

Enquiries received by the Royal Society of Chemistry indicate that there is a need for basic information on risk assessment at work arising from health and safety legislation. This Note is designed to answer this need. It does not address environmental risk assessment nor does it pretend to be a full or definitive guide to the subject. Readers are urged to obtain more detailed guidance and/or expert advice if this is required. The bibliography at the end of this Note provides a good starting point but it is not exhaustive.

BACKGROUND

The Management of Health and Safety at Work Regulations [made in 1992 and revised in 1999] require employers to identify hazards and to undertake the assessment, management and control of risks to both persons at work and others who may be affected by work activities. Although the concept of risk assessment in its present form is still relatively new to many people, we have been carrying out risk assessments all our lives, probably without realising it. Every time we cross the road we carry out a risk assessment in the split second in which we look both ways to assess the state of the traffic before deciding whether or not it is safe to cross. Many other everyday decisions are based on risk assessment.

In safety legislation the concept of risk assessment first appeared in 1980 in Regulations for the control of lead at work. This theme was developed in subsequent Regulations relating to the control of asbestos, the control of substances hazardous to health and the control of noise at work. Other sets of Regulations require special types of risk assessment for manual handling operations, the use of display screen equipment, the use of personal protective equipment, the use of dangerous substances and explosive atmospheres and for fire.

The concept of risk assessment is now well established and forms the basis of health and safety legislation. Risk assessment is the key issue on which control measures are based.

BASIC CONCEPTS - HAZARD AND RISK

Hazard and risk each have their own individual meaning. These meanings are quite separate and they are not interchangeable. It is important to understand the meaning of these words.

Hazard: is the potential for something to cause harm. For example hazards can include substances, machines, energy forms, or the way work is carried out.

Risk: is a combination of the likelihood or probability that the hazard will cause actual harm and the severity of the consequences.

This Note was produced by a Working Party of the Environment, Health and Safety Committee [EHSC] of the Royal Society of Chemistry.

The Society is a registered Charity. Its Royal Charter obliges it to serve the public interest by acting in an independent advisory capacity. In order to meet this obligation the members of the EHSC are drawn from a wide range of backgrounds and serve on the committee as individual experts and not as representatives of their employer.

The EHSC welcomes comments on this Note. Please send your comments to: The Secretary
Environment, Health and Safety Committee
Royal Society of Chemistry
Burlington House
Piccadilly
London
W1J 0BA

Tel: +44 (0) 207 440 3337
Fax: +44 (0)207 734 1227
Email: ehsc@rsc.org

EHSC Notes are also available on the Society's web site at www.rsc.org

EHSC Notes are updated from time to time and details of the most up to date versions can be found on the Society's website www.rsc.org

Version 4 – 14 June 2011

THE ASSESSMENT PROCESS

Risk assessment is a careful examination of the premises, processes and work activities to identify what could cause harm to people to enable decisions to be made as to whether sufficient precautions have already been taken or whether further controls are needed. Risk assessment is a subjective process. It can be seen as a logical way of asking questions which will produce enough information for sensible conclusions to be drawn. In the past, formal risk assessments may not have been done but decisions will have been made in order to provide appropriate precautions to protect employees and others who may be at risk. It is unlikely, therefore, that anyone will be starting their risk assessments completely from scratch. In this case, it is essential to consider whether or not existing risk control measures are adequate.

The questions which should be asked in the assessment process are:

- What are the hazards?
- What are the sorts of circumstances that can be realistically expected (“reasonably foreseeable”) to occur which are capable of leading to injury or ill health?
- When are the circumstances likely to arise?
- Who are the people who might be at risk?
- Are some people likely to be at particular risk (eg. pregnant workers, young persons, workers with disabilities and lone workers)?
- What is the severity of outcome likely to be in terms of injury or ill-health to those at risk?
- What is the nature and extent of the risk(s)?
- What are the existing precautions and are they appropriate and adequate?
- Are we fully complying with the law?
- If not, what action is required to control the risks?

The Management of Health and Safety at Work Regulations cover general risks. Some specific risks are covered by other legislation such as the COSHH Regulations, Noise at Work Regulations, Manual Handling Operations Regulations, Display Screen Equipment Regulations, Personal Protective Equipment Regulations, Dangerous Substances and Explosive Atmospheres Regulations and the Regulatory Reform (Fire Safety) Order. Where these assessments have already been done there is no need to repeat them. It is important, however, to identify these risks when general risk assessments are done so that comprehensive records are kept and that special areas are not overlooked.

HAZARD IDENTIFICATION

The first step in practical assessment is to identify the hazards which are present. Hazardous agents can be grouped into families - physical, chemical, biological and natural phenomena. These hazardous agents can exist in their own right or be associated with work activities. There are other hazards that can occur and these relate to the manner in which work is undertaken. The groupings are not perfect and there will always be some overlapping or argument about definitions. These groupings enable the task to proceed in a quick, systematic way:

- Physical hazards* - examples include gravity (falls of people and objects); manual handling; hand tools; moving parts of plant/machinery and/or their loads, vehicles; electricity, pressure (steam), radiation, noise and vibration.
- Chemical hazards* - examples include toxicity, fire and explosions, and contamination.

- Biological hazards* - examples include animals, micro-organisms and plants/vegetation.
- Natural phenomena* - examples include heat, cold, water and weather (snow, ice, fog).
- Other hazards* - examples include the way in which individuals interface with their work station due to poor ergonomic design which can cause musculoskeletal injuries (including work related upper limb disorders) and poor inter-personal relationships leading to excessive work loads, bullying and discrimination which can cause stress.

Hazards can occur across a whole site or can be specific to a work activity. If across-the-site hazards are identified first and associated risk assessments completed, then risk assessments of individual work activities will be simplified as some of the important risks will have already been addressed.

RISK ASSESSMENT

Risk can be considered as the combination of the likelihood of an event occurring and the severity of the outcome.

$$\text{Risk} = \text{likelihood of an event} \times \text{severity of outcome}$$

(probability)

The risk can then be estimated or rated by giving numerical values to both the likelihood of the event and the severity of outcome.

A range of numerical values could be ascribed to the likelihood of an event ranging from highly unlikely to highly likely, for example 1 to 3, 1 to 5 or 1 to 10. Whichever of these ranges is selected, the same range should then be ascribed to the severity of outcome from minor injury to fatality or multiple fatality. Risk ratings or risk estimators can then be calculated by inserting numerical values into the above formula. More simply, the risk may be described as low, medium or high. Decisions can then be made regarding the tolerability or acceptability of the risk. From these decisions action plans can be generated to make any necessary improvements. After any additional control measures have been introduced the risk ratings can be re-calculated to demonstrate the effect of the improvements which have been made. Consideration can then be made as to whether any further control measures are necessary.

If the risk cannot be eliminated then measures to control/mitigate the risks should be applied, according to the hierarchy: physical safeguards (e.g. guarding), engineering controls (e.g. local exhaust ventilation), safe systems of work, inspections and checks, personal protective equipment, training and management control.

When risk assessments are undertaken, special consideration should be given to vulnerable workers such as pregnant workers and others who have recently given birth or are breast feeding, young persons, workers with disabilities and lone workers. EHSC has already prepared Notes on each of these groups of workers.

DOCUMENTATION

If more than five people are employed by an organization then the risk assessment must be recorded. It is good practice, however, to keep records in all circumstances. All existing control measures should be recorded. The assessment will prompt decisions on the adequacy of these controls in order to identify whether they need to be improved or whether additional control measures will be required. Arising from the assessment an action plan should be established for the elimination or further reduction of the risks. When the additional control measures have been implemented, the risk assessment should be updated accordingly. It is important that risk assessments come to conclusions about how well the risks are controlled and that the requirements of relevant legislation have been met.

REVIEW OF RISK ASSESSMENTS

Risk assessment is a continuous, on-going process. Assessments should be reviewed on a regular basis or when there are any significant changes to hazard information, the premises, processes, work equipment, changes in technology, work activities, or working patterns or shifts.

FURTHER READING

1. British Standard BS 18004:2008 "Guide to achieving effective health and safety performance", British Standards Institution, 2008
2. EHSC Note "COSHH in Laboratories", Version 4, Royal Society of Chemistry, 2008
3. EHSC Note "Fire Safety in Chemical Laboratories", Version 2, Royal Society of Chemistry, 2008
4. EHSC Note "Health and Safety of Young Persons Working In Chemical Laboratories", Version 2, Royal Society of Chemistry, 2011.
5. EHSC Note "Lone Working & Laboratory Activities", Version 3, Royal Society of Chemistry, 2010.
6. EHSC Note "Pregnant Workers, Chemicals and the Law", Version 4, Royal Society of Chemistry, 2010.
7. EHSC Note "The Safety of Laboratory Workers with Disabilities, Version 3, Royal Society of Chemistry, 2009.
8. Health and Safety Commission, 'The Management of Health and Safety at Work Regulations – Approved Code of Practice and Guidance', L21, 2nd Edition, HSE Books, 2000.
9. Health and Safety Executive, "5 Steps to Risk Assessment" IND(G)163L, [Rev2], HSE Books, 2006. (Web link added) <http://www.hse.gov.uk/pubns/indg163.pdf>
10. Health and Safety Executive, "Successful Health and Safety Management", HS(G)65, 2nd Edition, HSE Books, 1997. (Web link added) <http://www.hse.gov.uk/pubns/priced/hsg65.pdf>
11. Health and Safety Executive's website: www.hse.gov.uk, and more specifically <http://www.hse.gov.uk/risk/index.htm>

This Note was prepared by a Working Party of the RSC Environment, Health and Safety Committee.

The members of the Working Party were:

Dr I Wrightson (Chairman), Sara J Cooper, Dr M Crookes, Dr N King, Dr P Lewis, Dr D H Lohmann, Dr C Maxwell, D M Sanderson, Dr C Watts, J Larner and Dr S Lipworth (Secretary).

This Note is also available on the RSC website : www.rsc.org