HEALTH & SAFETY OPERATIONAL STANDARD – NOISE AND VIBRATION

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NOISE

1. Background

Noise at work can cause hearing damage that is permanent and disabling. This can be hearing loss that is gradual because of exposure to noise over time, but also damage caused by sudden, extremely loud noises. The damage is disabling as it can stop people being able to understand speech, keep up with conversations or use the telephone. Hearing loss is not the only problem. People may develop tinnitus (ringing, whistling, buzzing, or humming in the ears), a distressing condition which can lead to disturbed sleep. High noise levels can interfere with communications and make warnings harder to hear. It can also reduce people's awareness of their surroundings. These issues can lead to safety risks – putting people at risk of injury or in some situation's death.

2. Assessing Risks from Noise

2.1 Identify the risk and level of risk involved

Construction sites have a range of different noisy activities going on, often at the same time. In order to understand actions to take, the source of noise and level of noise to which workers are exposed must be understood.

Rules of thumb used to identify if there is a potential noise risk are:

- Is conversation at 2m possible, but noise is intrusive? The noise level here is probably at or higher than the First Action Level 80dB
- Are people exposed to noise which makes it necessary to raise their voice to talk to someone 2m away from a source of noise? The noise level here is probably more than the Second Action Level 85dB.

Using these rules of thumb will help identify when more detailed information is required to assess the risks involved.

2.2 Calculating Daily Level of Exposure

It is important to know the noise levels in order to determine the actual exposure and the risk to health. A noise survey can establish the noise levels and determine whether the action levels are being exceeded.

The noise exposure ready reckoners enable estimates of the daily or weekly noise exposure. This is similar to those used for vibration.

To use the daily exposure ready reckoner, you will need to know the levels of noise and durations of exposure which make up a person's working day. For weekly noise exposure, appropriate where somebody's noise exposure varies markedly from day to day, you will need to know the daily noise exposure for each day in the working week.

This data is obtained by taking readings from a sound level meter at the workplace and making a record of the readings together with the duration of exposure.

Some tasks with indicative noise levels at or above the upper exposure action value are given below:

Task	Average Noise Level (LEP,d)
Carpentry	92
Concrete • chipping / drilling • floor finishing • grinding • concrete worker	 85+ 85 85+ 89
Driving a dumper or roller	85+
Formwork	92
Labouring: • concrete pour • digging / scabbling • shovelling hardcore • shuttering • angle grinding / cutting	 97 100 94 91 90 - 110
M&E general installation	89
Piling: • Operator • Worker	 85+ 100+
Reinforcement work	86

Actual levels can vary (possibly significantly) from this depending on what you are doing and where you are doing it, the specific equipment and how well it is maintained / used can have a particularly big impact.

The Daily and Weekly ready reckoners are supported by more technical calculation tools found by following this link http://www.hse.gov.uk/noise/calculator.htm

- Noise Exposure Calculator
- Hearing protection Calculator

2.3 Ready Reckoner

Noise exposure ready reckoner (Daily Exposure)

For each task or period of noise exposure in the working day, find the exposure points corresponding to the sound pressure level and duration on the table below (e.g. exposure to 93 dB for 1 hour gives 80 exposure points.)

Add up the points for each task or period to give total exposure points for the day. Look up in the table on the right the total exposure points to find the corresponding daily noise exposure (e.g. a total exposure points for the day of 280 points gives a daily noise exposure of between 89 and 90 dB).

Use the link for more details visit the HSE website: http://www.hse.gov.uk/noise/calculator.htm

Sound pressure level, L_{Aeq} (dB(A))	Duration of exposure									
	2 min	5 min	15 min	30 min	1 h	2 h	4 h	8 h	10 h	12 h
120	1300									
110	130	330	1000	2000						
105	42	105	315	625	1250					
100	13	34	100	200	395	790	1600			
98	8	22	60	125	250	500	1000	2000		
97	7	17	50	100	200	395	790	1600	2000	
95	4	10	32	65	125	250	500	1000	1250	1500
94		8	26	50	100	200	395	790	1000	1200
93		7	20	40	80	160	315	630	790	950
92		5	16	32	65	125	250	500	625	750
91		4	12	26	50	100	200	400	500	595
90			10	20	40	80	160	315	395	475
89			8	16	32	65	125	250	315	375
88			6	12	26	50	100	200	250	300
87			5	10	20	40	80	160	200	240
86			4	8	16	32	65	125	155	190
85				6	13	26	50	100	125	150
84				5	10	20	40	80	100	120
83				4	8	16	32	65	80	95
82					6	13	26	50	65	75
81					5	10	20	40	50	60
80					4	8	16	32	40	48
79						6	13	26	32	38
78						5	10	20	26	30
75							5	10	13	15

Total exposure points (sum of points from individual exposure components)	Daily noise exposure $L_{EP,d}$ (dB(A))
320000	120
32000	110
10000	105
3200	100
2000	98
1600	97
1000	95
790	94
630	93
500	92
400	91
315	90
250	89
200	88
160	87
125	86
100	85
80	84
65	83
50	82
40	81
32	80
26	79
20	78
10	75

Above upper exposure action value ($L_{EP,d}$ 85 dB(A))
Above lower exposure action value ($L_{EP,d}$ 80 dB(A))
Below lower exposure action value ($L_{EP,d}$ 80 dB(A))

Noise exposure ready reckoner (Weekly Exposure)

For each working day in the week, find the noise exposure points for the day (e.g. a noise exposure on Day 1 of 90dB gives 320 points.)

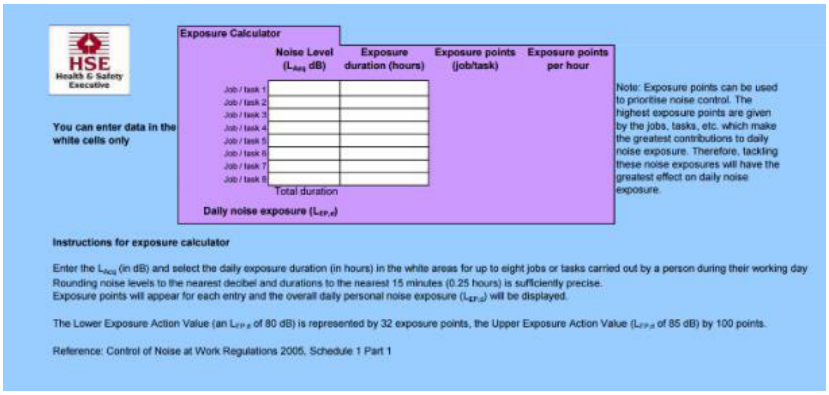
Add up the points for each day to give total exposure points for the week. Look up in the table on the right the total exposure points to find the corresponding weekly noise exposure (e.g. a total exposure points for the week of 2000 points gives a weekly noise exposure of 91dB).

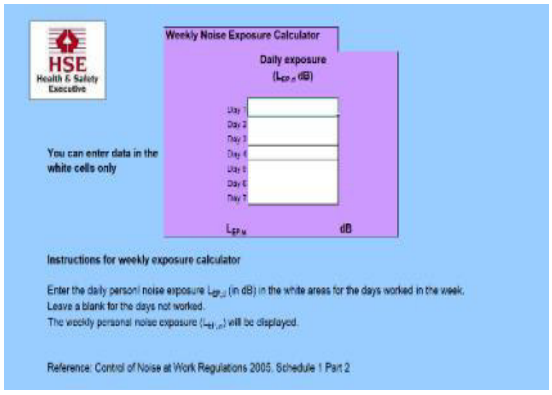
Daily noise exposure, $L_{EX,d}$ (dB)	*Points*						
	Day 1	*Day 2*	*Day 3*	*Day 4*	*Day 5*	*Day 6*	*Day 7*
95	1000	1000	1000	1000	1000	1000	1000
94	800	800	800	800	800	800	800
93	630	630	630	630	630	630	630
92	500	500	500	500	500	500	500
91	400	400	400	400	400	400	400
90	320	320	320	320	320	320	320
89	250	250	250	250	250	250	250
88	200	200	200	200	200	200	200
87	160	160	160	160	160	160	160
86	130	130	130	130	130	130	130
85	100	100	100	100	100	100	100
84	80	80	80	80	80	80	80
83	65	65	65	65	65	65	65
82	50	50	50	50	50	50	50
81	40	40	40	40	40	40	40
80	32	32	32	32	32	32	32
79	25	25	25	25	25	25	25
78	20	20	20	20	20	20	20

Total exposure points	*Weekly noise exposure $L_{EX,w}$ (dB)*
5000	95
4000	94
3200	93
2500	92
2000	91
1600	90
1300	89
1000	88
800	87
630	86
500	85
400	84
320	83
250	82
200	81
160	80
130	79
100	78

The noise exposure calculators found on the HSE website can help you work out your daily noise exposure, weekly noise exposures, and estimate the performance of hearing protection.

https://www.hse.gov.uk/noise/calculator.htm





3. Physical Controls for Noisy Work

Having identified what, the nature of the risk is a hierarchy of control for noise is used:

- Eliminate unnecessary noisy tasks
- Use alternative process that do not generate as much noise. For example:
    - block splitters instead of cut-off saws
    - crushing pile caps instead of pneumatic drilling
    - boring instead of pile driving
    - limiting vehicle reversing on site (reversing alarms add to the total noise on a site)
- **Equipment** –Select low-noise tools and equipment. Existing equipment can also be modified to reduce the noise it makes; e.g. fitting mufflers to intakes, silencers on exhausts and sound panels on engines.
- **Work practices** – the right equipment still has to be used correctly; e.g. make sure doors and windows of vehicle cabins are closed or the correct techniques used when dismantling formwork, shut down equipment, like vehicles, when they are not needed / in use.
- **Sound barriers** – stop noise escaping by using temporary shields / sound barriers. Common construction materials (e.g. plywood) or sound absorbing material can be used to make temporary barriers or enclosures.
- **Noise exclusion zones** – keep people away by limiting access to noisy areas. Warning signs will be required.
- **Distance** – noise levels drop significantly with distance. Position stationary noise sources as far as possible from workers. Locate walkways away from noisy tasks.
- **Rotate workers** – limit the time workers are exposed to noise. 'Weekly averaging' may be used to ensure exposures are managed. Include 'quiet days' when scheduling work.
- **Hearing protection** – provide workers with hearing protection, but this is not an alternative to eliminating and reducing noise at source. Hearing protection should not be the only control. It can easily fail or be misused. The right protection must also be used to avoid overprotection. Workers need to hear what is happening around them on construction sites to avoid accidents and to talk to each other.

The tool to estimate the performance of hearing protection will assist in ensuring the right level of protection is provided. http://www.hse.gov.uk/noise/calculator.htm

- **Provide information and training** – Tell workers about the risks to their hearing from loud noise and how to use the controls properly. The employer must (in addition to reducing noise levels by general action) inform each potentially affected worker and their representatives (where applicable) of the following:
    - The results of the measurements taken of the noise and the possible risk to their hearing
    - Results of preventative audiometric testing
    - what measures are being introduced to reduce the noise levels in the workplace
    - The advisability of wearing hearing protection that's individually fitted and where and how to obtain it
    - Hearing checks that are available
    - Any necessary additional information and where relevant training.

VIBRATION

1. Background

Approximately 1 million workers are exposed to high levels of vibration, of those 460,000 are estimated to be working in construction. Approximately 242,000 cases of HAVS are reported every year.

Hand-arm vibration is vibration transmitted from work processes into workers' hands and arms. It can be caused by operating handheld power tools, such as road breakers, and hand-guided equipment, such as powered lawnmowers, or by holding materials being processed by machines, such as pedestal grinders.

Regular and frequent exposure to hand-arm vibration can lead to permanent health effects. This is most likely when contact with a vibrating tool or work process is a regular part of a person's job. Occasional exposure is unlikely to cause ill health.

2. Hand-arm vibration

2.1 Sources of Risk

Hand-arm vibration can cause a range of conditions collectively known as hand-arm vibration syndrome (HAVS), as well as specific conditions such as carpal tunnel syndrome.

The following are typical sources of exposure to risks from hand-arm vibration.

- Road and concrete breaking drills
- Sanders and similar reciprocating tools
- Concrete pokers
- Cut-off saws or disc cutters
- Plate vibrators or wacker plates
- Power hammers and chisels hammers
- Demolition picks
- Percussive (hammer) drills
- Compressor guns
- Chainsaws
- Pneumatic drills
- Needle guns or scabblers
- Angle grinders
- Woodworking machinery

Other equipment that may occasionally be used and is a source of vibration includes plaster or paint mixers (whisks), impact wrenches, rotavators, lawnmowers and brush cutters.

Factors that should be considered when assessing the risks are those that can influence the magnitude of the vibrational acceleration reaching the hand and the effect of the vibration.

Considerations should be given to:

- Frequency at which the tool vibrates
- Exposure pattern (length and frequency of work and subsequent rest periods)
- Sharpness and suitability of the cutting tool or blade to cut the material being worked on
- Grip, push, and other forces used to guide and apply the vibrating tools. The tighter the grip, the more vibration energy is transferred to the hands. Vibration may increase as a tool becomes blunt and the user pushes harder
- Other factors that potentially affect blood circulation such as workplace temperature, whether the person smokes and individual's susceptibility
- Hardness of the material being worked

- Posture of the tool user, because tense muscles are more susceptible to hand-arm vibration e.g. using vibrating tools at arm length increases the effect.

2.2 Exposure Values

2.2.1 Measuring Exposure

Vibration is measured using an accelerometer, a device that attaches to the vibrating surface and produces an output proportional to the acceleration. The average magnitude of the vibration is indicated after the frequency weighting has been applied.

The damage caused by vibration is related to the total vibration a person is exposed to during the working day. This is referred to as the daily vibration exposure. To assess the daily vibration exposure, the eight-hour equivalent acceleration is determined. This quantity accounts for both the vibration magnitude and the time over which the exposure takes place.

A person's daily vibration exposure is, like the vibration magnitude, expressed in acceleration units of m/s2. The daily exposure can be thought of as the average vibration spread over a standard working day of eight hours, adjusted to take account of the actual total exposure time i.e. contact time or trigger time.

2.2.2 Exposure Action Value (EAV)

The EAV is a daily amount of vibration exposure where, if exceeded, action must be taken to control exposure. The greater the exposure level, the greater the risk and the more action the Package Lead Supervisor should take to reduce the risk. For Hand Arm Vibration it is a daily exposure of 2.5 m/s2 and for Whole Body Vibration it is a daily exposure of 0.5 m/s2

2.2.3 Exposure Limit Value (ELV)

The ELV is the maximum amount of vibration an employee may be exposed to on any single day. It represents a high risk above which employees should not be exposed. The only exception to this is for occasional (e.g. emergency work) where the ELV is exceeded on one day, but exposure is at or close to zero for the rest of the week.

The maximum daily level of vibration an employee may be exposed to. For Hand Arm Vibration it is a daily exposure of 5 m/s2 and for Whole Body Vibration it is a daily exposure of 1.15 m/s2 .

2.2.4 Measuring Equipment

There is a wide range of vibration monitoring equipment available. It is recommended that monitoring equipment that assesses the level of vibration that workers are exposed to when using various power tools is used.

Monitoring equipment like the HAV measures the length of time the tool is used for and by calculating the total exposure links to the ready reckoner points that are used for the risk assessment decisions.

There are similar items of monitoring equipment available from other manufacturers that do the same thing.



2.3 Calculating Daily Level of Exposure using the Ready Reckoner

Calculating the level of exposure, particularly when a person may be using more than one tool in a given day, involves a series of calculations. To make this easier enforcement agencies have developed a points-based system. The table below is a 'ready reckoner' for calculating daily vibration exposures using this points-based system. The ready reckoner covers a range of vibration magnitudes from 1 to 40 m/s² and exposure times from 5 minutes to 6 hours.

You need is the vibration magnitude (level) and exposure time. The exposures for different combinations of vibration magnitude and exposure time are given in exposure points instead of values in m/s2 A(8). The exposure points system is easier to work with than A(8) values:

3. exposure points change simply with time: twice the exposure time, twice the exposure points;
4. exposure points can be added together, for example, where a worker is exposed to two or more different sources of vibration in a day;
5. the EAV (2.5 m/s² A(8)) is equal to 100 points;
6. the ELV (5.0 m/s² A(8)) is equal to 400 points.

The cells are colour-coded with:

1. red for exposures above the ELV;
2. green for exposures below the EAV;
3. yellow for exposures between the two.

Table 1:- Ready-reckoner for vibration exposure points

Key
Above ELV
Likely to be above ELV
Above EAV
Likely to be at or above EAV
Below EAV

Vibration magnitude, a_{w} (m/s²)	5 min	15 min	30 min	1 h	1 h 30 min	2 h	3 h	4 h	5 h	6 h
40	265	800								
30	150	450	900							
25	105	315	825	1250						
20	67	200	400	800	1200					
19	60	180	360	720	1100	1450				
18	54	160	325	650	970	1300				
17	48	145	290	580	865	1150				
16	43	130	255	510	770	1000				
15	38	115	225	450	675	900	1350			
14	33	98	195	390	590	785	1200			
13	28	85	170	340	505	675	1000	1350		
12	24	72	145	290	430	575	885	1150	1450	
11	20	61	120	240	365	485	725	970	1200	1450
10	17	50	100	200	300	400	600	800	1000	1200
9	14	41	81	160	245	325	485	660	810	970
8	11	32	64	130	190	255	385	510	640	770
7	8	25	49	98	145	195	295	390	490	500
6	6	18	36	72	110	145	215	290	360	455
5.5	5	15	31	61	91	120	180	240	305	365
5	4	13	25	50	75	100	150	200	250	300
4.5	3	10	21	41	61	81	120	160	205	245
4	3	8	16	32	48	64	96	130	160	190
3.5	2	6	13	25	37	49	74	98	125	145
3	2	5	9	18	27	36	54	72	90	110
2.5	1	3	6	13	19	25	38	50	63	75
2	1	2	4	8	12	16	24	32	40	48
1.5	0	1	2	5	7	9	14	18	23	27
1	0	1	1	2	3	4	6	8	10	12

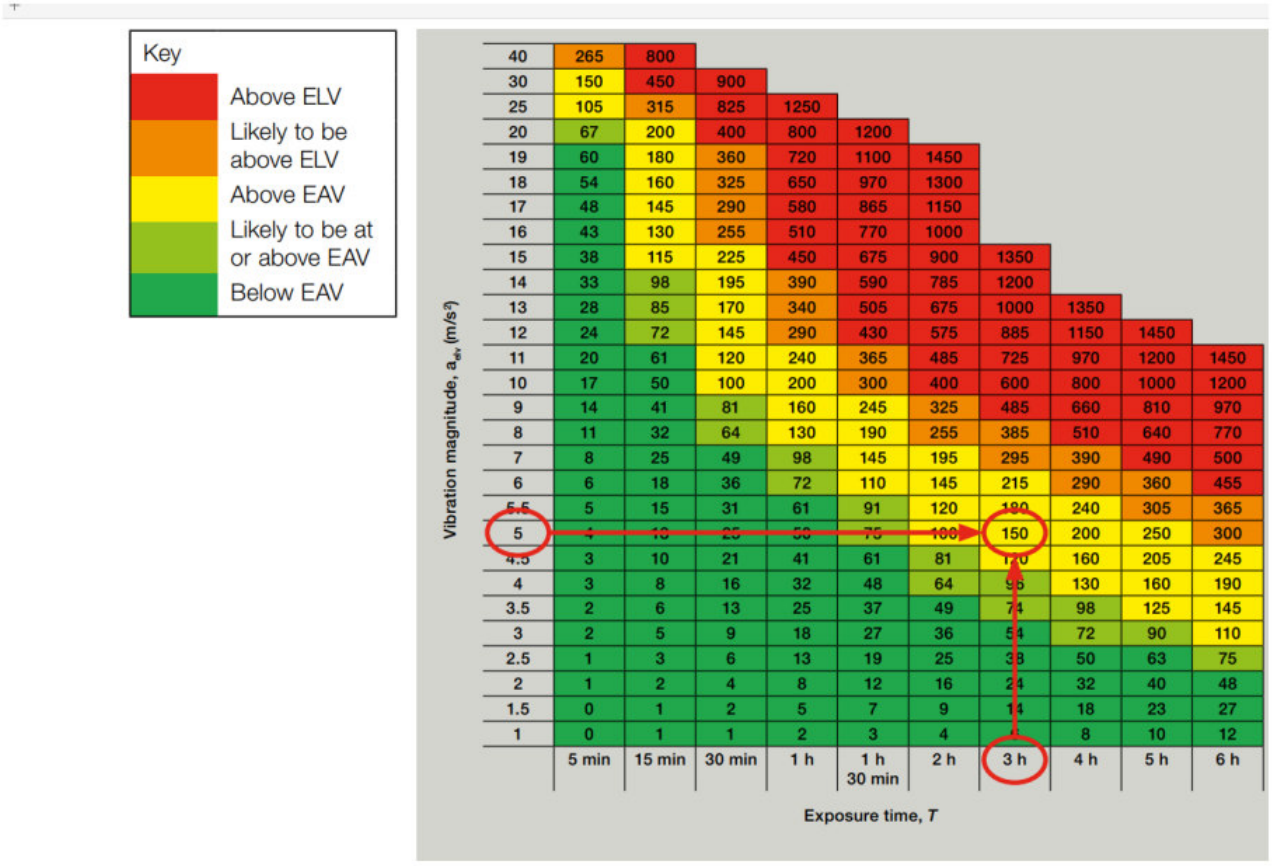
Exposure time, *T*

Two further colours have been included to account for the uncertainty introduced by estimating exposures:

(a) light green representing exposures (between 64 and 100 points) which should be considered as likely to be at or above the EAV;
(b) orange representing exposures (between 255 and 400 points) which should be considered as likely to be above the ELV.

If your exposure time does not appear on the table above, you can add points from different columns. For example: for 1 hour and 15 minutes of exposure, add values in the 1-hour and the 15-minute columns; for 8 hours exposure, double the 4-hour exposure points values.

Table 2:- Using the vibration exposure points ready-reckoner



40	265	800								
30	150	450	900							
25	105	315	825	1250						
20	67	200	400	800	1200					
19	60	180	360	720	1100	1450				
18	54	160	325	650	970	1300				
17	48	145	290	580	865	1150				
16	43	130	255	510	770	1000				
15	38	115	225	450	675	900	1350			
14	33	98	195	390	590	785	1200			
13	28	85	170	340	505	675	1000	1350		
12	24	72	145	290	430	575	885	1150	1450	
11	20	61	120	240	365	485	725	970	1200	1450
10	17	50	100	200	300	400	600	800	1000	1200
9	14	41	81	160	245	325	485	660	810	970
8	11	32	64	130	190	255	385	510	640	770
7	8	25	49	98	145	195	295	390	490	500
6	6	18	36	72	110	145	215	290	360	455
5.5	5	15	31	61	91	120	180	240	305	365
5	4	13	25	50	75	100	150	200	250	300
4.5	3	10	21	41	61	81	120	160	205	245
4	3	8	16	32	48	64	95	130	160	190
3.5	2	6	13	25	37	49	74	98	125	145
3	2	5	9	18	27	36	54	72	90	110
2.5	1	3	6	13	19	25	38	50	63	75
2	1	2	4	8	12	16	24	32	40	48
1.5	0	1	2	5	7	9	14	18	23	27
1	0	1	1	2	3	4	6	8	10	12

2.3.1 Using the exposure points ready reckoner.

- Find the vibration magnitude (level) for the machine or process concerned (or the nearest value) on the grey scale on the left of the table.
- Find the exposure time (or the nearest value) on the grey scale across the bottom of the table.
- Find the value in the table that lines up with the magnitude and time. Table 2 above shows how it works for a magnitude of 5 m/s2 and an exposure time of 3 hours: in this case the exposure corresponds to 150 points
- Compare the points value with the exposure action and limit values (100 and 400 points respectively). In this example, the score of 150 points lies above the EAV. The colour of the cell containing the exposure points value tells you whether the exposure exceeds, or is likely to exceed, the exposure action or limit value.

2.3.2 Partial vibration exposure

Where a person is exposed to more than one source of vibration (because they use two or more different machines or processes during the day) this will result in two or more partial vibration exposure values. These partial exposures can be added together using exposure points to give the overall daily exposure value for that person.

The partial exposures can help decide the priorities in an action plan for minimising vibration exposure, I.e. the machine and processes which provide the largest contributions to a person's overall daily exposure are those which should be given the highest priority for control.

2.3.3 Example: Use of partial vibration exposure

A heavy fabrication company has a regular contract to refit and paint steel barges. They use a vacuum-blasting system to strip paint and corrosion from the hulls. But this does not reach into all of the corners so they must use needle scalers. They also clean and dress small areas with angle grinders prior to carrying out weld repairs before repainting. They have a workforce of painters and welders.

The company has its own needle scalers and angle grinders for these tasks. The tools are well maintained, and the workforce are trained in correct use. The needle scalers have a vibration magnitude of about 12 m/s2 and the angle grinders 8 m/s2. They estimate daily use of about three hours for the angle grinders and 30 minutes for the needle scalers.

Having succeeded in eliminating a lot of vibration by introducing the vacuum-blasting system, the company uses the ready-reckoner to review and further manage vibration exposure. The company is considering getting the welders to do all the needle scaling and weld preparation work and the painters to do the vacuum-blasting and to paint. The daily vibration exposure for the welders would therefore comprise two partial exposures:

- Angle grinder (8 m/s2 for 3 hours): 385 points
- Needle scaler (12 m/s2 for 0.5 hour): 145 points

Total vibration exposure: 530 points

With this approach the ELV (400 points) would be exceeded, and the company must plan the work in another way to ensure the welders' exposure is reduced, at least, to below the ELV and to as low as is reasonably practicable.

Although the needle scalers have a higher vibration level than the angle grinders, the use of the angle grinder accounts for the greater proportion of the welders' vibration exposure and is therefore a higher priority for urgent attention than the use of the needle scalers.

The partial exposure from use of the angle grinder is close to 400 exposure points, and it is likely that the ELV will be exceeded by this work alone. The company introduces a job rotation system. It trains some of its painters so that they can use angle grinders. This reduces daily use of the angle grinders by any employee to 1.5 hours in either a morning or an afternoon (but not both). The actual use of the angle grinders is then likely to be up to about 1.5 hours per day. Summing the points for 8 m/s2 for 1 hour (130 points) and for 30 minutes (64 points) gives an exposure of 194 points and is well below the limit value.

The exposure from use of the needle scaler alone is greater than the EAV (100 points) and must also be reduced to the lowest level reasonably practicable. A reduced vibration model is hired with a vibration emission of about 7 m/s2. This gives a partial exposure of only 49 points which by itself is below the EAV.

Because employees who use powered hand tools are regularly and frequently exposed above the EAV, a health surveillance scheme is introduced for them.

The planned controls of exposure to vibration – a maximum of 1.5 hours on the angle grinder and up to 0.5 hour on the needle scaler – should achieve maximum exposures of each employee of (from Table 1):

- Angle grinder (8 m/s2 for 1.5 hours): 194 points
- Needle scaler (7 m/s2 for 0.5 hour): 49 points

Total vibration exposure: 243 points

If all of the painters are trained to use the angle grinders and needle scalers, with careful management it will be possible to share work with the welders and halve the amount of hand-arm vibration exposure. This means the angle grinder work can be reduced to about 45 minutes and neither welders nor painters will need to use both a needle gun and an angle grinder on the same day. Exposure can therefore be further reduced.

Using Table 1:

- Angle grinder (8 m/s2 for 30 minutes): 64 points
- Angle grinder (8 m/s2 for 15 minutes): 32 points

Total vibration exposure: 96 points on days when a grinder is used.

Total vibration exposure: 49 points on days when a needle gun is used.

The planned work will result in vibration exposure likely to be below the EAV on days when a needle gun is used and at or above the EAV but below the ELV on days when a grinder is used.

This system for working out exposure times can be found on the HSE website using this link together with a more detailed explanation of how it works: www.hse.gov.uk/vibration

There is a spreadsheet calculator available on-line for calculating daily exposures found on www.hse.gov.uk/vibration

2.4 Controlling the Risk

2.4.1 Change the process

The most effective means of controlling vibration exposure is by changing the process. Avoiding the use of hand-held equipment will effectively eliminate the incidence of hand-arm vibration.

2.4.2 Reduce vibration created

The next option should be to ensure equipment generates the lowest possible amount of vibration. This may be achieved in the following ways:

- Opting a buy/hire smooth policy, whereby the manufacturers or hirers published vibration emission data is used to select low vibration equipment (Note: manufacturers data cannot be relied upon to provide accurate data for an individual, monitoring of actual usage is needed). Some tools might emit less vibration than others but are relatively inefficient, resulting in increased exposure times and higher grip and push forces, therefore resulting in an overall higher exposure
- Maintaining equipment so that it continues to operate at the lowest possible vibration levels. This includes ensuring bearings, bushings and vibration-resilient components are regularly serviced and replaced if necessary
- Using the correct bit, disc, or attachment for the work, and keeping them sharpened, or replacing items such as sanding disks when worn. Using blunt or worn-out bits, disks and attachments causes workers to exert more force on the tool, which increases the transmission of vibration to the hand

- Operating the equipment at a speed that gives the lowest vibration. Often by increasing the rotational speed, the vibration emission can be minimised. The best speed can be determined by experimentation and accurate measurement

2.4.3 Reduce Level of Exposure

If these methods do not adequately reduce the vibration exposure of individuals, the daily use must be limited. Ensure that workers have regular short breaks, particularly if they experience acute symptoms (such as pins and needles in the hands and fingers).

- Maintain blood circulation in the fingers, which makes a significant contribution towards preventing damage from hand-arm vibration. The following measures can help to achieve this
- Wearing gloves to keep the hands warm

Note: the use of 'anti-vibration gloves' is prohibited. In most cases they have little or no effect on vibration transmitted to the hand, and in some cases can make matters worse.

- Using proprietary heating pads for the hands
- Using tools with heated handles
- Avoiding tools that have pneumatic exhausts that discharge towards the hands
- Encouraging operatives to warm up before starting work, and helping them to stay warm
- Providing warm, weatherproof clothing in cold, wet areas, and ensuring it is worn
- Massaging and exercising fingers during work breaks.

2.5 Information and Training

- Ensure that workers are aware of the course of action they should take if they are experiencing early symptoms of over exposure to hand-arm vibration, such as reporting to an appointed manager, supervisor, or occupational health service
- Ensure training and information is provided to all workers, supervisors, and managers

2.5.1 Health Surveillance

Health surveillance should be provided for the following vibration-exposed employees:

- Those who are likely to be regularly exposed above the EAV
- Those who are likely to be exposed occasionally above the action value and where the risk assessment identifies that the frequency and severity of exposure may pose a risk to health
- Those who have a diagnosis of HAVS (even when exposed below the action value)

Where health surveillance indicates that a worker is being adversely affected by vibration in the workplace, the employer must ensure the following:

- The risk assessment is reviewed
- Existing control measures are reviewed, considering any advice given by a doctor, occupational health professional or enforcing authority.
- Consideration is given to reassigning the employee to other work where there is no risk from further exposure
- The health of any other employee who has been similarly exposed is reviewed, including the provision of a medical examination were recommended by a doctor, occupational health professional or the enforcing authority.

Health surveillance for GMI workers identified as being at risk will be arranged by the Project Lead in liaison with GMI HR.

3. Whole Body Vibration Risk

Whole Body Vibration (WBV) is vibration or jolting of the whole body through the surface that is supporting the body (such as a machine seat or floor).

WBV, which often results from driving or operating some types of construction plant or vehicle, has the potential to cause back injury or make an existing back condition more painful.

Mobile machine operators and drivers (especially those who work off-road) are at increased risk from back pain.

The following items of plant have been shown to generate potential risks relating to WBV:

- Rough-terrain forklift trucks and telehandlers
- Vibratory rollers
- Mobile crushers
- Dumper trucks and other forms of earth-moving machinery

WBV can be controlled in different ways although the best control is to ensure the surfaces over which vehicles must travel are as smooth as possible without significant bumps, potholes or similar that produce significant jolting when the machine passes over them.

Other controls include improved technology in mobile plant (such as improved suspension and air cushioned driver seats), operator training, smooth operation of machines and job rotation.

At-risk workers include older people, those with previous back or neck problems, young people and pregnant women who are more likely to be at risk of back pain and may be at higher risk from exposure to whole-body vibration.

Once the vibration risk assessment has established that there are workers at risk, the employer (Sisk or supply chain as applicable) must design and implement a control programme to reduce the exposure to a level as low as is reasonably practicable, and in any case below the ELV. Such a programme follows the same principals as that for hand-arm vibration.

4. Legislation & Guidance

Document	Link
Noise at Work Regs	NAWR
Noise Guidance & exposure calculator	NAWR Guide
Control of Vibration at Work Regulations 2005	CVAWR
Vibration Guidance and ready reckoner	CVAWR guide]
INDG 242 – Controlling back pain from whole body vibration	INDG 242
INDG 175(rev2) Hand-arm vibration at work: A brief guide	HAV 175
Noise exposure ready-reckoner (Daily exposure)	Daily Exposure
Noise exposure ready-reckoner (Weekly exposure)	Weekly Exposure