Bad Vibrations

John Ross, former Course Manager and Master Greenkeeper, is now working to improve health and safety in the turf management industry. This month he turns his attention to the common ailment of Hand Arm Vibration Syndrome – which is actually classed as a disease

The effects of vibration causing ill health and injury in the workplace are clearly understood. So much so that Hand Arm Vibration Syndrome (HAVS) has been listed as a prescribed disease in the UK since 1985 and is covered in RIDDOR2013(8) as being an occupational disease. Its occurrence must be recorded by the person designated responsible for managing health and safety in the workplace and reported to the HSE.

So what is HAVS, how do we recognise it and how do we manage in order to prevent it?

HAVS is caused by the continuous use of vibrating machinery and affects nerves, muscles, joints and blood vessels. Symptoms appear in the vascular system which involves the tips of fingers going white (blanching), or that the vascular system, which includes numbness and tingling of the fingers and a reduced sense of temperature or touch. Attacks in the early stages of the condition are continuous and you do not have to be using vibrating equipment for the symptoms to manifest despite the fact they have been caused by that equipment, simply working in cold conditions is enough to trigger the symptoms.

When this occurs and the cold body subsequently warms back up an exaggerated return blood flow can occur that will lead to a throbbing of the fingers and the fingers going red and feeling extremely painful. HAVS will be exacerbated by conditions that have resulted in reduced blood circulation – and this includes smoking which causes small blood vessels to narrow and can exacerbate the symptoms.

If exposure to vibration continues then the symptoms will spread further up the hand and can even affect the thumb. Sufferers will experience joint pain (Carpel Tunnel Syndrome) reduced muscle strength and permanent nerve damage. In turf management the equipment that can lead to HAVS is hand held power tools and hand guided power tools. HAVS does not appear overnight, it is a chronic condition that studies have suggested may take up to ten years to develop. Once it has developed it cannot currently be cured.

Managing HAVS

Exposure to vibration is regulated, and these regulations place a duty on the employer to either eliminate vibration at source, or to reduce exposure and replace it with equipment that reduces vibration excessively – ensure equipment is maintained in accordance with the manufacturers’ recommendations.

- Provide employees with instruction on HAVS and what is being done to reduce exposure.
- Implement a programme of health surveillance (this is important to this means regularly asking staff if they have any symptoms).

ELV

Reduced exposure to below the limit value is immediately - identify the sources to limit being exceeded and modify measures to prevent it being exceeded again.

So what do the regulations say?

As vibration is a workplace hazard, any employer exposings their staff to vibration must conduct a vibration risk assessment. Like any risk assessment it is a tool that enables the manager to record what controls are in place, whether they are effective or not, and if any improvements needed. The risk assessment should determine who is exposed, the magnitude of exposure and the duration of exposure for all equipment. It should also identify vulnerable workers (those with early symptoms of HAVS) and young workers with developing bodies who are more susceptible to Musco Skeletal Disorder.

"You cannot manage what you cannot measure" is a well known adage. Vibration can be measured because it is an oscillation around a fixed point and is measured like noise, in amplitude (the extent of oscillation) and frequency (how often it occurs). The measurement taken as factory new, and that equipment deteriorates, gets damaged, is not always maintained as it should be.

In mechanical terms the measurement is expressed in Metres per second sq (M/S2), knowing the vibrating levels of machinery is the starting point to implementing procedures.

The amount of vibration you can be exposed to is subject to C/VVR95 (4) Exposure Action Values (EAV) and Exposure Limit Values (ELV). The EAV is the amount of vibration over which the employer has to take action. The ELV is the maximum amount of vibration an employee can be exposed to in a day, these are both measured over an eight hour working period so is referenced as (A8). Unlike the regulations for noise, Personal Protective Equipment is given no consideration. Those values are an EAV of 2.5 M/S2 (A8) and an ELV of 5 M/ S2 (A8). The data for these levels is provided by the manufacturers of the equipment and is published within the operators’ manual. We must bear in mind that this is a measurement taken as factory new, and that equipment deteriorates, gets damaged, and is not always maintained as it should be.

The measurement provided by the manufacturer also does not consider wear and tear, service requirements, damaged parts, or blunt blades - all of which add to the vibration exposure. This means that any employer exposing employees to vibration also has a duty to measure to determine actual vibration levels.

Once vibration levels are established it is easy to put in place procedures that keep exposure levels below the ELV, the easiest way of doing this using a points system introduced by the HSE. Points are awarded to a vibration magnitude per hour, if the points tally for the day reaches 100 you have reached the Exposure Action Value and must take action, if the point tally reaches 400 you have hit the Exposure Limit Value that exposure cannot exceed.

Using the HSE Vibration Exposure Points Calculator we can see that equipment with a vibration magnitude of 5 M/S2 can be used for eight hours before the ELV is reached 5/S2x400 points.

I know from experience as a Course Manager, that much equipment greenkeepers and groundsman use reaches the EAV, and some reaches the ELV, so we need to know what the duty of the employer is when those levels are reached. Those duties are shown in the table above (EAV).

Managing vibration is relatively easy once exposure levels have been established. The easiest way to do this is to put a timeframe on how long a piece of equipment can be used for, take into consideration breaks and rest periods and rotate tasks amongst the team all to ensure that points are experienced on the HSE calculator remains below 400.

When purchasing equipment you consider the vibration magnitude as part of your purchasing policy and buy the most suitable piece of equipment for the task but with the lowest exposure levels. However, familiarise yourself with the symptoms and what are, and tell them to report to you immediately if any symptoms are experienced and maintain equipment and ensure that it is set up correctly.
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When this occurs and the cold body subsequently warms back up an exaggerated return blood flow can occur that will lead to a trembling of the fingers and the fingers going red and feeling extremely painful. Excess blood can be measured that has been caused by HAVS and hand held power tools and hand guided power tools. HAVS does not appear overnight, it is a chronic condition that studies have suggested may take up to ten years to develop. Once it has developed it cannot currently be cured.

Managing HAVS

Exposure to vibration is regulated, and these regulations place a duty on the employer to either eliminate vibration at source, or to lower exposure to as low as is reasonably practicable. What eliminate at source means is taking physical contact with the vibrating equipment out of the task (using a remote control) or do not undertake the task if those hands really need changing? However where it cannot be eliminated (yes that bank does need regrading) eliminate at source means introduce organisational and technical procedures appropriate to the activity and to apply MHSWR1999 [4] The Principles of Prevention.

So what do the regulations say?

As vibration is a workplace hazard, any employer exposing their staff to vibration must conduct a vibration risk assessment. Like any risk assessment it is a tool that enables the manager to record what controls are in place, whether they are sufficient or not, and if any improvements needed. The risk assessment should determine who is exposed, the magnitude of exposure and the duration of exposure for all equipment. It should also identify vulnerable workers (those with early symptoms of HAVS) and young workers with developing bodies who are more susceptible to Musco Skeletal Disorder.

“You cannot manage what you cannot measure” is a well-known adage. Vibration can be measured because it is an oscillation around a fixed point and is measured like noise, in amplitude (the extent of oscillation) and frequency (how often it occurs). The measurement taken as factory new, and that equipment deteriorates, gets damaged, and is not always maintained as it should be.

In mechanical terms the measurement is expressed in Metres per second sq (M/Sq2). Knowing the vibration levels of machinery is the starting point to implementing procedures.

The amount of vibration you can be exposed to is subject to CVVR05 (4) Exposure Action Values (EAV) and Exposure Limit Values (ELV). The EAV is the amount of vibration over which the employer has to take action. The ELV is the maximum amount of vibration an employee can be exposed to, and can be divided up into eight hour periods.

Managing vibration is relatively easy once exposure levels have been established. The easiest way to do this is to put a timeframe on how long a piece of equipment can be used for, take into consideration breaks and rest periods and rotate tasks amongst the team all to ensure that points are experienced on the HSE calculator remains below 400.

When purchasing equipment consider the vibration magnitude as part of your purchasing policy and buy the most suitable piece of equipment for the task with the lowest exposure levels.

In applying the principles of prevention the employer must:
- Find other working methods which eliminate or reduce exposure
- Take account of the work to be done
- Choose equipment that reduces vibration exposure and replace that which is vibrating excessively
- Ensure equipment is maintained in accordance with the manufacturer’s recommendations
- Provide employees with instruction on HAVS and what is being done to reduce exposure
- Implement a programme of health surveillance (this is simpler than it sounds as means regularly asking staff if they have any symptoms)

ELV

- Reduce exposure to below the limit immediately
- Identify the monitors for monitoring being exceeded and modify measures to prevent it being exceeded again

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