Education and Culture DG

Lifelong Learning Programme

GT VET

Greening Technical VET – Sustainable Training Module for the European Steel Industry

Work Package 2

Industry Driven Analysis of Job Requirements

National Report

WP1 Health and Safety Report

D.6.5.2

United Kingdom

Dr Dean Stroud

Dr Claire Evans

Contents:

WP1 Report – Health and Safety Legislation

1 Introduction

The purpose of this report is to identify and describe the health and safety legislation that pertains and applies to the UK steel industry. The protection of employees, the preservation of their health and the prevention of accidents will present challenges, as the processes of iron and steel production, by their very nature, have the potential to expose workers to a wide range of hazards.[1] The ILO has identified the major hazards as those arising from the operation of machinery and on-site moving equipment; exposure to molten metal; exposure to inhalable agents (gases, vapours, dusts and fumes); contact with chemicals (irritants, acids [e.g. an essential element in the 'pickling' process], alkalis, solvents and sensitizers); exposure to high temperatures (e.g. furnaces, scarfing); noise and vibration; fire and explosion; as well as slips, trips and falls and hazards presented by falling objects (ILO, 2005).

It is axiomatic that, given what is at stake, that such challenges be addressed. This is not just as a matter of the highest corporate social responsibility, but also because health and safety is – understandably - a highly regulated area, with criminal sanctions (i.e. heavy fines and/or the potential for imprisonment for the worst transgressions). This system of criminal sanctions exists alongside the right for victims to pursue compensatory damages in the civil courts for injuries/illnesses incurred as a result of employer negligence in the duty of care owed towards employees.

Prior to European emanations in the field, the UK had an extant tradition of health and safety regulation, extending back over a period of 150 years (HSE,

[1] A 'hazard' is some entity with the potential to cause harm, whilst 'risk' is the likelihood of harm occurring (TUC Hazards, 2005).

2009). The present system came into being with the Health and Safety at Work Act (HASAWA) in 1974, arguably the most important piece of health and safety statute in the UK (TUC, 2005). Given its pivotal position with the field of UK health and safety (H&S hereafter) regulation, this report will commence with an overview of this Act, with a focus on the principal employer duties contained therein and moreover, the 'enabling' aspect of this statute. After this summation, the report will briefly review the legal foundations of the EU's approach to H&S and the principal directives that have derived from Treaty aims and provisions. Thus, an overview of the Framework Directive of 1989 will be supplied, prior to describing other EU directives that relate specifically to the hazards presented by the production of iron and steel. An identification and discussion of the specific pieces of UK legislation, enacted to ensure compliance with the European directives, will immediately succeed the identification of these latter. Furthermore, the implications of each piece of legislation for these two occupational groups will be examined. The H&S legislation to be reviewed can be divided into the following key areas (following the categorisation/structure utilised by the European Agency for Safety and Health at Work):

- Workplaces (including workplace requirements and welfare provisions), equipment/machinery and personal protective equipment.

- Provisions on workload and ergonomic risks, including working time and display screen equipment

- Control of exposure to dangerous agents at work, including chemicals, industrial gases and carcinogens/mutagens, dangerous and explosive atmospheres and control of major hazards and accidents that could result from such environments

- Exposure to physical hazards at work including artificial optical radiation, exposure to vibration, exposure to noise and electricity at work.

Thus, this structure will be adopted in the subsequent text. After this review, a discussion of policy and initiatives in evidence at both sectoral and company levels will be provided.

1.0 The Health and Safety at Work Act (HASAWA) 1974

The HASAWA was passed in 1974, two years after the UK accession to the EC and some years prior to the EU Framework Directive of 1989 (which led to the implementation of the 'Six-Pack' Regulations in 1992).
The HASAWA was designed so as to:

- remedy the deficiencies of earlier H&S legislation;
- ensure that all workers in all occupations are protected by H&S legislation - the Act covers people rather than premises and as such, brought seven million more workers under protection (Turner, 2002);
- provide a broad framework within which H&S can be regulated (TUC, 2005).

In addition to modernising the extant body of regulation, the Act created the Health and Safety Commission, which had overall responsibility for the control and development of occupational H&S. It also created a unified inspectorate, with pre-existing government inspectorates brought under the auspices of the Health and Safety Executive, the operating and enforcing arm of the Commission.[2]

[2] The HSC and HSE merged in 2008, thereby forming a unitary body which brings together their functions and powers, retaining the name of Health and Safety Executive (HSE, n.d.).

The effect of the HASAWA has been to provide for a unified institutional structure and legal framework for health and safety regulation, as it is an 'enabling' act under which more detailed H&S regulations - including those which implement European directives - are made. The approach to reform of H&S law under the Act has been, wherever possible, the enactment of regulations (usually introduced via statutory instruments) which articulate general duties, goals and principles, with subordinate detailed requirements placed in accompanying approved codes of practice (ACOPs) and guidance notes. The purpose of these latter is to identify ways in which set standards might be achieved. By 2005, the Act had been supplemented by more than four hundred regulations, fifty approved Codes of Practice (ACoPs) and a wide range of guidance for employers (TUC, 2005).[3]

The Act is written in very general terms and imposes duties on employers (as well as on the self-employed, employees, designers, manufacturers, importers and suppliers). Under the main provisions of the Act, employers have legal responsibilities in respect of the health and safety of their employees and other people who may be affected by their undertaking and exposed to risks as a result. Section 2 of the Act outlines the general duty of employers to ensure the health, safety and welfare at work of their employees. Section 2(2) elaborates on this general duty, stating that the employer must, as far as is 'reasonably practicable', provide:[4]

[3] The HASAWA has achieved some success: between 1974 and 2007, the number of fatal injuries to employees fell by 73 per cent; the number of reported non-fatal injuries fell by 70 per cent. Between 1974 and 2007, the rate of injuries per 100,000 employees fell by a huge 76 per cent, and Britain had the lowest rate of fatal injuries in the European Union in 2003, which was the most recent year for which figures are available at the time of writing. The EU average was 2.5 fatalities per 100,000 workers; the figure in the UK was 1.1 (Hansard, 2008).

[4] Many of the duties outlined in sections 2 to 9 of the Act are qualified by the phrase 'as far as is reasonably practicable'. This means that the extent of the risk must be balanced against the difficulty involved (in terms of time, money or trouble) in controlling the risk further; additional controls are not necessary if the difficulty in implementing them would be grossly disproportionate to the risk, or to the reduction in risk that would be achieved. Making such judgments is an essential part of the risk assessment process and should be informed by approved codes of practice, published standards as well as HSE or industry guidance on good practice

- safe plant, maintenance and systems of work;
- safe use, handling and transport of articles and substances;
- information, instruction, training and supervision;
- a safe place of work and safe means of access and egress;
- a safe working environment; and
- adequate welfare facilities (Turner, 2002).

To reiterate, the 'enabling' nature of the Act means that it facilitates the passing of more detailed sets of regulations. Increasingly, as the European H&S agenda (developed principally since the passing of the Single European Act in 1986, the Social Charter of 1989 and the subsequent Treaty of the European Union) has acquired substance and momentum, much new legislation in the field has originated from the Union, particularly as the European legislative process sometimes requires more specific requirements than would be envisaged under the Act. The next section briefly outlines the antecedents and foundations of the EU's approach to regulation of H&S.

2 Background: EU Law and Health and Safety

Articles A136-A145 of the founding EC Treaty (Treaty of Rome) established the basis for future developments in social integration and H&S, by stating that 'Member states agree upon the need to promote better conditions of living and work for workers, so as to make possible their harmonisation, whilst

where available. The size of the business and its financial strength do not determine the health and safety standards to be achieved (HSE, 2009: 13).

improvement is being maintained' (cited in Threlfall, 2003).[5] However, little progress was made on the 'social dimension' and improved worker rights up until the mid-80s (Turner, 2005). At this time, the Single European Act 1986 represented a major development in the regulation of workplace H&S at European level, in that it introduced new legal provisions (Article A118A and A118B) on social policy to the EC Treaty. This provision was aimed at the securing of 'improvements, especially in the working environment, as regards the health and safety of workers'. The insertion of this provision emphasised the importance attached to the creation of safe working conditions across workplaces in member states.

The right to improved living and working conditions was also enshrined in the Social Charter of 1989 (Turner, 2005). The right to protection of health and safety at work was one of the thirteen principles contained therein (ibid.). The Social Chapter of the Treaty of the European Union (TEU), which affirmed member states' recognition of, and commitment to implementing, the principles of the Charter via legislative programmes, was accepted by eleven of the then twelve member states, with the exception of the UK. Due to UK opt-out, the Social Protocol of the TEU was adopted at Maastricht.

With the Treaty of Amsterdam (ToA) in 1997, the UK signed the Social Chapter and legislative competence in the fields of European social policies was expanded by the incorporation of the social agreement into the EC Treaty. Articles A136 and A137 were inserted, recognising the Charter. Specifically, A136 includes reference to the promotion and maintenance of improved working conditions.[6]

The Lisbon Treaty re-numbered the Articles on social policy, but retained the substance of the provisions of ex Article 136 ff TEC. As such, EU directives

[5] This has since been re-numbered, under the provisions of the Treaty of Amsterdam 1997. Health and safety matters are now covered by Article 153, rather than A136 and A137

[6] A137 states that Qualified Majority Voting will be the decision-making procedure adopted in order to implement objectives, including the improvement of the working environment (Turner, 2005).

on safety and health at work now have their legal foundation in Article 153 of the Treaty on the Functioning of the European Union (ex A136 and A137 TEC), which gives the EU the authority to adopt directives in this field.

A relatively high number and wide variety of EU directives, setting out health and safety requirements for the protection of workers, have since been adopted. Member States are free to adopt stricter rules for the protection of workers when transposing EU directives into national law, and so legislative requirements in the field of safety and health at work can vary across EU Member States.

A key element is the health and safety Framework Directive (**89/391/EEC**). The provisions of this important Directive will now be outlined, followed by an overview of the specific pieces of legislation that have transposed the requirements of this Directive into UK law.

EU Directives and specific legislation transposing these into the UK

2.0 The Framework Directive (89/391/EEC)

The Framework Directive of 12 June 1989 was aimed at guaranteeing minimum health and safety standards for workers across all workplaces in all member states (European Agency for Safety and Health at Work, 2011a). A central element of the directive is that employers are obliged to risk assess all work activities, so as determine all potential hazards (i.e. something with the potential to cause harm), the likelihood of harm occurring (i.e. risk) and to identify and implement appropriate preventative and protective measures. The elimination of risks at source is a key priority (ibid.). The obligation to

implement prevention measures implicitly emphasises the importance of particular forms of safety and health management as part of general management processes.

Also of significance is that the Framework Directive has an 'enabling' capacity and a series of individual directives, focusing on specific aspects of safety and health at work, were adopted on this basis.[7] Although the Framework Directive continues to apply to all areas covered by the individual directives, where these latter contain more stringent and specific provisions, these will prevail. Individual directives tailor the principles of the Framework Directive to:

- specific tasks (e.g. manual handling of loads)
- specific hazards at work (e.g. exposure to dangerous substances or physical agents)
- specific workplaces and sectors (e.g. temporary work sites, extractive industries, fishing vessels)
- specific groups of workers (e.g. pregnant women, young workers, workers with a fixed duration employment contract)
- certain work related aspects (e.g. organisation of working time).

The individual directives define how to assess these risks and, in some instances, set limit values for certain substances or agents. A number of these, as they apply to the steel industry, will be outlined below. Prior to this though, the report now turns to the implementation of the Framework Directive within the UK context, before proceeding to specifically apply the provisions to the work of mechanical and electrical technicians.

[7] The standards set in these individual directives are minimum standards for the protection of workers. Member States are able to maintain or establish higher levels of protection.

- *Application of the Framework Directive into the UK context:*

  - *The Management of Health and Safety at Work Regulations 1999 (*SI 1999, No. 3242*);*

  - *Health and Safety at Work Act 1974; Employers' Liability (Compulsory Insurance) Act 1969; Employers' Liability (Compulsory Insurance) Regulations 1998 (*SI 1998, No. 2573*) as amended 2008 (*SI 2008, No. 1765*); Safety Reps and Safety Committees Regs 1977* (SI 1977, No. 500*) and/or depending on whether workplace has a recognised union(s), the Health and Safety (Consultation with Employees) Regulations 1996 (*SI 1996, No. 1513*); The Corporate Manslaughter and Corporate Homicide Act 2007; Health and Safety Offences Act 2008; The Health and Safety Information for Employees Regulations 1989* (SI 1989 No. 682); *The Health and Safety Information for Employees (Amendment) Regulations 2009* (SI 2009 No. 606); *Social Security (Medical Evidence) and Statutory Sick Pay (Medical Evidence) (Amendment) Regulations 2010* (SI 2010/137); *OHSAS18001:2007 Occupational Health and Safety Management Systems*.

The Management of Health and Safety at Work Regulations 1999 (MHSWR) generally make more explicit what UK employers are required to do to manage health and safety under the HASAWA. As with the Act, the MHSWR apply to all work activities.

The main requirement on employers is to carry out a risk assessment (see above). Employers with five or more employees need to record the significant findings of the risk assessment.

Under the MHSWR, there are a number of duties with which employers must comply. These include the following (TUC, 2005):

- making arrangements for the effective planning, organisation, control, monitoring and review of the protective and preventative measures (Regulation 5);
- ensure that employees are provided with health surveillance, with regard to the risks that have been identified by the assessment (Regulation 6):
- establishing procedures to be followed in the event of serious and imminent danger to persons at work (Regulation 8):
- provide employees with comprehensible and relevant information on risks, preventative and protective measures, procedures for serious and imminent danger (Regulation 10):
- provide training (Regulation 13).

Application to the work of mechanical and electrical technicians

All work activities must be risk-assessed. As stipulated under the HASAWA, employees have a duty to take care, as far as possible, of their own safety and health and that of other persons affected by his or her acts or omissions at work. Employees must also in accordance with his training and the instructions provided by the employer.

3 Workplace (including workplace requirements and welfare provisions), Work Equipment and Personal Protective Equipment

2.1 Workplace Requirements - Directive 89/654/EEC

This directive was passed in November 1989, and establishes the minimum safety and health requirements for the workplace (European Agency for Safety and Health at Work (2011b).

Under the directive, the employer must ensure that:

- traffic routes to emergency exits and the exits themselves are kept clear at all times;
- technical maintenance of the workplace and of the equipment and devices is carried out as quickly as possible;
- the workplace and the equipment and devices are regularly cleaned to an adequate level of hygiene;
- safety equipment and devices intended to prevent or eliminate hazards are regularly maintained and checked (ibid.).

➢ *Application of the Directive into the UK context*

- *The Workplace (Health, Safety and Welfare) Regulations 1992 (*SI No. 3004 of 1992*)*

Employers have a general duty under section 2 of the Health and Safety at Work etc Act 1974 to ensure, so far as is reasonably practicable, the health, safety and welfare of their employees at work. The Workplace Regulations expand on these duties and are intended to protect the health and safety of

everyone in the workplace, and ensure that adequate welfare facilities are provided for people at work (HSE, 2007).

Health aspects include ventilation, temperature, lighting, cleanliness and waste storage and disposal, room dimensions and space, as well as workstations and seating (ibid.). Safety aspects cover maintenance of the workplace and certain equipment, systems and devices, the condition of buildings, floors and traffic routes, which must be sufficient in number and safe to use, stairs and handrails, fencing and covering of pits, tanks etc that hold dangerous substances, windows, doors, gates and escalators are also included. Finally, welfare aspects cover sanitary conveniences, washing facilities, drinking water, accommodation for clothing and facilities for changing as well as facilities for rest and for eating.

2.2 Personal Protective Equipment

Council Directive 89/686/EEC on the approximation of the laws of the Member States relating to personal protective equipment (OJ L399/18 of 30.12.1989).

This directive was passed on the 30 November 1989, and specifies the minimum health and safety requirements for the use by workers of personal protective equipment at the workplace (third individual directive within the meaning of Article 16 (1) of Directive 89/391/EEC) (European Agency for Safety and Health at Work, 2011c).

Personal protective equipment (PPE) is to be used when the risks cannot be avoided or sufficiently limited by technical means of collective protection or procedures of work organization (ibid.).

Employers must ensure that all PPE complies with the relevant Community provisions on design and manufacture with respect to safety and health (ibid.).

In addition, all PPE must:

- be appropriate for the risks involved, without itself leading to any increased risk;
- correspond to existing conditions at the workplace;
- take account of ergonomic requirements and the worker's state of health;
- fit the wearer correctly after any necessary adjustment.

The employer must provide the appropriate equipment free of charge and he must ensure that it is in good working order and hygienic condition.

Where the presence of more than one risk makes it necessary for a worker to wear simultaneously more than one item of personal protective equipment, such equipment must be compatible.

Employers shall organize training and demonstration on the use of PPE. Workers shall be informed of all measures to be taken. Consultation and participation shall take place on the matters covered by this directive (ibid.)

➢ *Application into the UK Context:*

- *The Personal Protective Equipment (EC Directive) Regulations 1992 (*SI 1992, No. 3139*);*
- *The Personal Protective Equipment (EC Directive) (Amendment) Regulations 1994 (*SI 1994, No. 2326);
- *Health and Safety (Miscellaneous Amendment) Regulations 2002 (*SI 2002, No. 2174) *and Guidance*.

The contents of these regulations concur with the above. Regulation 4 covers the suitability of PPE (appropriate for the risks involved, fits the wearer, effective, compliance with design and manufacture provisions under European law). Regulation 5 covers compatibility of PPE, whilst Regulation 9 pertains to the adequate and appropriate instruction, provision of information and training of employees (TUC, 2005).

Application to the work of mechanical and electrical technicians

Whilst carrying out their duties, mechanical and electrical technicians should be provided with appropriate PPE, in accordance with the scope of their work.

In addition, due to the presence of different hazards and risk levels in different areas of the plant, they should carry out their work with appropriate collective protection but where the nature of the tasks in certain areas demands, workers should be provided with PPE, designed specifically to protect against hazards within a particular department.

2.3 Use of Work Equipment

Directive 2009/104/EC – Use of Work Equipment (second individual directive within the meaning of Article 16(1) of Directive 89/391/EC)

Directive 89/655/EC is repealed by Directive 2009/104/EC

This Directive lays down minimum safety and health requirements for the use of work equipment by workers at work. After numerous amendments, this new Directive on the use of work equipment was adopted in the interests of clarity and rationality, and the previous directive 89/655/EEC and its

amendments were repealed (European Agency for Safety and Health at Work, 2011d).

The Directive lays down a number of obligations for employers (ibid.):

- The employer shall take every measure to ensure the safety of the work equipment made available to workers. During the selection of the work equipment the employer shall pay attention to the specific working conditions which exist at the workplace, especially in relation of safety and health of the workers. If risks cannot be fully eliminated during the operation of the work equipment, the employer shall take appropriate measures to minimise them. Furthermore the work equipment should comply with relevant Community directives and/or minimum requirements laid down in Annex I to the Directive.
- Throughout its working life, the employer shall keep the work equipment compliant by means of adequate maintenance. The employer shall ensure that the work equipment is installed correctly and is operating properly by inspection/testing of the work equipment (initial, after assembly, periodic and special) by competent persons. The results of inspections shall be recorded and kept.
- If the use of work equipment is likely to involve a specific risk, the employer shall ensure restricted access to its use, and any modifications can be made by expert personnel only.
- The employer shall provide workers with adequate, comprehensible information (e.g. written instructions) on the work equipment, which must detail: the conditions of use, foreseeable abnormal situations, as well as any additional conclusions drawn from experience. Workers shall be made aware of dangers relevant to them.
- The employer shall ensure that workers receive adequate training, including risks and specific training on specific-risk equipments (European Agency for Safety and Health at Work, 2011d).

➢ *Transposition of directive into UK context:*

- *The Provision and Use of Work Equipment Regulations (PUWER) 1998 (*SI 1998, No. 2306);
- *Lifting Operations and Lifting Equipment Regulations 1998 (*SI 1998, No. 2307)
- *Health and Safety (Miscellaneous Amendment) Regulations 2002 (*SI 2002, No. 2174);
- *Health and Safety (Safety Signs and Signals) Regulations 1996 (*SI 1996, No. 341)

PUWER 98 applies to the provision of all work equipment, with mobile and lifting equipment covered by the supplementary Lifting Operations and Lifting Equipment Regulations. The regulations apply to all workplaces and work situations where the Health and Safety at Work etc Act 1974 applies (HSE, 1999).

PUWER came into effect in December 1998, replacing and amending PUWER 1992 (ibid).

In general terms, the Regulations require that equipment provided for use at work is:

- suitable for the intended use, and for the purpose and conditions in which it is used;
- accompanied by suitable safety measures, e.g. protective devices, markings, warnings.

- safe for use, maintained in a safe condition and, in certain circumstances, inspected to ensure this remains the case. Inspections are to be carried out by competent persons and records must be kept;
- used only by people who have received adequate information, instruction and training (HSE, 1999).

Employers should also ensure that risks, created by the use of the equipment, are eliminated where possible or controlled by:

- taking appropriate 'hardware' measures, e.g. providing suitable guards, protection devices, markings and warning devices, system control devices (such as emergency stop buttons) and personal protective equipment; and
- taking appropriate 'software' measures such as following safe systems of work (e.g. ensuring maintenance is only performed when equipment is shut down etc), and providing adequate information, instruction and training (HSE, 1999)

Part IV of the Regulations also contains specific requirements regarding power presses. Power presses, and associated guard or protection devices, must be thoroughly examined at specified intervals and inspected daily in use to ensure that it is safe. Such work should only be performed by a competent person and records must be kept (ibid.).

Also of relevance in this section are considerations as to safe use of electrical equipment. There are a number of regulations that pertain to electricity at work, namely the Electrical Equipment (Safety) Regulations 1994 (SI 194, No. 3260), the Electricity at Work Regulations 1989 (SI 1989, No. 635) and the BS7671:2008 Requirements for Electrical Installation - IEE Wiring Regulations (17th Edition). In particular, the Electricity at Work Regulations require

primarily that all electrical systems are constructed so as to prevent danger and that such systems are maintained. Electrical equipment must be of appropriate strength and capability. Conductors, earthing, connections and means for cutting off supply and isolation are also covered (TUC, 2005).

Application to work of mechanical and electrical technicians

For technicians involved in maintenance work, such activities can expose those who carry it out to a wide range of hazards (European Agency for Safety and Health at Work, 2010). Maintenance activities include the following processes (ibid.):

- setting up, preparation, installation, mounting, disassembling, dismantling
- maintenance, repair, tuning, adjustment
- mechanised of manual cleaning of working areas and machines
- monitoring, inspection of manufacturing, work areas, means of transport, equipment, with or without monitoring equipment.

Comparative research across a number of European countries by Eurostat in 2006 (for the year 2005/06) found that around 20% of all accidents in Belgium were related to maintenance operations. Similar figures were also found for Finland (18-19%); Spain (14-17%) and Italy (10 – 14% from 2003 - 2006). Moreover, the data from several European countries indicate that, in 2006, around 10-15% of all fatal accidents were related to maintenance operations. Other studies have indicated that occupational diseases and work-related health problems (such as asbestosis, cancer, hearing problems, and musculoskeletal disorders) are also more prevalent among workers involved in maintenance activities (ibid.).

Thus, it is essential to implement appropriate risk assessment procedures for maintenance operations, as well as employing adequate preventive measures to ensure the safety and health of workers involved in maintenance activities.

4 Workload and Ergonomic Requirements

These include provisions relating to the use of display screen equipment and limits to working time.

2.4 Display Screen Equipment

Directive 90/260/EC *of 29 May 1990 on the minimum safety and health requirements for work with display screen equipment (fifth individual Directive within the meaning of Article 16 (1) of Directive 89/391/EEC)*

This Directive lays down minimum safety and health requirements for work with display screen equipment. Under this directive, employers are obliged to perform an analysis of workstations in order to evaluate the safety and health conditions as they might impact upon their workers, particularly as regards to possible risks to eyesight, physical problems and problems of mental stress. They shall take appropriate measures to remedy the risks found taking account of the additional and/or combined effects of the risks so found (European Agency for Safety and Health at Work, 2011e).

Employers must take the appropriate steps to ensure that workstations meet the minimum requirements laid down in the Annex of the directive.

The employer must plan the worker's activities in such a way that daily work on a display screen is periodically interrupted by breaks or changes of activity reducing the workload at the display screen (ibid.).

Workers shall receive information on all aspects of safety and health relating to their workstation. Workers or their representatives shall be informed of any health and safety measure taken in compliance with this directive.

Every worker shall also receive training in use of the workstation before commencing this type of work and whenever the organization of the workstation is substantially modified.

Workers are entitled to an appropriate eye and eyesight test carried out by a person with the necessary capabilities before commencing display screen work, at regular intervals thereafter, and if they experience visual difficulties during work. Moreover, workers are entitled to an ophthalmological examination if the results of the test show that this is necessary (ibid.).

➢ *Transposition into UK Context*

- *The Health and Safety (Display Screen Equipment) Regulations 1992 (as amended in 2002).*

  The regulations meet the stipulations of the directive as outlined above.

6.2 Working Time

Directive 2003/88/EC working time

The Directive aims at protecting workers from negative health effects due to shift and night work. It lays down minimum general safety and health requirements for the organisation of working time with regard to maximum working time. In addition, the Directive sets out requirements for periods of daily rest, breaks, weekly rest and annual leave (European Agency for Safety and Health at Work, 2011f).

Member States shall take the measures necessary to ensure that every worker is entitled to a minimum daily rest period of 11 consecutive hours per 24-hour period. They shall take the measures necessary to ensure that, per each seven-day period, every worker is entitled to a minimum uninterrupted rest period of 24 hours (plus the 11 hours' daily rest if possible) (ibid.).

Every worker is entitled to a rest break, whenever the daily working time exceeds six hours. Details including duration and the terms on which it is granted, shall be laid down in collective agreements or agreements between the two sides of industry or by national legislation (ibid.).

The average weekly working time shall not exceed 48 hours (ibid.).

It shall be ensured that every worker is entitled to paid annual leave of at least four weeks. This minimum leave cannot be replaced by other allowances except for in cases of termination of the employment.

Member States shall ensure that normal hours of work for night workers do not exceed an average of eight hours in any 24-hour period. They shall also ensure that night workers whose work involves special hazards or heavy physical or mental strain do not work more than eight hours in any period of 24 hours during which they perform night work (ibid.).

Night workers are entitled to a free health assessment before their assignment and to frequent check-ups. Night workers suffering from health problems recognised as being connected with the fact that they perform night work are to be transferred whenever possible to day work to which they are suited.

Member States shall ensure that night workers and shift workers have safety and health protection appropriate to the nature of their work and that appropriate protection and prevention services or facilities with regard to the

safety and health of night workers and shift workers are equivalent to those applicable to other workers and are available at all times.

Member States shall take the measures necessary to ensure that an employer who intends to organise work according to a certain pattern takes account of the general principle of adapting work to the worker.

- *Transposition into UK Law*
  - *The Working Time Regulations 1998 (as amended, 2003)*

The regulations meet the requirements of the directive.

7.0 Exposure to Chemical Agents and Chemical Safety

This category will incorporate discussion of the directives pertaining to risks arising from chemicals, carcinogens and mutagens as well as those that specify indicative occupational exposure limit values.

7.1 Risks related to chemical agents at work – Directive 98/24/EC (fourteenth individual directive within the meaning of Article 16(1) of Directive 89/391/EC.[8]

The directive provides for the drawing up of indicative and binding occupational exposure limit values as well as biological limit values at Community level. Member States must establish a national occupational

[8] See also Directive 99/ 92/EC (also known as 'ATEX 137' or the 'ATEX Workplace Directive'), implemented in the UK under the DSEAR Regulations 2002 (HSE, 2011a).

exposure limit value, taking into account the Community limit value (European Safety and Health at Work, 2011g).

Along the same lines, binding occupational exposure limit values may be drawn up at Community level. For any chemical agent for which a binding occupational exposure or biological limit value is established at Community level, Member States must establish a corresponding national binding occupational exposure that does not exceed the Community limit value (ibid.).

The employer must determine whether any hazardous chemical agents are present at the workplace and assess any risk to the safety and health arising from their presence. This assessment shall be kept up-to-date, particularly if there have been significant changes, or if the results of health surveillance show it to be necessary (ibid.). Moreover, in the case of activities involving exposure to several hazardous chemical agents, the risks must be assessed on the basis of the risk presented by all such chemical agents in combination.

If the assessment reveals a risk, the employer must take the necessary preventive measures and risks must be eliminated or reduced to a minimum following the hierarchy of prevention measures.[9]

The employer must ensure that the risk is eliminated or reduced to a minimum, preferably by substitution (replacing a hazardous chemical agent with a chemical agent or process which is not hazardous or less hazardous).

The employer must regularly measure chemical agents which may present a risk to workers' health, in relation to the occupational exposure limit values, and must immediately take steps to remedy the situation if exceeded.

[9] The hierarchy of control measures sets out a priority of order for measures: 1 Eliminate the use of a harmful product or substance and use a safer one.2 Use a safer form of the product, eg paste rather than powder.3 Change the process to emit less of the substance.4 Enclose the process so that the product does not escape.5 Extract emissions of the substance near the source.6 Have as few workers in harm's way as possible.7 Provide personal protective equipment (PPE).

The employer must establish procedures (action plans) which can be implemented in the event of an accident, incident or emergency related to the presence of hazardous chemical agents at the workplace

The employer must inform all workers:[10]

- of emergency arrangements;
- as to the results of the risk assessment;
- as to the hazardous chemical agents present at the workplace, providing access to safety data sheets;
- by training on the appropriate precautions and on the personal and collective protection measures that are to be taken.

The employer must ensure that the contents of containers and pipes and any hazard that they represent are clearly identifiable.

Annex III to the Directive specifies limits above which certain chemical agents and activities involving chemical agents are prohibited. Member States may permit derogations from these prohibitions in special circumstances.

Member States must introduce arrangements for carrying out appropriate health surveillance of workers for whom the results of the assessment made by the employer reveal a risk to health. Health surveillance is compulsory for work with a chemical agent for which a binding biological limit value has been set. Individual health and exposure records must be made and kept up-to-date for each worker who undergoes health surveillance. The individual worker must have access to his personal records.

➢ *Transposition into UK context*

[10] The requirements, as stipulated in the Health and Safety Information for Employees (Amendment) Regulations 2009, are to inform all staff of exposure and not just those deemed to be at risk from exposure.

The directive has been implemented in the UK via the Control of Substances Hazardous to Health Regs 2002 and the Dangerous Substances and Explosive Atmospheres Regs 2002 (see below).

- *The Control of Substances Hazardous to Health Regulations 2002 (*SI 2002, No. 2677).

The COSHH Regulations require UK employers to comply with the above requirements: to assess the risk to their employees, and to prevent or adequately control those risks, through both equipment and ways of working, if risk cannot be eliminated/substituted (HSE, 2009b).[11] Employers must monitor exposure levels and provide health surveillance, as well as provide information, instruction and training.

- *The Dangerous Substances and Explosive Atmospheres Regulations 2002 (*SI 2002, No. 2776).[12]

[11]Any potentially hazardous substances must be risk assessed before introduction into the workplace. Local exhaust ventilation equipment, a control measure, must be thoroughly examined and tested at a maximum frequency of every 14 months (or as laid down in Schedule 4 for certain processes and substances).

[12] There are two other directives that effected the implementation of the DSEAR Regs. These are Directives ATEX 95 (94/9/EC) and ATEX 137 (1999/92/EC) (HSE, 2011b). The first, ATEX 95, concerns the supply of equipment, protective systems, components etc, where these are for use in potentially explosive atmospheres. In the UK, these were implemented under the Equipment and Protective Systems for Use in Potentially Explosive Atmospheres Regulations, 1996 (EPS). ATEX 137, on the other hand, is implemented by HSE under The Dangerous Substances and Explosive Atmosphere Regulations, 2002 (DSEAR). ATEX 137 (1999/92/EC) concerns worker health, safety and protection in those workplaces where potentially explosive atmospheres may be present (HSE, 2011b).

Dangerous substances can put peoples' safety at risk from fire and explosion and therefore, DSEAR puts duties on employers to protect people from such risks (HSE, 2011a).

Dangerous substances are any substances used or present at work that could, if not properly controlled, cause harm to people as a result of a fire or explosion. They can be found in nearly all workplaces and include flammable gases and dusts from machining.

DSEAR requires that employers:

- find out what dangerous substances there are in their workplace and what the fire and explosion risks are;
- put control measures in place to either remove those risks or, where this is not possible, control them;
- put controls in place to reduce the effects of any incidents involving dangerous substances;
- prepare plans and procedures to deal with accidents, incidents and emergencies involving dangerous substances;
- make sure employees are properly informed about and - significantly for our purposes - trained, to control or deal with the risks from the dangerous substances;
- identify and classify areas of the workplace where explosive atmospheres may occur and avoid ignition sources (from unprotected equipment, for example) in those areas (ibid.).

Application to work of mechanical and electrical technicians

Mechanical and electrical technicians are at risk of exposure to hazardous chemicals (e.g. metalworking fluids) and industrial gases while performing their daily duties such as repairs and maintenance of machines and installations, and moving around the site. The ATEX 1995 (94/9/EC) Directive,

implemented in the UK as the Equipment and Protective Systems for Use in Potentially Explosive Atmospheres Regulations 1996 (EPS), is also of relevance (HSE, 2011b). Technicians need to understand the requirements to only install and use safe and suitable equipment.

7.1 Council Directive 96/82/EC known as the Seveso II Directive, as amended by Directive 2003/105/EC

Directive 96/82/EC on the control of major accident hazards involving dangerous substances (the Seveso II directive) is aimed at preventing major accidents involving large quantities of dangerous substances (or mixtures thereof) as listed in its Annex I, so as to limit the consequences of such accidents on humans and the environment (European Commission, 2010). Major hazard sites are industrial sites that manufacture, process or store dangerous chemicals and substances in quantities that could pose a risk to workers, people in the vicinity of the site, and the environment in the event of a major accident (HSE, 2008). These 'major accidents' include fires, explosions or incidents in which dangerous substances are released.

Although the Directive applies mainly to the chemical industry, it also pertains to some storage activities, explosives and nuclear sites, and other industries where threshold quantities of dangerous substances identified in the directive are kept or used. Integrated steel-making sites and blast furnaces are covered by the directive's provisions. There is a tiered approach to the level of controls, with the larger the quantities of substances, the stricter the rules. Integrated steel-making sites are categorised as Tier 1 (European Commission, 2008).

The Directive is due to be further amended as a result of changes in the EU system of classification of dangerous substances to which the Directive refers (ibid.).

- *Transposition into the UK Context*

  - *The Control of Major Accidents and Hazards Regulations 1999*
  - *The Control of Major Accidents and Hazards (Amendment) Regulations 2005*

The COMAH regulations replaced the Control of Industrial Major Accident Hazards Regulations 1984 (CIMAH).

Under the Regulations, operators of sites with dangerous substances above specified quantities, have to take all necessary measures to:

- prevent major accidents; and
- in the event of such accidents, limit the effects on people and the environment.

For certain sites, with particularly high quantities of dangerous substances, operators must also describe their control measures to prevent major accidents in a 'safety report'. Safety reports are sent to the Competent Authority (CA), which enforces the COMAH Regulations. In England and Wales, the CA comprises the Health and Safety Executive (HSE) and the Environment Agency. The CA is responsible for checking that site operators take steps to prevent and limit the effects of major accidents (HSE, 2008).

Safety reports demonstrate that all the necessary measures have been taken to prevent major accidents and to limit their consequences. Site operators have to systematically review how they manufacture, store and use dangerous substances. This helps them to identify any necessary improvements to their management systems, plant, equipment or safety procedures, thereby reducing the risk of a major accident occurring (ibid.).

Operators must review the safety report at least every five years, and also when any significant changes occur. The operator must inform the CA of any such changes made to the safety report (ibid.).

Major hazard sites are subject to a system of inspections. Inspectors who regularly visit the site will assess the adequacy of the information contained in safety reports (ibid.).

Application to the work of mechanical and electrical engineering technicians

Technicians need to be aware of the provisions of the regulations and to act in accordance with the stipulations of the safety report. They should also be familiar with the procedures to be followed in the event of any major accident or hazard.

7.3 Indicative Occupational Exposure Limits: Directive 91/332/EEC – indicative limit values; Directive *2000/39/EC – indicative occupational exposure limit values; Directive 2006/15/EC – indicative occupational exposure limit values;* Directive 2009/161/EU – indicative occupational exposure limit values

- Directive 91/332/EEC – indicative limit values: establishes indicative limit values by implementing Council Directive 80/1107/EEC on the protection of workers from the risks related to exposure to chemical, physical and biological agents at work (European Agency for Safety and Health at Work, 2011h).

- Directive 2000/39/EC – indicative occupational exposure limit values: establishes a first list of indicative occupational exposure limit values through implementation of Council Directive 98/24/EC on the protection of the health and safety of workers from the risks related to chemical agents at work.
- Directive 2006/15/EC – indicative occupational exposure limit values: establishes a second list of indicative occupational exposure limit values through implementation of Council Directive 98/24/EC and amending Directives 91/322/EEC and 2000/39/EC
- Directive 2009/161/EU – indicative occupational exposure limit values: establishes a third list of indicative occupational limit values through implementation of Council Directive 98/24/EC and amending Commission Directive 2000/39/EC

➢ *Control of Substances Hazardous to Health Regulations 2002*

Table 1 of the COSHH Regulations lists the workplace exposure limits (WELs) for all relevant substances, which are updated so as to consolidate amendments made through the passing of more recent directives.

Application to the work of mechanical and electrical technicians

Whilst performing their duties (maintenance and repairs), mechanical and electrical technicians are exposed to the same risks as other workers in the company. In metallurgical processes, some agents listed in the 2009/161/EU Directive (i.e. sulphuric acid, hydrogen sulphide) could be created or could be released.

Moreover, a number of agents listed in Directive 2006/15/EC (i.e. chlorine, phosphine, carbon monoxide (present in large quantities in BFG and BOS

gases) and carbon dioxide could also be generated and/or emitted, as could a number of those listed in Directive 2000/39/EC (i.e. chlorobenzene, hydrogen chloride, hydrogen fluoride. Finally, agents listed in Directive 91/322/EEC (i.e. nitrogen monoxide, tin, inorganic compounds as Sn) also pose a risk.[13]

7.4 Directive 2004/37/EC - Carcinogens or Mutagens at work, on the protection of workers from the risks related to exposure to carcinogens or mutagens at work (Sixth individual Directive within the meaning of Article 16(1) Directive 89/391/EEC.

This Directive replaces Directive 90/394/EEC and its subsequent amendments (Directive 97/42/EC and Directive 1999/38/EC).

The directive stipulates that employers shall assess and manage the risk of exposure to carcinogens or mutagens. This process shall be renewed regularly and data shall be supplied to authorities at request. Special attention is made to take account of all possible ways of exposure routes (including the skin), and to persons at particular risk (European Agency for Safety and Health at Work, 2011i).

Workers' exposure must be prevented. The employer shall reduce the use of a carcinogen or mutagen by replacing it with a substance not, or less, dangerous. If replacement is not possible, the employer shall use a closed technological system. Where a closed system is not technically possible, the employer shall reduce exposure to minimum. Exposure shall not exceed the limit value of a carcinogen set out in Annex III of the directive (ibid.).

Wherever a carcinogen or mutagen is used, the employer shall:

- limit the quantities of a carcinogen or mutagen at the place of work;

[13] Nitrogen (a major component of air) is not listed, but many areas will be purged with nitrogen for safety and this causes an asphyxiating atmosphere

- keep as low as possible the number of workers exposed;
- design the work processes so as to minimise the substance release;
- evacuate carcinogens or mutagens at source, but respect the environment;
- use appropriate measurement procedures (especially for early detection of abnormal exposures from unforeseeable event or accident);
- apply suitable working procedures and methods;
- use individual protection measures if collective protection measures are not enough;
- provide for hygiene measures (regular cleaning);
- inform workers;
- demarcate risk areas and use adequate warning and safety signs (including ”no smoking”);
- draw up emergency plans;
- use sealed and clearly and visibly labelled containers for storage, handling, transportation and waste disposal.

Employers shall make certain information available to the competent authority if requested (activities, quantities, exposures, number of exposed workers, preventive measures) and inform the workers if abnormal exposure has occurred.

The employer shall also provide appropriate training on potential risks to health, precautions to prevent exposure, hygiene requirements, protective equipments, clothing and incidents. Moreover, employers shall inform workers on objects containing carcinogens or mutagens, and label them clearly and legibly, together with warning and hazard signs. Consultation and participation of workers shall take place in accordance with Directive 89/391/EEC (ibid.).

The Member States shall establish arrangements for health surveillance of workers if there is a risk for health and safety (prior to exposure, at regular intervals thereafter). If a worker is suspected to suffer ill-health due to exposure, health surveillance of other exposed workers may be required, and the risk shall be reassessed. Individual medical records of health surveillance shall be kept (ibid.).

Information and advice must be given to workers regarding any health surveillance that they may undergo following the end of exposure. Workers shall have access to the results of the health surveillance that concern them. Workers concerned or the employer may request a review of the results of the health surveillance. All cases of occupational cancers shall be notified to the competent authority. Records shall be kept for at least 40 years following the end of exposure, and transferred to the authority concerned if the firm ceased to exist (ibid.).

- *Control of Substances Hazardous to Health Regulations 2002 (transposition into UK law)*

As detailed above in 6.2.

Application to the work of mechanical and electrical technicians

Whilst performing their duties (maintenance and repair), mechanical and electrical technicians are exposed to the same risks as other workers in the company. Metallurgical processes, such as welding, could generate and/or emit carcinogens or mutagens (e.g. dioxins, furans, polycyclic aromatic hydrocarbons, compounds of chromium, nickel).

7.5 Regulation EC 1907/2006 – REACH

NB. As the legal act of REACH is a regulation, as opposed to a directive, it is directly binding on member states. No national implementing measures are required.

REACH became law in the UK on the 1st of June 2007 (UK REACH Competent Authority, 2009).

REACH (Registration, Evaluation, Authorisation and restriction of Chemicals) is the system for controlling chemicals in the EU (ibid.). The **registration** aspect requires that any company manufacturing or importing into the EU a substance on its own, in a preparation (mixture of substances), or intentionally released from articles (finished manufactured goods) at or above 1 tonne per year may have to register it. This is done by submitting a dossier to the European Chemicals Agency (the Agency; ECHA). The dossier must contain details of the substance's properties, other relevant information about risks and how these risks can be managed**.** Companies will not be able to manufacture or import a substance within the EU, or import an article that intentionally releases a substance, unless the substance has been registered.

Evaluation: a chemical safety assessment shall be performed and a chemical safety report completed for all substances subject to registration in quantities of 10 tonnes or more per year per registrant. A chemical safety assessment of a substance shall include the following steps:

- human health hazard assessment
- physicochemical hazard assessment
- environmental hazard assessment
- persistent, bioaccumulative and toxic (PBT) and very persistent and very bioaccumulative (vPvB) assessment (European Agency for Safety and Health at Work, 2011g).

If a substance meets the criteria for classification as dangerous or is assessed to be a PBT or vPvB, the chemical safety assessment shall include additional steps (ibid.).

Any registrant shall identify and apply the appropriate measures to adequately control the risks identified in the chemical safety assessment, and where suitable, recommend them in the safety data sheets which he supplies (see below).[14]

Authorisation: Substances of very high concern (SVHC) will need to be authorised for specific uses if they appear in Annex XIV of the regulations. The first proposed list for Annex XIV was published by the Agency on the 1st June, 2009. Applications for authorisation may be made by companies that register the substances, or by those that use them. When a substance is placed on Annex XIV, a 'sunset date' is set, after which its use will be prohibited, unless an authorisation has been granted for that use. Authorisation will be granted if the use is considered safe as long as the risks are adequately controlled, and the conditions of the authorisation are met or if the use of the substance can be demonstrated to be so important on socio-economic grounds that its continued use outweighs the risks to human health and the environment (UK REACH Competent Authority, 2009).

Information: REACH requires that there is clear provision of information about any dangerous properties a chemical may have. The introduction of REACH has prompted the development of a new classification and labelling system (compliant with the UN Globally Harmonised System). The European Regulation (EC) No1272/2008 on Classification, Labelling and Packaging of

[14] Steel and cement industries have been slow to act and as such, are now having to get up to required standards with substances such as limestone, iron ore, slags etc

Substances and Mixtures (CLP Regulation) has repealed and replaced the extant Chemical Hazard Information and Packaging Regulations (CHIP), although CHIP requirements will not be fully phased out until June 2015. Until then, suppliers must classify substances according to both CHIP and CLP, but labelling and packaging will be carried out in accordance with CLP.

There was an established EU system for the classification of different chemicals according to their characteristics (for example, those that may cause cancer, or are toxic to the aquatic environment). However, since the introduction of REACH, a world-wide classification and labelling system has been developed – the Globally Harmonsied System.

The passage of information up and down the supply chain is one of the key features of REACH – downstream users of chemicals (i.e. those who use them at work) should be able to understand what manufacturers and importers know about the dangers involved in using chemicals. As such, REACH adopts and builds on an existing system for passing information in a structured way down to chemicals users – the **Safety Data Sheet** (SDS). This should accompany materials down through the supply chain, providing the information that users need to ensure chemicals are safely managed. REACH will also allow for information on uses of chemicals to be passed back up the supply chain, so that these can be reflected in the SDS.

Downstream users of chemicals will need to comply with any conditions described in the SDS. Where SDSs have attached exposure scenarios that detail how chemicals may be used, then users should implement the required risk management measures (or use equivalent measures).

Application to the work of mechanical and electrical engineers

Specific compliance with the Regulations regarding the submission of dossiers for registration of substances would be handled at a senior level within a company. However, technicians would need to be aware of the new chemical safety data sheets which have been generated as a result of REACH. The chemical warning symbols have also changed as a result of REACH/CLP and technicians would need to be cognisant of what these changes involve.

8.0 Exposure to Physical Hazards

This category covers the hazards of noise, vibration and artificial optical radiation at work.

8.1 Directive 2003/10/EC – NOISE

of 6 February 2003 on the minimum health and safety requirements regarding the exposure of workers to the risks arising from physical agents (noise) (Seventeenth individual Directive within the meaning of Article 16(1) of Directive 89/391/EEC).

The objective of this directive is to lay down minimum requirements for the protection of workers from risks to their health and safety arising or likely to arise from exposure to noise and in particular the risk to hearing (European Agency of Safety and Health at Work (2011j).

The Directive defines the physical parameters that serve as risk predictors, such as peak sound pressure, daily noise exposure level and weekly noise exposure level. It sets exposure limit values and exposure action values in respect to the daily and weekly noise exposure level as well as peak sound pressure. The exposure limit values fixed at 87 decibels shall take into account of the attenuation provided by personal protective equipment (hearing

protectors) worn by the workers. The exposure action value is fixed at 80 decibels (lower value) and 85 decibels (upper value) (ibid.).

The employer shall assess and, if necessary, measure the levels of exposure to noise to which workers are exposed. This has to be done in accordance with the obligations laid down in the framework directive. Results of the risk assessment have to be recorded on a suitable medium and regularly updated. The risk assessment itself shall be similarly updated, particularly if there have been significant changes which could render it out of date, or if the results of health surveillance show it to be necessary (ibid.).

Whilst carrying out the risk assessment, the employer must give particular attention to level, type and duration of exposure, exposure limit / action values, health effects spreading from particular sensitivity of the worker, interractions with other risks (ototoxic substances, vibrations), the exposure to noise beyond normal working hours under the employer's responsibility, and noise caused by warning signals at work.

The risks arising from exposure to noise shall be eliminated or reduced to a minimum. The reduction of risks arising from exposure to noise shall be based on the general principles of prevention set out in the Framework Directive (e.g. by working methods or equipment that require less exposure to noise, instructions on the correct use of equipment, technical measures [shield, noise absorbing covering] or organisational measures in order to reduce duration and intensity of exposure). If risk cannot be eliminated or reduced by other means, the employer has to provide properly fitting personal protective equipment (hearing protectors), in accordance to that directive.

The exposure limit values must not be exceeded. If they are exceeded, the employer has to take adequate measures immediately in order to reduce the exposure.

The employer shall ensure that workers who are exposed to risks from noise at work and/or their representatives receive any necessary information and training relating to the outcome of the risk assessment provided for in Article 4 of the Directive.

Member States must adopt provisions to ensure the appropriate health surveillance of the workers (preservation of the hearing function).

- *The Control of Noise at Work Regulations 2005 SI 2005 Number 1643*

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). These regulations replace the Noise at Work Regulations 1989 (HSE, 2011b).

The Noise Regulations comply with the stipulations of the directive, aiming to ensure that workers' hearing is protected from excessive noise at their place of work, which could cause them to lose their hearing and/or to suffer from tinnitus (permanent ringing in the ears). In line with the prescriptions outlined above, the level at which employers must provide hearing protection and hearing protection zones is now 85 decibels (daily or weekly average exposure) and the level at which employers must assess the risk to workers' health and provide them with information and training is now 80 decibels. There is also an exposure limit value of 87 decibels, taking account of any reduction in exposure provided by hearing protection, above which workers must not be exposed (HSE, 2011b).

Application to the work of mechanical and electrical technicians

As employees, including mechanical and electrical technicians, traverse the company, and perform their duties in different departments, they are exposed to background noise from other workstations and are also exposed to noise emissions from the devices an equipment that they use.

8.2 Directive 2002/44/EC – Vibration of the of 25 June 2002 on the minimum health and safety requirements regarding the exposure of workers to the risks arising from physical agents (vibration) (sixteenth individual Directive within the meaning of Article 16(1) of Directive 89/391/EEC)

The Directive aims at ensuring health and safety of workers through creating a minimum basis of protection against exposure to mechanical vibration, through emphasising the timely detection of adverse health effects (particularly musculo-skeletal disorders) arising, or likely to arise, from exposure to mechanical vibration (European Agency of Safety and Health at Work, 2011k).

The Directive distinguishes between vibration affecting the hand-arm-system and vibration being transmitted to the whole body. Exposure limit values (using a standardised eight-hour reference period) for both hand-arm-vibrations and whole-body-vibrations are defined. Additionally, exposure action values for both kinds of vibration, also on the basis of an eight hour reference period, are defined (ibid.).

Employers shall assess, and if necessary measure, the levels of exposure to mechanical vibration on the basis of technical specifications given in the annex of the Directive. Such risk assessments must be carried out in accordance with the obligations laid down in the Framework Directive. The results of risk assessment must be recorded on a suitable medium and updated on a regular basis. Furthermore, the risk assessment itself shall be updated on a regular basis, particularly if there have been significant changes

which could render it out of date, or if the results of health surveillance show it to be necessary (ibid.)

When assessing the exposure, the employer must take into account working practices and working equipment. This information will be provided by the manufacturer. Measurements must be taken using adequate technical apparatus and appropriate methodology (ibid.).

The employer shall give attention to level, type and duration of exposure, limit and action values defined in the Directive, particular sensitivity of workers, interaction with vibrations caused by other equipment at work place, unusual working conditions (especially cold work) and the exposure to vibration beyond working hours under employer's responsibility. Based on the results of the risk assessment, the employer must deploy measures that reduce risks at source (ibid.).

If the action values are exceeded once, the employer must implement an action plan to prevent exposure from exceeding the exposure limit values. Such action might include adequate technical and / or organisational measures, aimed at reducing exposure to mechanical vibration to a minimum. If exposure limit values are exceeded, the employer must take immediate action to reduce exposure below the set limit (ibid.).

The employer shall ensure that workers who are exposed to risks from vibration at work and/or their representatives receive all necessary information and training relating to the outcome of the risk assessment.

Member States were also required to adopt provisions to ensure the appropriate health surveillance of the workers. Surveillance is aimed at the timely diagnosis of any health effect caused by mechanical vibration at work. Member States shall also ensure that in cases of positive diagnosis, the worker is informed immediately and receives any required information and

advice. Moreover, the employer will be required to review the risk assessment, as described above.

Member States must establish arrangements to ensure that health records are made on individual basis, accessible to the worker in question (ibid.).

Member states had to transpose the Directive until 6 July 2005. Every five years, Member States are to provide a report on practical implementation of this Directive to the Commission.

- *The Control of Vibration at Work Regulations 2005 SI 2005 Number 1093 (transposition into UK context)*

The Control of Vibration at Work Regulations 2005 require more specific duties compared to earlier general health and safety regulations such as the Management of Health and Safety at Work Regulations 1999. The HSE s of the opinion that if employers comply with the Vibration Regulations and follow set guidance, it may be possible to eliminate any new incidence of disability from hand-arm vibration by 2015, as well as prevent employees developing advanced stages of these diseases (HSE, 2011c).

In compliance with the directive as outlined above, the regulations introduce action and limit values for hand-arm and whole-body vibration. For hand-arm vibration, the regulations introduce an:

- Exposure action value of 2.5m/s^2 A(8) at which level employers should introduce technical and organisational measures to reduce exposure.
- Exposure limit value of 5.0m/s^2 A(8) which should not be exceeded.

For whole-body vibration (that which is transmitted through the seat or feet of employees who drive mobile machines, or other work vehicles, over rough and uneven surfaces), the regulations introduce an:

- Exposure action value of 0.5m/s^2 A(8) at which level employers should introduce technical and organisational measures to reduce exposure.
- Exposure limit value of 1.15/ms^2 A(8) which should not be exceeded.

Employers must carry out risk assessments, deploy preventative measures as appropriate and ensure apposite health surveillance, as instructed by the directive provisions.

Application to the work of mechanical and electrical technicians

These groups of employees are particularly at risk from hand-arm vibration, due to the nature of maintenance activities and the equipment utilised (e.g. furnace and/or ladle wrecking/re-lining [HSE 2002]).

Thus, there is a range of European legislation in the form of both regulations and directives, which are of particular salience. These will be identified below.

In order to contextualise the report, and subsequently, a concise discussion of the origins and principles of EU health and safety policy will now be outlined.

8.3 Directive 2006/25/EC – Artificial Optical Radiation on the minimum health and safety requirements regarding the exposure of the workers to risks arising from physical agents (artificial optical radiation, 19th individual directive within the meaning of Article 16(1) of Directive 89/391/EEC).

This directive establishes limit values for exposures of workers to artificial optical radiation to eyes and skin. Exposure to natural optical radiation (sunlight) and its possible health consequences are not covered by Directive 2006/25/EC (European Agency for Safety and Health at Work, 2011l).

The directive provides legal definitions of optical radiation, wavelength ranges (visible, ultraviolet, infrared), types of artificial optical radiation (laser radiation and non-coherent radiation), exposure limit values, compliance with which ensures the physical health of workers exposed to artificial optical radiation at work, as well as on parameters for measurement such as irradiation, radiance and radiant exposure (ibid.).

Under the directive, employers are obliged to assess and measure/calculate the levels of exposure to artificial optical radiation to which workers are likely to be exposed. When doing so, the employer shall take account of

- the level, wavelength range, duration of exposure to artificial sources of optical radiation and the exposure limit values set out in the Annexes of the Directive.
- special circumstances such as multiple sources, indirect effects (blinding, explosion, fire), particularly sensitive risk groups of workers and possible effects resulting from workplace interactions between optical radiation and photosensitising chemical substances.
- standards of the International Electrotechnical Commission (IEC) in respect of laser radiation, and the recommendations of the International Commission on Illumination (CIE) and the European Committee for Standardisation (CEN) in respect of non-coherent radiation.
- principles of prevention set out in the Framework Directive (ibid.).

Risk assessment shall be recorded on a suitable medium. It shall be carried out periodically and be updated, particularly if significant changes in working conditions can be observed or if it is indicated by health surveillance results (ibid.).

The reduction of risks shall be based on the principles of prevention set out in the framework directive. The risks arising from exposure to artificial optical

radiation shall be eliminated or reduced to a minimum, taking account of technical progress and of the availability of measures to control risk at source. If the results of the risk assessment indicate that exposure limit values may be exceeded, the employer shall devise and implement an action plan comprising technical and organisational measures in order to prevent the exposure exceeding the limit values (ibid.).

The employer shall ensure that workers who are exposed to risks from artificial optical radiation and their representatives receive any necessary information and training relating to the outcome of the risk assessment.

Member States shall adopt provisions to ensure appropriate health surveillance of workers in order to prevent and to detect timely any adverse health effects, long term health risks and any risk of chronic diseases resulting from the exposure to artificial optical radiation. Such health surveillance shall be done by a doctor, an occupational health professional or a medical authority. Individual health records are to be made.

Member States shall transform the Directive into national law until 27 April 2010. National law shall provide for adequate penalties to be applicable in the event of infringement of the national legislation adopted pursuant to this directive. These penalties must be effective, proportionate and dissuasive (ibid.).

- *The Control of Artificial Optical Radiation at Work Regulations (AOR) 2010 (transposition into UK law)*

As stipulated by the directive, these regulations require employers to protect the eyes and skin of their workers from exposure to hazardous sources of artificial optical radiation. To reiterate, AOR includes light emitted from all

artificial sources in all its forms, such as ultraviolet, infrared and laser beams, but excludes sunlight (HSE, 2010).

The regulations identify hazardous light sources that present a 'reasonably foreseeable' risk of harming the eyes and skin of workers and where control measures are needed. These include arc and oxy-fuel welding and plasma cutting, used in metal working , as well as the AOR from 'hot industries', or furnaces (ibid).

Risk assessments must be carried out and appropriate control measures (eg using faceshields, coveralls and gloves for welders) must be implemented and reviewed (HSE, 2010).

Application to the work of mechanical and electrical technicians

Employees, including mechanical and electrical technicians, can be exposed to AOR as they traverse the company, as well as performing maintenance and repair duties (such as welding and furnace operations).

9.0 Sectoral Level Initiatives

A review of the extant legislation, at both Community and national level, did not reveal any sector-specific regulation. Rather, relevant legislation operates at a general level and covers workplace, workplace activities and hazards arising.

A perusal of the HSE website found that that this body consults with two groups when drawing up industry-specific guidance. These are the Molten Metals National Interest Group and the Foundries Industry Advisory Committee (HSE, 2006). The latter's primary remit is to provide a forum for member industries to promote improved standards of health and safety, as well as the "Revitalising agenda" within the foundries industry.[15]

10.0 Tata Steel - Company Position on Health and Safety

The following section outlines the company's position on, and approach to, health and safety, based on a perusal of its website and company documents available therein.

10.1 Health and Safety Strategy and Policy

Tata Steel Europe makes an explicit and unequivocal commitment to the health and safety of its people, which it declares to be the Group's first priority (Tata Steel, 2011a). This policy also states that the Group works on the principles that 'all injuries and work-related illness can and must be prevented' and that the Group wishes to ensure 'zero harm to its employees, contractors and the communities in which it operates' (ibid.). This pledge is described as integral to the Group's business process and as being embedded in its business systems and processes, health and safety policies, standards and working procedures (Tata Steel, 2011a, 2011b).

[15] Enquiries: Secretary, FIAC, Health and Safety Executive, Arden House, Regent Centre, Gosforth, NE3 3JN. Tel: 0191 2026272

To this end, every Tata Steel Group board meeting includes a detailed review of health and safety issues. The Group has a board-level Safety, Health and Environment Committee, which provides overall leadership in SH&E matters across the global business (Tata Steel, 2010).

Each of the Group's four regional businesses has a comprehensive health and safety policy, with supporting principles, standards and procedures. Moreover, a Tata Steel group-wide health and safety policy has been introduced from January 2011. Clear objectives for process safety, occupational safety and health are embedded within the health and safety management plans of each business (ibid.).

In 2009/10, the Group sought to increase the level of integration and shared learning on safety matters throughout its global operations. A meeting of safety professionals from India and Europe was held in November 2009 to promote shared learning and adoption of best practices across the Group's four regional businesses. For example, the Red Stripe Bulletin system that was originally devised within the European arm of the business has now been extended to cover all of the Group's operations. The system cascades information, findings and recommendations about serious and potentially serious incidents as soon as they are available, and requires feedback on actions taken to be disseminated, so as to prevent similar occurrences (Tata Steel, 2010).

In October 2009, the World Steel Association (Worldsteel) recognised Tata Steel for demonstrating excellence in health and safety, particularly in relation to its contract workforce programme.

10.2 Key Performance Indicators and Progress Made

The Group states that clear objectives are set regarding health, process safety and occupational safety and that these are constantly monitored (Tata Steel, 2011c). The Group's key safety performance indicators are fatalies and the lost time injury frequency (LTIF) rate (defined as the number of lost time incidents per million hours worked), which covers both employees and contractors.

There was one fatality recorded for the European Group in 2007/08 as well as 2009/10 (Tata Steel, 2011d).[16] No details were provided in the Corporate Responsibility report as to how these fatalities occurred.

In terms of the LTIF measure, Tata Steel states its aspiration "to be the health and safety benchmark for the steel industry globally", setting itself an overall target of attaining a lost time injury frequency (LTIF) rate of 0.4 or lower by 2012 (Tata Steel, 2011b). This is one of four key corporate goals (Tata Steel, 2010).

Progress on this measure is recorded and the Group's global performance data indicated an improvement in LTIF from 1.38 in 2008/09 to 0.95 in 2009/10 (Tata Steel, 2010, 2011c).[17]

For the Group's European organisation, safety performance for 2009/10 was the best in its recorded history. The year's average combined employee and contractor rate was 1.5; a figure that shows a 16% reduction from the 2008/09 data. The figure for 2007/08 was 2.38 (Tata Steel, 2009). Tata Steel Europe is targeting a 25% year-on-year improvement in LTIF and recordables in general for 2010/11 (2011c).

[16] There have been several fatalities more recently at Scunthorpe, at Holland and India.

[17] The figures reported in the 2008/09 CSR report cite a higher figure of 1.82 for 2008/09 (Tata Steel, 2009).

10.3 Health Promotion

Tata Steel states its commitment to the safeguarding and promotion of the physical, mental and social well-being of its employees (Tata Steel, 2011d).

The Group declares that it aims to eliminate, reduce or isolate hazards wherever possible, as opposed to a simple reliance upon the provision of adequate personal protective equipment (ibid.). It states that some of the potential health hazards associated with its processes include noise, vibration, hazardous substances, manual handling, driving and climatic conditions (ibid.) The 2008/09 Corporate Safety Report alludes to a programme that has been introduced at all of the Group's European sites, which is aimed at identifying, controlling and minimising potential health hazards. The goal is to reduce the number of employees exposed (without personal protective equipment) to the site's five main health hazards by 25% by 2015 (Tata Steel, 2010).

The company avers that it is currently in the process of establishing baseline exposure levels, so that it can prioritise is improvement plans, as well as measuring their effect (Tata Steel, 2011).

In order to promote safety awareness, Tata Steel Europe developed and ran a campaign over 2010, targeted at reducing the six hazards that present the most frequently occurring risks in the workplace. These have been identified as forklift truck operations; slips, trips and falls; loading and unloading; working at height; noise; and man-machine contact (Tata Steel, 2010). These six hazards accounted for over 60% of Tata Steel Europe's lost-time injuries in 2009, and each became the theme of the campaign for a period of two months each.

11.0 Conclusions

This report has outlined the main health and safety legislation, at both European and national levels, as it applies to the steel industry. The pertinent legislation focuses on the workplace, activities and particular hazards that might be contained therein, rather than on the steel sector specifically. As such, after a review of two highly significant pieces of general legislation, namely the HASAWA and the Framework Directive, relevant legislation has been reviewed as it applies to the workplace, equipment and PPE; chemical agents and the control of associated risks; and physical hazards, namely noise, vibration and artificial optical radiation, with the analysis conducted at both European and national level. Efforts have been made to assess how such legislation might impact upon the work of mechanical and electrical technicians, given the particular hazards that the conduct of their duties might entail. The report ended with a general overview of Tata Steel's health and safety strategy and policy.

12.0 Bibliography

European Agency for Safety and Health at Work (2010a) *Maintenance and OSH: A Statistical Picture.* Belgium: OSHA

European Agency for Safety and Health at Work (2011a) 'The OSH Framework Directive.'
http://osha.europa.eu/en/legislation/directives/the-osh-framework-directive
Date downloaded:

European Agency for Safety and Health at Work (2011b) 'Directive 89/654/EEC - workplace requirements.'
http://osha.europa.eu/en/legislation/directives/workplaces-equipment-signs-personal-protective-equipment/osh-directives/2
Date downloaded:

European Agency for Safety and Health at Work (2011c) 'Directive 89/656/EEC – the use of personal protective equipment.'
http://osha.europa.eu/en/legislation/directives/workplaces-equipment-signs-personal-protective-equipment/osh-directives/4
Date downloaded:

European Agency for Safety and Health at Work (2011d) 'Directive 2009/104/EC.'
http://osha.europa.eu/en/legislation/directives/workplaces-equipment-signs-personal-protective-equipment/osh-directives/3
Date downloaded:

European Agency for Safety and Health at Work (2011e) '
'Directive 90/270/EEC – Display Screen Equipment.'

http://osha.europa.eu/en/legislation/directives/provisions-on-workload-ergonomical-and-psychosocial-risks/osh-directives/5
Date downloaded:

European Agency for Safety and Health at Work (2011f)
'Directive 2003/88/EC – working time.'
http://osha.europa.eu/en/legislation/directives/provisions-on-workload-ergonomical-and-psychosocial-risks/osh-related-aspects/directive-2003-88-ec
Date downloaded:

European Agency for Safety and Health at Work (2011g) 'Directive 98/24/EC – Risks related to Chemical Agents at Work.'
http://osha.europa.eu/en/legislation/directives/exposure-to-chemical-agents-and-chemical-safety/osh-directives/75
Date downloaded:

European Agency for Safety and Health at Work (2011h) 'Directive 2004/37/EC - carcinogens or mutagens at work.'

http://osha.europa.eu/en/legislation/directives/exposure-to-chemical-agents-and-chemical-safety/osh-directives/directive-2004-37-ec-indicative-occupational-exposure-limit-values

Date downloaded:

European Agency for Safety and Health at Work (2011i) 'Regulation (EC) No 1907/2006 – REACH.'

http://osha.europa.eu/en/legislation/directives/exposure-to-chemical-agents-and-chemical-safety/osh-related-aspects/regulation-ec-no-1907-2006-of-the-european-parliament-and-of-the-council
Date downloaded:

European Agency of Safety and Health at Work (2011j) 'Directive 2003/10/EC – Noise.'
http://osha.europa.eu/en/legislation/directives/exposure-to-physical-hazards/osh-directives/82
Date downloaded:

European Agency of Safety and Health at Work (2011k) 'Directive 2002/44/EC – Vibration.'
http://osha.europa.eu/en/legislation/directives/exposure-to-physical-hazards/osh-directives/19
Date downloaded:

European Agency of Safety and Health at Work (2011l) 'Directive – Artificial Optical Radiation.'
http://osha.europa.eu/en/legislation/directives/exposure-to-physical-hazards/osh-directives/directive-2006-25-ec-of-the-european-parliament-and-of-the-council-of-5-april-2006
Date downloaded:

European Commission (2010) *Proposal for a Directive of the European Parliament and of the Council on control of major-accident hazards involving dangerous substances.'* Brussels: European Commission.

Hansard (2008) 'Health and Safety Offences Bill.' House of Lords, 4 July 2008: Column 473.
Fehler! Hyperlink-Referenz ungültig.
Date downloaded:

Health and Safety Executive (2011a) 'Dangerous Substances and Explosive Atmospheres Regulations 2002.'

http://www.hse.gov.uk/fireandexplosion/dsear.htm
Date downloaded:

Health and Safety Executive (2011b) 'ATEX and Explosive Atmospheres.'
http://www.hse.gov.uk/fireandexplosion/atex.htm
Date downloaded:

Health and Safety Executive (2011c) 'The Control of Noise at Work Regulations 2005.'
http://www.hse.gov.uk/noise/regulations.htm
Date downloaded:

Health and Safety Executive (2011d) 'The Control of Vibration at Work Regulations.'
http://www.hse.gov.uk/vibration/hav/regulations.htm
Date downloaded:

HSE (2010) *Guidance for Employers on the Control of Artificial Radiation at Work Regulations 2010.* Sudbury, Suffolk: HSE Books.

Health and Safety Executive (2009a) *A guide to health and safety legislation in the UK.* (4th edition), Richmond, Surry: The Office of Public Sector Information.

Health and Safety Executive (2009b) *Working with Substances Hazardous to Health: What you need to know about COSHH.* Sudbury, Suffolk: HSE Books.

Health and Safety Executive (2008) *Major hazard sites and safety reports: what you need to know.'* Sudbury, Suffolk: HSE Books.

Health and Safety Executive (2007) *Workplace health, safety and welfare: A short guide for managers.* Sudbury, Suffolk: HSE Books.

Health and Safety (2002) *Hand-arm vibration in foundries: Furnace and ladle re-lining operations.* Foundries Information Sheet No 9. Sudbury, Suffolk: HSE Books.

Health and Safety Executive (1999) *Simple Guide to the Provision and Use of Work Equipment Regulations 1998.* Sudbury, Suffolk: HSE Books.

Health and Safety Executive (n.d.) *HSE/HSC Merger Enforcement Statement.* http://www.hse.gov.uk/aboutus/furtherinfo/merger.htm
Date downloaded:

ILO (2005) *Safety and Health in the Iron and Steel Industry: Code of Practice.* 2nd edition, Geneva: International Labour Office.

Tata Steel (2009) Corporate Social Responsibility Report 2008/09.'

Tata Steel (2010) 'Corporate Social Responsibility Report 2009/10.'

Tata Steel (2011a) 'Health and Safety Policy.' 1st January 2011
http://www.tatasteeleurope.com/en/responsibility/our_people/
Date downloaded:

Tata Steel (2011b) 'Corporate Responsibility – Safe Workplace.'
http://www.tatasteeleurope.com/en/responsibility/our_people/health_and_safety
Date downloaded:

Tata Steel (2011c) 'Health and Safety – Performance.'
http://www.tatasteeleurope.com/en/responsibility/our_people/health_and_safety/performance/
Date downloaded:

Tata Steel (2011d) 'Health and Safety – Health Promotion.'

http://www.tatasteeleurope.com/en/responsibility/our_people/health_promotion/
Date downloaded:

Threlfal, M. (2003) 'European Social Integration: Harmonization, Convergence and Single Social Areas.' *Journal of European Social Policy* 13(2): 121-39.

Turner, C. (2002) *Employment Law: The Comprehensive Guide to all the Facts.* London: Hodder and Stoughton.

Turner, C. (2005) *European Law: The Comprehensive Guide to all the Facts.* London: Hodder and Stoughton.

TUC (2005) *Hazards at Work: Organising for Safe and Healthy Workplaces.* London: Trade Union Congress.