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Risk Assessment:
The Missing Link for EHS Professionals

Lawrence Bamber, BSc, DIS, CFIOSH, FIRM, MASSE
Managing Director
Risk Solutions International
Poynton, Cheshire, UK

John Stevens CMIOSH, MIRM, FCIPD, MIIRSM, MASSE
Managing Director
Risk Frisk
Hatfield, Hertfordshire, UK.

Introduction

This paper examines the UK/EU/IOSH approach to risk assessment, which is a legal requirement throughout the EU and has been since 1992, unlike the situation in the U.S., with risk assessment not featured explicitly or specifically in any OSHA requirements.

The paper outlines the EU/UK legal requirements and provides EHS professionals with a tried and trusted methodology for risk assessment so as to enable EHS professionals to undertake their own workplace risk assessments and, thereafter, to train managers, supervisors and employees in the logic of risk assessment and, hence, risk control.

The paper draws on practical examples and real-life case studies to illustrate the whole risk assessment process and highlights a well-researched, useful, practical, quantitative method of risk assessment and control in the workplace.

As a result of risk assessment/control strategies being in place within the UK/EU for the last twenty years, the number of fatal, major and serious injury accidents has been greatly reduced. This is attributable, not only to the promotion of risk assessment as a process by UK/EU EHS professionals, but also to enforcement by the Labour Inspectorates of EU Governments.

Risk Assessment: A Legal Requirement

The legal requirement for risk assessment within the European Union was first mentioned in the European Framework Directive which saw the light of day in 1989 (ref. 89/391). The aim of the Directive was to introduce measures to encourage improvements in the health and safety of workers at work. As a result of this Directive, each member state of the EU has to enact local/national legislation so as to bring the requirements of the Directive into the regulatory framework of each Nation.

Within the UK, the regulations requiring risk assessment are the Management of Health and Safety at Work Regulations in 1992, which were revised in 1999. They come with their own Approved Code of Practice (ACoPs) published by the then UK Health and Safety Commission (HSC).

ACoPs primarily provides practical guidance on how to comply with the relevant legislative requirements. Although failure to comply with any provision of the Code is not, in itself, an offence in law, that failure may be taken by a court in criminal proceedings as proof that a person or organisation has contravened the regulation to which the provision relates. In such a case, however, it will be open to that person/organisation to satisfy a Court that compliance with the regulation has been achieved in some other way. In summary: when in doubt, follow the Code!

Specifically, Regulation 3 of the Management of Health and Safety at Work Regulations, 1992/1999 (MHSWR) requires employers and the self-employed to make a "suitable and sufficient" assessment of the risks to both employees and persons not in their employment (e.g., contractors, visitors, and members of the public). The purpose of this assessment is to identify the measures needed to comply with the requirements and prohibitions (dos and don'ts) imposed by the regulation (i.e., identifying what is needed to comply with the law). In essence, this is taking the risk management process and making it a legal requirement: Identify, Evaluate, and Control.

It is interesting to note here that Reg. 3 requires risk assessment; the remainder of the MHSWR— some fifteen or so regulations—are all concerned with controls!

Regulation 4: Principles of Prevention to be Applied, introduces the preferred hierarchy of control. The logic is to start at the top of the hierarchy and work down until the risk has either been eliminated or reduced to an acceptable level. The complete hierarchy is as follows:

- avoid risks (elimination)
- evaluate risks that cannot be avoided (assessment)
- combat risks at source (remove)
- adapt work to the individual (work design/ergonomics)
- adapt to technical progress (innovation)
- replace dangerous with safe or safer alternatives (reduce)
- develop a coherent overall prevention policy (control)
- give priority to collective over individual protective measures (group, not single)
- give appropriate instructions to all employees (information/training)

[N.B. It is interesting to note that there is no mention or inclusion of personal protective equipment (PPE) anywhere in this hierarchy. Hence, PPE is *not* an acceptable control measure in EU law, unless it can be shown to be not technically feasible or reasonably practicable to combat the risk by measures other than PPE. PPE is therefore the last resort, not the first (and only?) option.]

The Remainder of the MHSWR 1999

[N.B.: All are Control Requirements]

Reg. 5: Health and Safety Arrangements
Employees are required to have appropriate arrangements (systems and procedures) in place for the effective:

- planning
- organisation
- control
- monitoring
- review

of those preventive and protective measures. Those organisations having five or more employees must keep a written record of these arrangements; this requirement also applies to the need to keep and revise written risk assessments (Reg. 3).

Reg. 6: Health Surveillance
Where health risks are identified via risk assessments, then exposed employees must be provided with such health surveillance as is appropriate.

Reg 7: Health and Safety Assistance
Employers shall appoint one or more competent persons to assist in undertaking measures that need to be taken in order to comply with the relevant requirements and prohibitions (dos and don'ts)

Reg. 8: Procedures for Serious and Imminent Danger/Danger Areas
Every employer shall establish and give effect to appropriate procedures to be followed in the event of serious and imminent danger to persons at work, and to restrict access to designated "danger areas".

Reg. 9: Contacts with External Services
Every employer should ensure that any necessary contact with the emergency services - fire, ambulance, paramedics, police etc - are arranged, particularly as regards to first aid, emergency medical care and rescue work.

Reg. 10: Information for Employees
Employees are required to provide all employees with comprehensible and relevant information on:

- the OSH risks identified by the risk assessment(s)
- the commensurate preventive and protective measures (controls)
- emergency procedures

Reg. 11: Co-operation and Co-ordination
This requires employees and self-employed persons sharing a workplace to:

- co-operate with each other in respect of health and safety
- co-ordinate their precautions/risk control measures
- take reasonable steps to inform each other about osh risks

Reg. 12: Persons Working on Third Party Locations
Host employers are required to provide comprehensible information to all third parties working on their location concerning OSH risks on site. This include emergency evacuation procedures.

Reg. 13: Capabilities and Training
Every employer shall, in entrusting tasks to his employees, take into account their capabilities as regards to health and safety, i.e., square pegs in square holes! Capability includes training plus the capacity to put that training into practice. It also includes physical and mental capabilities.

Every employer shall ensure that all employees are provided with relevant osh training on recruitment (induction), on being exposed to new or increased risk because of change in responsibilities/new work equipment/new technology/new processes or systems of work.

Such training should be repeated periodically, should take account of new or changed osh risk, and should take place during normal working hours.

Reg. 15: Temporary Employees
In essence, this requires temporary and part-time employees to be treated in exactly the same way as full-time employees in respect of the provision of risk information and controls.

Reg. 16: New and Expectant Mothers

Reg. 17: Night Work by New and Expectant Mothers

Reg. 18: Notification of Pregnancy by Expectant Mothers

Reg. 19: Protection of Young Persons

Reg. 20: Exemptions (e.g. Ministry of Defence)

Reg. 21: Exclusion of Civil Liability
Any breach of a duty imposed by these Regulations shall not confer a right of action in any civil proceedings (i.e., workers = compensation).

Risk Assessment in Practice

The fundamental risk management process can be traced back to the mid-1970s and, as stated above, may be summarised as:

IDENTIFY → EVALUATE → CONTROL

Steps 1 and 2 taken together constitute Risk Assessment. So risk assessment is a means to an end; the end being Risk Control - N.B. The Risk Control Hierarchy mentioned above.

In the UK. the government body responsible for enforcing OSH legislation is the Health and Safety Executive (HSE) and is the equivalent of OSHA in the U.S.

They have produced (and recently revised) an excellent guidance leaflet (reference IND G 163, Rev 2, 2006) entitled "Five Steps to Risk Assessment;" this is available to download at: www.hse.gov.uk/riskassessment.

The five steps are:

Step 1: Identify the Hazards
Step 2: Decide who might be harmed and how
Step 3: Evaluate the risks and decide on precautions/controls
Step 4: Record the findings and implement them
Step 5: Review the assessment and update if necessary

Hence, a risk assessment is simply a careful examination of what, at work, could cause harm— injury or disease—to people so that a decision may be made on whether enough precautions have been taken or whether more needs to be done to prevent harm.

A *hazard* is anything likely to cause harm such as chemicals, electricity, working from ladders etc. For a hazard to cause harm, a hazardous event must happen.

The *risk* is the chance, the odds, the probability, the likelihood that someone could be harmed by these and other hazards, together with how serious that harm could be, i.e., the chance that the hazardous event will occur.

The *consequence* is the outcome of the hazardous event once it occurs.

So risk is measurable, quantifiable, and reducible.

Step 1: Hazard Identification

A list of workplace hazards may be developed via a combination of:

- workplace inspections
- analysis of accident/ill-health data
- workforce involvement
- government/trade association guidance publications
- manufacturers/suppliers data sheets

Step 2: Decide Who Might Be Harmed and How

Include all persons who come into contact with work activities - e.g. contractors, visitors, customers, members of the public.

Pay special attention to vulnerable employees, including young persons, older employees, people with disabilities, new and expectant mothers.

Also include: cleaners, maintenance workers, temporary employees.

Do not forget to ask the workforce for their opinions.

Step 3: Evaluate the Risk and Decide on Precautions

Use should be made of the Risk Control Hierarchy mentioned above when selecting suitable control measures:

- Can the hazard be totally eliminated (risk avoidance)
- Can risk be controlled in such a way so that harm is unlikely (risk reduction)
- Try a less risky option (e.g., switch to a less hazardous chemical)
- Prevent access to the hazard (e.g., by machine guarding)
- Organise work to reduce exposure to the hazard (e.g., put barriers between pedestrians and traffic)
- Provide welfare facilities (e.g., first aid, washing facilities)
- And, as a last resort or temporary control measure, consider the issue of personal protective equipment

Step 4: Record your Findings and Implement Them

Writing down the results of the risk assessment and sharing the findings with all relevant employees is a vital step in the risk assessment process. Written risk assessments do not need to be perfect, but they do need to be "suitable and sufficient."

Suitable and sufficient risk assessments should show that:

- a proper check was made
- the question "who might be affected?" was asked
- all significant hazards - including the number of people at risk - were taken into account
- the precautions/controls taken were reasonably practicable and the residual risk is low or very low
- employees and/or safety representatives were involved in the process

In order to implement the findings, develop an action plan which tackles the most important, high risk items first.

A good action plan may include:

- a few cheap and easy improvements that can be done quickly: Quick Fixes!
- temporary control measures until more reliable controls are in place
- longer term solutions to those high risk items
- arrangement for training employees on the residual/remaining risks and their commensurate control measures
- regular checks to make sure that the implemented control measures remain in force
- clear responsibilities and accountabilities on who will lead on what action is to be taken and by whom

Step 5: Review the Risk Assessment(s) and Update if Necessary

At least once a year a formal review of all risk assessments should be undertaken (hence the need to write them!). This ensures continued OSH improvement.

Review the risk assessment and ask have there been changes: e.g. new equipment, changed work processes, new employees, different chemicals etc.

Also ask:

- Are there any further improvements that can be made?
- Are all existing control measures still in place?
- Are all employees up to date with the current risk assessments?

- Have any employees spotted any problems?
- Have there been any near misses?
- Have there been any injury accidents or ill-health cases?

Make sure all risk assessments are given both the date of assessment as well as the review date, are kept up to date and are regularly and frequently communicated to all relevant employees. Hence, clear responsibilities and accountabilities for review and communication should be firmly fixed as KPIs.

If something changes between review, don't wait; check and amend the risk assessment as soon as possible and share the results. Build risk assessment into any change process; don't bolt it on as an afterthought!

N.B. In the UK/EU it is a legal requirement to review all risk assessments on a regular and frequent basis.

Risk Quantification/Evaluation

Risk is a combination of the Likelihood (chance, odds, probability) of the hazardous event occurring and the Consequence (outcome, severity) of the event.

$$\text{Risk} = \text{Likelihood} \times \text{Consequence}$$

Likelihood = How likely is it that something could go wrong?

Consequence = How serious could the outcome be?

Likelihood ranges from impossible to certain. Consequence varies from near-miss to multi-fatalities.

The above are subjective; it is better to stick to more objective terminology and make use of a risk matrix approach so as to score or measure one risk against another.

Likelihood	5	Very likely (Certain
	4	Likely
	3	Fairly Likely
	2	Unlikely
	1	Very Unlikely
	0	Impossible
Consequence	5	Catastrophic (Multi-fatalities)
	4	Major
	3	Moderate

	2	Minor
	1	Insignificant
	0	Near Miss

This gives us a 6 x 6 matrix with risk ratings of 25, 20, 16, 15, 12, 9, 8, 6, 5, 4, 3, 2, 1 and 0.

Increasing Consequence ö						
	5	5	10	15	20	25
	4	4	8	12	16	20
	3	3	6	9	12	15
	2	2	4	6	8	10
	1	1	2	3	4	5
	0	1	2	3	4	5
		Increasing Likelihood ö				

The scores are then used in the Action Plan so as to prioritise the implementation of control measures, as follows:

1-4	Acceptable:	No further actions required but ensure control measures are maintained
5-9	Adequate:	Look to improve by next review
10-16	Tolerable:	Look to improve within agreed, specified timescale
17-25	Unacceptable:	Stop activity and make immediate improvements

The logic is to start with the 20/25 range (if any exist) and work down through the matrix.

Fixing agreed, specified time-scales to the risk rating scores will greatly assist in this regard.

25 - Immediate
20 - Within 1 day
16 - Within 3 days
15 - Within 5 days
12 - Within 1 week
10 - Within 2 weeks
9 - Within 1 month
8 - Within 2 months
6 - Within 3 months
5 - Within 6 months

4 - Within 1 year
3 - Within 1 year
2 - Within 1 year
1 - Within 1 year

These are illustrative and may be changed to suit each organisation and its available resources—people, time, and money.

The final part of the process is to ensure that control measures are implemented within the agreed, specific timescales.

This may be facilitated by a written and communicated Action Plan, having the following headings:

Action(s) to be Taken List	By Whom? Name/Title	By When? Date	Actions Completed Date

Conclusion

Risk assessment is a means to an end; that end is the implementation and maintenance of commensurate control measures. Control measures result in fewer injury accidents and cases of ill-health, as demonstrated by the reduction of fatalities, serious/major injuries and ill-health cases within UK plc.

Case Studies

We will be using two case studies as follows:

- Aircraft ground handling risk assessments using a total process approach rather than a typical separate job activity/task approach which does not identify the inter-relationships between all those people who supply services to an arriving/departing aircraft.
- Ordnance management (mine clearance) risk assessments where a 3-D process/matrix was used to factor in the environmental factors, e.g., hostile countries/areas, which added to the hazards/risks of the actual job activity/task. There was also a cultural factor to take into account' which was the initial military approach to hazard/risks/accidents —all part of the job, whereas within a company environment with a clearer duty of care approach, it was necessary to ensure that all aspects of the job activity/task were thoroughly risk assessed afresh and new controls implemented