF VIBRATION MAGNITUDES

The table below gives vibration emissions measured by the HSE on equipment in use at work;

Road breakers	Typical	12m/s ²	Angle grinders (large)	Modern vibration reduced designs	4 m/s ²
	Modern tool designs, good operating conditions and trained users	5m/s ²		Other types	8 m/s ²
	Worst tools and operating conditions	20m/s ²	Angle grinders (small)	Typical	2-6 m/s ²
Demolition hammers	Modern tools	8m/s ²	Clay spades / jigger picks	Typical	16 m/s ²
	Typical	15 m/s ²	Chipping hammers (metal-working foundries)	Typical fettling	18 m/s ²
	Worst tools	25 m/s ²		Modern tool designs	10 m/s ²
Hammer drills / combi hammers	Typical	9 m/s ²	Pneumatic stone working hammers	Vibration reduced hammers and shrouded chisels	8-12 m/s ²
	Bad tools and operating conditions	6 m/s ²		Older tools, contaminated chisels	30 m/s ²
	Worst tools and operating conditions	25 m/s ²	Chainsaws	Typical	6 m/s ²
Needle scalers	Modern tool designs	5-7 m/s ²	Brushcutters	Typical	4 m/s ²
	Older tool designs	10-25 m/s ²		Best	2 m/s ²
Scabblers (hammer type)	Typical	20-40 m/s ²	Sanders (random orbital)	Typical	7-10 m/s ²

DAILY VIBRATION EXPOSURE LEVEL A(8)

A person's daily vibration exposure is the average vibration spread over the working day of eight hours. The table below gives a range of vibration magnitudes, together with the corresponding exposure times, which would result in exposures at the EAL (2.5 m/s² A(8)) and the ELV (5 m/s² A(8)).

Vibration magnitude (m/s ²)	2.5	3.5	5	7	10	14	20
Time to reach EAL (hours)	8	4	2	1	0.5	0.25	8 min
Time to reach ELV (hours)	>24	16	8	4	2	1	0.5

The ready reckoner below expresses the combination of vibration magnitude and exposure time in exposure points instead of values in m/s² A(8). To use the ready reckoner, find the level of the vibration magnitude on the left, find the exposure time across the bottom of the table and find the value in the table that corresponds with the magnitude and time.

Exposure points can be added together, for example when a worker is exposed to two or more tools. The EAL (2.5m/s² A(8)) is equal to 100 points. The ELV (5.0m/s² A(8)) is equal to 400 points.

Vibration magnitude m/s ²	40	800									
	30	450	900								
	25	315	625	1250							
	20	200	400	800							
	19	180	360	720	1450						
	18	160	325	650	1300						
	17	145	290	580	1150						
	16	130	255	510	1000						
	15	115	225	450	900	1350					
	14	98	195	390	785	1200					
	13	85	170	340	675	1000	1350				
	12	72	145	290	575	865	1150	1450			
	11	61	120	240	485	725	970	1200	1450		
	10	50	100	200	400	600	800	1000	1200		
	9	41	81	160	325	485	650	810	970	1300	
	8	32	64	130	255	385	510	640	770	1000	1200
	7	25	49	98	195	295	390	490	590	785	865
6	18	36	72	145	215	290	360	430	575	720	
5.5	15	30	61	120	180	240	305	365	485	605	
5	13	25	50	100	150	200	250	300	400	500	
4.5	10	20	41	81	120	160	205	245	325	405	
4	8	16	32	64	96	130	160	190	255	320	
3.5	6	12	25	49	74	98	125	145	195	245	
3	5	9	18	36	54	72	90	110	145	180	
2.5	3	6	13	25	38	50	63	75	100	125	
2	2	4	8	16	24	32	40	48	64	80	
1.5	1	2	5	9	14	18	23	27	36	45	
1	1	1	2	4	6	8	10	12	16	20	
		15 m	30 m	1 h	2 h	3 h	4 h	5 h	6 h	8 h	10 h
		Daily exposure time									

ACTIONS TO BE TAKEN TO MANAGE THE RISK FROM VIBRATION

The basic methods for reducing vibration exposure and risk are:

- Eliminate the use of vibrating tools or equipment by introducing mechanisation or alternative, vibration-free processes.
- Replace power tools with suitable modern, efficient, ergonomic, vibration-reduced types.
- Select appropriate consumables (eg better-balanced and fitted grinding wheels) and replace them when required.
- Provide employees with training, information and instruction on safe use of tools and equipment and ensure adequate supervision.
- Carry out maintenance of tools and equipment and replace consumables, as recommended by the manufacturers.
- Minimise the forces needed to operate and control the tools (eg with tensioners, balancers, jigs, fixtures)
- Reduce the exposure time, eg through job rotation.



FURTHER INFORMATION

- The Health and Safety Executive have guidance on the website at; <http://www.hse.gov.uk/pubns/indg175.htm>