10.2.2 Occupational safety 1652

10.2.2 Occupational safety 1652

SECTION 10 Environmental medicine, occupational medicine, and poisoning 1652 and societal approach to achieve health promotion and protection, as well as ill health prevention. The strongest link to public health exist when work and the workplace (as well as the home, school, and other environments) are used as a setting to promote good environ- mental standards, personal health, and healthy behaviours so as to bring about the highest state of ‘well-being’ for individuals, whether in the working population or not. FURTHER READING Adisesh A, et al. (2013). Review: UK standard of care for occupa- tional contact dermatitis and occupational contact urticaria. Br J Dermatol, 168, 1167–75. Agius R, Seaton A (2006). Practical occupational medicine, 2nd edition. Hodder Arnold, London. Baroushi B (1993). Effects of the workplace on fertility and related reproductive outcomes. Environ Health Perspect, 101 (Suppl. 2), 81–90. Baxter PJ, et al. (2010). Hunter’s diseases of occupations, 10th edition. CRC Press, Boca Raton, FL. Burton AK, Bastys S, Wright IA, Main OJ (2005). Obstacles to recovery from musculoskeletal disorders in industry, research report 323. Health and Safety Executive (UK), London. Cartwright S, Cooper CL (1997). Managing workplace stress. Sage Publishing, Thousand Oaks, CA. Dick FD (2006). Solvent neurotoxicity. Occup Environ Med, 63, 221–6. Grandjean P, Landrigan PJ (2006). Review: developmental neurotox- icity of industrial chemicals. Lancet, 368, 2167–78. Health and Safety Executive (UK) (2017/2018). Health and safety sta- tistics: annual report for Great Britain (2016/17). http://www.hse.gov. uk/statistics International Labour Organization (ILO) (2013). The prevention of oc- cupational diseases. http://www.ilo.org/wcmsp5/groups/public/--- ed_protect/--- protrav/---safework/documents/publication/wcms_ 208226.pdf Langan-Fox J, Cooper CL (eds) (2011). Handbook of stress in the occu- pations. Edward Elgar, Cheltenham. Palmer KT, Brown I, Hobson J (2013). Fitness for work: the medical aspects, 5th edition. Oxford University Press, Oxford. Rushton L, et al. (2012). Occupational cancer burden in Great Britain. Br J Cancer, 107, S3–7. Sithamparanadarajah R (2008). Controlling skin exposure to chemi- cals and wet-work: a practical book. RMS Publishing, Stourbridge. https://www.personneltoday.com/hr/controlling-skin-exposure- to- chemicals-and-wet-work-a-practical-book/ Snashall D, Patel D (eds) (2013). ABC of occupational and envi- ronmental medicine (ABC series), 3rd edition. Wiley-Blackwell, Chichester. Stellman JM (ed) (1998). Encyclopaedia of occupational health and safety (vol.2—Hazards), 4th edition.

International Labour Office, Geneva. Venables K (2013). Current topics in occupational epidemiology. Oxford University Press, Oxford. Waddell G, Burton AK (2000). Occupational health guidelines for the management of low back pain at work: evidence review. Occup Med (Lond), 51, 124–35. Waddell G, Burton AK (2006). Is work good for your health and well- being? TSO, London. White RF, Proctor SP (1997). Review: solvents and neurotoxicity. Lancet, 349, 1239–43. 10.2.2 Occupational safety Lawrence Waterman ESSENTIALS Any approach to occupational health must acknowledge that acci- dents in the workplace result in many injuries. Construction, agricul- ture, and primary extraction provide the main worksites for fatalities and serious injuries, but many more minor injuries result from all types of work. Health and safety law has developed with an emphasis on accident prevention that is based on designing and managing the working environment by: (1) defining appropriate processes and work practices that are safe; (2) ensuring that the workplace and work equipment are suitable for the work to be undertaken; (3) developing and maintaining a health and safety culture, including mechanisms to influence behaviour, so that everyone is focused on the best and safest way to do their work. Establishing this approach to safety management begins with an organization committing itself to a policy influenced by legal obli- gations and current good practice, such as the developing standards for corporate governance of risks and public reporting. Management systems based on the formula ‘Plan–Do–Check–Act’ are central to accident prevention, with detailed decisions driven by risk assess- ments. Risk assessments are formed when the hazards associated with the work are identified; that is, the potential for harm, and the likelihood, severity, and impact of that harm is assessed. This forms the basis for defining precautions and mitigations to minimize likeli- hood and impact, in proportion to the degree of risk. A key ingredient to safety is genuine worker engagement, going beyond the legal obligations for consultation. Organizations can im- prove their safety culture when they recognize that this is the product of individual and group values, attitudes, competence, and patterns of behaviour that determine the commitment to, and the style and pro- ficiency of, their safety programmes. A positive culture requires appro- priate leadership, including genuine commitment of the most senior manager(s) in the organization, and an appropriate emphasis on com- petence, such that the right people, trained and skilled, are doing the right job in the right way, with their supervisors and managers having ready access to competent health and safety advice when required. These basic concepts hold true in whichever country you are working. While this chapter draws heavily on the UK situation, where there has been considerable experience and development of ap- proaches to health and safety, it is incumbent on any physician to consider the work environment and whether changes to the work- place might improve not only the lot of their patients but others po- tentially at risk in the workplace. Introduction Accidents, sometimes fatal, are an important cause of illness and harm to health at work. In 1995, the World Health Organization estimated that every year, worldwide, there were approximately 120 million

10.2.2 Occupational safety 1653 accidents leading to 20 000 fatalities. In 2014, the International Labour Organization estimated that of 2.33 millions deaths from occupa- tional accidents and work-related illness, 13.7% or 380 500 were due to accidents (Reference: Global Estimates of Occupational Accidents and Work-Related Illnesses 2017, Paivi Hamalainen, Jukka Takala, Tan Boon Kiat, WSH Institute Singapore for the ILO, 2017). China, whose workforce is expanding quickly through rapid industrializa- tion, reported a rise in fatal accidents from 73 500 in 1998 to 80 000 in 2010. According to official data the reported Chinese fatal accident rate was 21 times that for the United Kingdom. In industries with a poor safety record, such as mineral extraction and agriculture, the toll of accidental injuries is matched or exceeded by the numbers made ill by exposure to

health risks. It is therefore appropriate to give ser- ious consideration to the risks of both accidents and illnesses at work. Accidents at work occur under varying circumstances. Globally, and in the United Kingdom, the largest group of accidents and fatalities occur in the construction industry. Worldwide, one in six fatal work- place accidents occurs on a construction site. However, in the United Kingdom in 2017/18, 24% of all such fatalities were associated with construction work with approximately 7% of the workforce, the higher proportion reflecting economic development away from traditionally hazardous industries such as heavy engineering and mining. But ser- ious accidents continue to occur: fires and explosions in chemical pro- cess plants, transportation disasters, and entanglement in machinery. Most accidents involve everyday events such as slips, trips, and hand- tool injuries that most commonly result in only minor injuries. Research since the 1950s has demonstrated that in any organiza- tion, many minor accidents occur for every serious one. This was developed into a strategy for preventing accidental losses, both fi- nancial and human, based on the concept of accident triangles illustrating the relationship between minor events and serious ac- cidents (Fig. 10.2.2.1). Despite the diversity of accidents and their outcomes, their causes, and the underlying principles of safety man- agement for their prevention are common to all accidents, and to the control of other health hazards at work. The three elements of safety management are designed to address: • working environment—encompassing physical arrangements, equipment, materials, and the environment in which they are used • working processes and practices—the way in which the work is expected to be carried out, often embodied in written standard operating procedures • culture and behaviour—the human element, that takes the work- place and the procedures and brings them to life, summed up as ‘this is the way we do things around here’ In order to address these elements, employers have increasingly been encouraged to develop formal management systems. The key mechanism adopted for ‘encouragement’ has been the development of occupational health and safety law. British law from the mid-19th century onwards seemed to reflect Parliament’s desire to take action only after a tragedy had happened. As industrial hazards were re- vealed by research or major accidents, regulators conducted a form of risk assessment and prescribed general control measures. As a re- sult, many different and highly specific sets of regulations ended up on the statute book, with overarching acts, such as the Factories Acts imposing general duties applicable only to defined workplaces, such as factories, workshops, offices, shops, and railway premises. The 1802 Health and Morals of Apprentices Act and subsequent legisla- tion were crucial in driving workplace controls. Many workers were excluded but it was estimated that the 1974 Health and Safety at Work Act brought up to 5 million workers within the ambit of the law. In the United Kingdom after the First World War, there were de- velopments outside legislation. The cooperative movement grew into a major developer of social commerce, and other organizations, such as the children’s organization Woodcraft Folk, were founded on ideas of social improvement. The public began to demand better management of industrial safety, both for moral and economic reasons. The British Industrial Safety First Movement, later the Royal Society for the Prevention of Accidents (RoSPA), promoted accident prevention through committees, workers’ participation, the employment of safety officers, joint accident investigations, and the promotion of positive attitudes. Enlightened industrial management that recognized the cost of accidental losses, legal obligations, and voluntary efforts based on worker engagement and morality was summarized in the 1972 Robens Report, which formed the basis for the Health and Safety at Work Act 1974. Risk assessment, initially implicit, was later made an explicit requirement. Worker engagement, through safety rep- resentatives and worker/management committees (at least in the minority of British workplaces with recognized trades unions), was a new element. However, law always seemed to lag behind in-

dustrial developments. The 1974 Act established the Health and Safety Commission and the Health and Safety Executive not only to be custodians, developers, and enforcers of the law, but also to be responsible for identifying and disseminating good practice. Although many people accept the need for both enforcement and encouragement in dealing with enlightened and obstinate employers, some call for more prosecutions of companies and individual dir- ectors. Employers are no longer expected to adhere slavishly to sets of statutory rules, but to develop their own safety organization and arrangements following good practice. It is now recognized that safety is a key challenge to be addressed by management. Other events have influenced organizations' approach to risk. Financial scandals (Polly Peck, Mirror Group Newspapers) led to reports from committees chaired by Cadbury (on preventing malpractice), Greenbury (on the role of directors), and Hampel (outlining good governance) that laid the foundations for Turnbull and changes in the rules applying to publicly listed companies in the United Kingdom. Management of risk and safety are essential com- ponents of good corporate governance both in the public and vol- untary sectors. While these formal risk management requirements were being developed, corporate social responsibility was maturing through the formulation of the Global Reporting Initiative and local ventures such as corporate social responsibility indices, the launch of FTSE4Good, and ethical investment organizations. Their impact should not be underestimated. The history of companies such as Railtrack, where major accidents led to loss of control, should re- mind directors that they are expected to govern in order to protect the public, the organization, and its shareholders from such disasters. 1 20 30 600 Major Minor Property damage Near miss Fig. 10.2.2.1 Accident triangle developed by Frank Bird.

SECTION 10 Environmental medicine, occupational medicine, and poisoning 1654 The size of the problem During the year 2014/15, some 142 workers, employees, and self- employed, were killed at work in the United Kingdom. This reflects both effective accident reduction and a dramatic change in economic activity; there are now many more people working in call centres than in mining. Numbers of nonfatal accidents are less certain, because of underreporting. In the period 2014/15 61 100 workers reported in- juries through the self-reporting schemes that the Health and Safety Executive uses to record injuries. According to figures recorded through Reporting of Injuries, Diseases and Dangerous Occurrences Regulations 2013 (RIDDOR) 76 054 nonfatal injuries occurred in UK workplaces. Slipping and tripping are responsible for the largest group of major injuries, almost three times the numbers of injuries from moving machinery/objects, from falls, or from direct handling. Statistics show that many employees suffer from mental ill health, followed by musculoskeletal disorders. However, an individual's per- ception of what level of incapacity forces them to be absent from work is clearly influenced by their mental state. The nature of the injuries received and the process of rehabilitation and return to work are clearly important, but the safety practitioner is interested primarily in methods of prevention embodied in safety management systems and the associated work to develop and maintain the safety culture. Safety management Accident prevention requires a safe working environment and suit- able equipment combined with safe behaviour by the workforce, including the avoidance of error, by those doing hazardous work. Most practical accident prevention involves physical safeguards or safety rules designed to prevent recurrence of unsafe conditions or acts that have already led to accidents. Similarly, occupational hy- gienists anticipate, recognize, assess, and control hazards to health at work. Accidents usually result from a chain of connected events. Effective safety management addresses the physical conditions, the work processes, and the human behaviour that have combined to cause harm and conversely could prevent harm. Modern safety management is based

on risk assessment and the definition and implementation of methods for preventing harm. Policy—organizational commitment Effective health and safety policies set out a clear direction for the organization, indicating what is expected of managers and workers. This may represent no more than a commitment to formal, min- imum legal compliance but most bodies express themselves more in the manner of a mission statement. For example, Marks & Spencer is ‘committed to ensure the health, safety, and well-being of all its employees, customers and others who visit or work on our premises’. The policy is an opportunity clearly to state the responsi- bilities and arrangements for delivering what is promised. Planning The foundation of safety management is planning: to create the right physical conditions and shape the activities undertaken. This includes identifying accident risks inherent in the workplace and the work, assessing their significance and determining suitable pre- cautions. There is a hierarchy of such controls, promulgated across the European Union in the Framework Directive, which targets protection of the whole group of exposed people rather than per- sonal protection: • Elimination—selection and design of facilities, equipment, and processes to prevent exposure to an identified risk. For example, fitting a long-life plastic sign may avoid the need to repaint a high board. • Minimization—reducing risk. For example, selecting a less- hazardous material, redesigning a tool, or replacing baskets and belts on a conveyor with softer, more resilient materials to reduce noise. • Personal protection—as a last resort, selecting methods of work and personal protective equipment so that the exposed workers are protected to some extent. Risk assessment is a critical activity. It requires a degree of know- ledge and understanding of the work itself and of the principles of safety management. This means that in practice it is often best conducted by a team made up of workers, managers, and safety practitioners. Monitoring performance Residual risks that cannot be wholly eliminated require moni- toring. Key performance indicators may be used to explore training courses, supervisory inspections, and accident frequency rates. Accident frequency rates are typically related to workers’ hours (i.e. accidents per 100 000 h worked), allowing compari- sons between different-sized workplaces and workforces. Active monitoring of key performance indicators is supplemented with reactive monitoring (accident investigations) to determine imme- diate and underlying causes of failure. Audit and review Good organizations learn from their experiences, and apply the lessons. Regular audits check that safety policies are being imple- mented, that people are discharging their responsibilities, and pro- cedures for safe working are documented and followed. Reviews are more searching and make comparisons with other organizations. They ask the challenging question, ‘Are we doing the right or best things?’ These processes contribute to an organization’s ability to communicate to its stakeholders inside and outside the organiza- tion, for example in the annual report. There are three types of cor- porate report on health and safety: • minimal reports on injuries and ill health, days lost, comparison with national or sector targets, and information on events such as awards and/or convictions • comprehensive reports with statistics, trend analysis against per- formance indicators, director workplace visits, health and safety training days, inspections and audits, emergency drills, and so on • verified reports (i.e. comprehensive reports that have been re- viewed externally)

10.2.2 Occupational safety 1655 Safety management and safety culture The effort to create and maintain a physically suitable workplace and equipment, and implement documented safe working prac- tices, will be effective only if it is matched by the engagement of the whole workforce from director to shop floor. A healthy and safe culture is one in which the members of the organization: • understand and respect the hazards of their operations • are alert to the many ways in which safe working systems may be breached or bypassed • are committed to maintaining safe working • honestly report problems and opportunities for improvement A key ingredient is real worker

engagement, going beyond the legal obligations to consult. Organizations can progress when they recognize that their safety culture is the product of indi- vidual and group values, attitudes, competencies, and patterns of behaviour that determine the commitment to, and the style and proficiency of their safety programmes. Those with a positive culture communicate on a basis of mutual trust, share percep- tions of the importance of safety, and are confident in the efficacy of preventive measures. This becomes possible only when there is appropriate leadership, including the commitment of the chief executive. As an example, the strategy adopted by the Olympic Delivery Authority for the planning and construction of venues, test events, and infrastructure for the London 2012 Games, the 2–4–1 approach, has allowed time to establish the right culture. The staff were com- mitted to weaving safe design and construction into all components of London 2012 and its legacy for east London and United Kingdom as a whole. This was made clear to all the contractors and other sup- pliers involved in this project. Competence Training is an essential part of any company's safety arrangements. How well people have been trained to do what is required, from working safely to reporting problems, will influence the risks in the working environment. Competence is not purely defined by training and qualifications, but by the additional skills, knowledge, and experience of individ- uals in the workplace. The definition of competence has been up- dated in the Construction (Design and Management) Regulations 2015 reflecting this approach. Current issues Leadership There has been an increasing drive to promote strong leadership within organizations, to continually improve safety and health risk management performance. This is reflected in various activities. The Institute of Directors published guidance on safety leadership aimed at those holding senior corporate positions. Furthermore, there have been legal developments such as the Construction (Design and Management) Regulations 2015 that have put a greater emphasis on the duties held by a client and new role of Principal Designer to ensure safety management is a fundamental approach to construction projects. The Health and Safety Executive has re- vised its guidance on safety management by updating the HSG 65 Successful Health and Safety Management model. This revised model has a modernized approach that aligns more closely with the principles of Plan–Do–Check–Act which was laid out in the management standard OHSAS 18001, now superseded by ISO 45001 management standard, published in 2018 and now used to evaluate, certify, and accredit management systems worldwide. The new standard is much more explicit and proscriptive about the leadership that organization are required to demonstrate and the evidence auditors will seek to be satisfied. The standard is written to align with recently updated management standards ISO 9001 Quality Management Systems and ISO 14001 Environmental Management. All of these new standards have stricter require- ments for organizations to demonstrate leadership to bring about changes and improvements in performance. Additionally, in the United Kingdom the Health and Safety Executive has published guidance aimed at small to medium-sized enterprises, and cre- ated a self-assessment tool to establish what leadership activity is in practice while identifying opportunities to improve leadership performance. Cost recovery and sentencing guidelines In light of government reviews to reduce the administrative burden of health and safety on employers, many pieces of UK legislation have been repealed, amended, and updated to ease bureaucracy, re- move unnecessary red-tape, and reduce costs. Changes to accident reporting regulations (RIDDOR) brought in a change in threshold for when an employer must report injuries resulting in lost time from over 3 days to over 7 days. In addition, it was concluded that the cost burden for investigating and enforcing material breaches of health and safety legislation should be borne by the employer at fault and not the taxpayer. This has led to the Health and Safety (Fees) Regulations 2012 and the introduction of Fees for Intervention. Under these arrangements, HSE can charge employers, based on an hourly rate of around £127 to recover costs associated with inves- tigation, research, consultation with

specialist advisors, and subse- quent enforcement action where there has been a material breach of legislation. Another major change to the enforcement process has been the publication in 2016 of revised sentencing guidelines in for health and safety offences, which has led to a significant increase in the financial penalties levied on larger organisations—for example in 2017 Laing O’Rourke was fined £3.8m following a fatal accident, and Warburtons the bakers £1.9m following an entrapment accident that resulted in severe friction burns requiring skin grafts for the worker involved. Prior to these changes, fines and custodial sentences were limited by fairly low thresholds. Furthermore, sentences were more likely to be based on the outcome of a breach in legislation. However, the Health and Safety at Work Act 1974 is based on risk of exposure and so the new sentencing guidelines reflect this, as the sentence issued should be based on the ‘harm risked’. The inflationary factors that can lead to significantly increased fines and custodial sentences include culp- ability for an organization or individuals, harm risked, number of people exposed, and the financial turnover of the organization. This can lead to fines in the millions of pounds for large organizations and a shift from a typical six-month custodial sentence to a possible

---

Revision #1
Created 2026-01-22 16:37:07 UTC by Omar Ayman
Updated 2026-01-22 16:37:07 UTC by Omar Ayman