

# Electricity Industry Occupational Health Advisory Group



## Guidance Note 4.1

# Noise and Vibration

The Occupational Health Advisory Group for the Electricity Industry (OHAG) is an independent body of senior occupational physicians. They all have a professional role to provide advice to individual companies in the electricity industry and they meet together three times a year to discuss matters of common interest and to promote good practice in occupational health across the industry. The main route for doing this is by the preparation of guidance notes on topics of interest to the industry. The remit of OHAG and its guidance covers all aspect of the industry from generation, through transmission and distribution to retail and supply.

Until now the promulgation of this OHAG guidance has largely been by means of paper copies of the documents circulating within individual companies in the electricity industry. OHAG recognises that there is a need to make these papers more widely available and is grateful for the support provided by the Energy Networks Association (ENA) in hosting these documents on their website, and the links to them from the websites of the Association of Electricity Producers (AEP) and the Energy Retail Association (ERA).

The guidance notes will be of interest to managers, employees and occupational health professionals within the industry. They give general advice which has to be interpreted in the light of local circumstances. Health professionals using the guidance, retain an individual responsibility to act in accordance with appropriate professional standards and ethics. This guidance is offered in good faith and neither the individual members of OHAG, the companies they support, the ENA, AEP or the ERA can accept any liability for actions taken as a result of using the guidance.



## **Noise and Vibration**

### **1. Introduction**

#### **a. Noise.**

- Noise exposure has long been recognised as a cause of deafness, a few Companies introduced a Hearing Conservation Programme after the 1989 Regulations came into force, but many workers remained exposed to noise in their workplace. Some 170,000 people in the UK suffer deafness, tinnitus or other ear conditions as a result of exposure to excessive noise at work. The 2005 Noise at Work Regulations, built upon the EU Physical Agents Directive, both lowers the statutory exposure levels for workplace noise and also tightens the rules about Health Surveillance for workers who are exposed to noise in the workplace.
- When assessing individuals for the effects of noise, it is important to consider also personal leisure activities that can contribute to noise dose and also environmental noise. The main health effect of noise exposure is hearing impairment caused by damage to the cochlear hair cells. Tinnitus (constant ringing in the ears) is another consequence of noise exposure, most often linked to impact noise such as that from percussive tools. Lastly, some non auditory health effects have been attributed to noise exposures, particularly persistent environmental noise doses. These effects include high blood pressure, heart disease, sleep disturbance and mood changes. Various other conditions have been cited as noise linked although the evidence of causal association is much weaker.

#### **b. Hand transmitted vibration.**

- Hand transmitted vibration is a common hazard in Industrial workplaces. Anyone using hand-held power tools, holding materials being machine processed or using some hand guided machinery is at risk. Frequent exposure can cause a range of permanent injuries to the hands and arms known collectively as Hand-Arm Vibration Syndrome (HAVS). Other colloquial names such as 'dead finger', 'white finger', or 'dead hand' have been used to describe components of the syndrome over many years. Around five million workers are exposed to hand-arm vibration in the workplace. Two million of these workers are exposed to levels of vibration where there are clear risks of developing disease.
- Although the effects of Vibration on health have been known about since the beginning of the 20th Century, the date of 'guilty knowledge' is generally accepted to be in the mid 1980's, hence there is no legal excuse for a firm to expose its workers to vibration levels damaging to health. The 2005 Regulations brought the UK 'Guidance levels' for exposure into line with the lower EU levels and imposed statutory exposure limits. Notwithstanding the statutory limits, good employers will attempt to keep exposure as low as reasonably practicable.



### **c. Whole body vibration**

- Regular long term exposure to Whole Body Vibration (WBV) is associated with back pain alongside other factors such as poor posture and heavy lifting. WBV risks exist where any commercial, industrial or construction vehicles are driven regularly for most of the day. The vibration is transmitted through the seat or the feet of the machine operator/driver

## **2. Aims of this Document**

The aims of this document are:

- to identify the relevant existing legislation and guidance
- to identify the key issues and principles of health surveillance
- to summarize the measures required to approach exposure control within the workplace

## **3. Relevant Legislation**

- The Control of Vibration at Work Regulations 2005 (the Vibration Regulations), came into force on 6 July 2005 and aim to protect workers from risks to health from vibration.
- The Control of Noise at Work Regulations 2005 (the Noise Regulations) came into force for all industry sectors in Great Britain on 6 April 2006 (except for the music and entertainment sectors where they came into force on 6 April 2008).
  - The Control of Noise at Work Regulations 2005 replace the Noise at Work Regulations 1989.

## **4. Relevant Guidance**

- [Controlling noise at work. Guidance on the Control of Noise at Work Regulations 2005](#) L108, ISBN 0 7176 6164 4 HSE Books
- [HSE's free employers leaflet Noise at Work - Advice for employers INDG362 \(rev 1\)](#)  
This leaflet is for employers on good practice and considering what they need to do
- [HSE's free pocket card Protect your hearing or lose it! INDG363](#)  
Contains notes on good practice which you may find helpful.
- [Hand-arm vibration - Advice for employees \(INDG296\)](#)
- [Hand-arm vibration – The Control of Vibration at Work Regulations 2005 \(L140\) \(ISBN 0-7176-6125-3\)](#)



- ['Vibration solutions: practical ways to reduce the risk of hand-arm vibration injury' \(HSG170 \(ISBN 0-7176 0954-5\)\)](#)  
Good practice vibration solutions. A book of 51 case studies on how vibration problems were tackled in a range of industries.
- ['Hard to Handle' \(ISBN 0717618811\)](#) priced £40.00 +VAT.  
A 15 minute video for employers and employees showing the causes, effects and controls for HAV.
- [Control back-pain risks from whole-body vibration - Advice for employers on the Control of Vibration at Work Regulations 2005 INDG 242](#)
- [Drive away bad backs - Advice for mobile machine operators and drivers IND404](#)
- [Whole-body vibration. Control of Vibration at Work Regulations 2005. \(L141\) \(ISBN 0-7176-6126-1\)](#)

## 5. The Issues

### a. Noise

- If you walk into a sufficiently noisy environment, you will leave with at least some hearing loss. If the damage has not been severe this will recover during the next few hours but can take up to 48 hours to recover. This phenomenon is known as temporary threshold shift. If the noise exposure was severe, or you repeat it often enough, the hearing loss may become permanent. Excess noise characteristically damages hearing at the higher frequencies first, hence there is a characteristic 'warning' pattern of hearing change that can be recognised in an individual when health screening by audiometry is conducted.
- It is generally accepted that hearing damage is unlikely at continuous equivalent noise levels below 70-75dB. The Regulations require workers to be offered hearing protection when the workplace exposure is likely to exceed an continuous equivalent of 80dB(A) and they **must** have PPE and wear it if the noise environment exceeds 85dB(A).
- **Principles of Hearing Conservation.** Any hearing conservation programme depends first of all on identification of hazardous areas and noise sources, considering all means of reducing the noise and education of the workforce. PPE should be considered only as a last resort. The only way of monitoring the success of the programme is by audiometry of the exposed population. Statutory 'Health records' created in a hearing conservation programme are **management** documents designating fitness for work. These must be made available to Enforcing Authorities, the screened individual and their safety representative on request as appropriate. Further anonymised collated results from the screening programme must be available if requested. 'Health records' must be kept separate from any medical records written by health professionals; these latter documents are confidential.
- When the risk assessment identifies designated noise hazardous zones, the workers whose workstations are in these zones and/or who will spend enough



time in these areas so that they might receive an exposure close to an action level must undergo periodic audiometry. Audiometry should be undertaken by and assessed by a competent person. If the test is conducted when the worker has come directly from the shop-floor and is normal, all is well. If the test is abnormal it may indicate temporary threshold shift and it confirms there is a noise hazard in that work area. The worker with an abnormal test should be re-tested after two days without any significant noise exposure and if the result is still abnormal, referral to a duly qualified OH Physician is appropriate. Likewise, workers whose audiogram changes significantly between tests should be referred for review as detailed in the HSE guidelines.

- One of the main difficulties is assessing noise exposure levels in an environment where the noise may fluctuate widely, but it remains a statutory duty to prevent any member of the workforce from an exposure that exceeds an 8 hour equivalent dose of 85dB(A) and it is good practice to prevent exposure above 80dB(A). On an equal energy principle, 8hr LAe<sub>(pd)</sub> equates to a 2 second exposure at 125dB(A). Unfortunately, it is not uncommon to see people lift up the edge of their earmuff in order to hear better what a colleague is saying. In that one brief exposure they may exceed their statutory dose limit.

#### **b. Hand Arm Vibration**

- Vibrations in the frequency range of 2 to 1500Hz are potentially damaging. Vibration damage effects either or both the blood vessels and the nerves. Vibration exposures may be expressed as a daily 8 hour energy equivalent expressed as A(8). Whilst employers are required to limit noise exposure to the lowest possible level, if workers are exposed to an A(8) exceeding 2.5m/s/s the employer must take steps to reduce their exposure. No employee must be allowed to exceed a dose of 5m/s/s A(8) and procedures should be established to immediately stop an employees exposure if they reach this limit.
- Early presentation of vibration damage may typically be with a sensation of tingling or 'pins and needles' in the fingers or hand. This is most noticeable at the end of the working day or when the hands are cold and may be accompanied by numbness. With continued exposure the sufferer may experience periodic episodes of blanching of the fingers when exposed to cold. In mild cases, only the tip of the fingers are affected; as the condition progresses greater areas show changes.
- In the early phases improvement may occur if work is changed to avoid exposure to vibration. As the condition progresses symptoms become more frequent and may last longer causing pain and loss of manual dexterity. The latter can lead to clumsiness and reduced grip strength. Eventually episodes can occur with minimal exposure and in warm weather.
- Diagnosis is made on the basis of a careful history taken by a competent Doctor. Assessment and grading of the disease is needed in order to determine the occupational management and surveillance needs. Specialist tests when required can be arranged at specialist test centres.



- You must provide health surveillance for all your employees who, despite your action to control the risk, are likely to be regularly exposed above the Exposure Action Value or are considered to be at risk for any other reason. The purpose of health surveillance is to:
  - identify anyone exposed or about to be exposed to hand-arm vibration who may be at particular risk, for example people with blood circulatory diseases such as Raynaud's Disease;
  - identify any vibration-related disease at an early stage in employees regularly exposed to hand-arm vibration;
  - help you prevent disease progression and eventual disability;
  - help people stay in work;
  - check the effectiveness of your vibration control measures.
- HSE recommend a tiered system of seeking information as part of a suitable Health Surveillance programme. Staff performing Health Surveillance need to be suitably qualified and experienced. Certificates of competence to perform Statutory Health Surveillance can be obtained through attendance at an approved training course. You could ask an occupational health service provider to provide a complete service on your behalf.

### **c. Whole Body Vibration**

- Drivers of some mobile machines, including certain tractors, fork lift trucks and quarrying or earth-moving machinery, may be exposed to WBV and shocks, which are associated with back pain. Other work factors, such as posture and heavy lifting, are also known to contribute to back problems for drivers and the relative importance of WBV is not clear at present.

Inadequate seat damping and/or poor springs can significantly increase the energy transmitted to the driver when a vehicle rides over uneven surfaces. It is good practice to have regular preventative maintenance undertaken on the seats and their mountings in industrial vehicles.

## **6. Recommendations**

- Risk assessments should be conducted for all areas where workers may be subject to noise exposure or vibration.
- Assessments of driving position and the adequacy of seat damping should be regularly assessed in all commercial or industrial machines.
- Health surveillance programmes should be established for all personnel who are known to be or thought to be at risk of noise or hand-arm vibration exposure above the statutory limits.



## 7. Summary

- Both noise and vibration exposure potentially pose significant health risks to the workforce.
- Regulations introduced in 2005 demand employers undertake workplace screening and where it is identified that employees are exposed to levels greater than the action level **or it is felt that they might be so exposed**, then in addition to reducing exposures to the lowest level reasonably practicable, employers are also required to instigate health screening for those staff who are at risk
- Statutory 'Health Records' and the collated results of Health Surveillance must be made available to authorised staff and Health and Safety Inspectors on request.
- Health screening records in the form of a recommendation of fitness for continued exposure are management documents, separate to the confidential medical record.
- Occupational Health Practitioners are able to advise on the impact of these Regulations to a specific workplace and also to run a suitable Health Screening programme.

## 8. References & Sources of Further Information

HSE Website is a source of information for both employers and employees. In addition, HSE provide on-line calculators to allow workplace risk assessments to be undertaken in determining the management of staff who might possibly be exposed at hazardous levels.