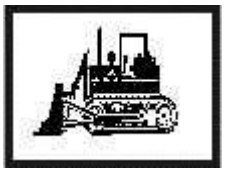
Machinery Safety

INTRODUCTION



Legislation relating to machinery safety has evolved quickly over recent years. From the general requirement to 'securely fence all dangerous parts of machinery' (e.g. Factories Act 1961), there are now a number of more extensive duties and responsibilities specified:-

(i) Health and Safety at Work etc. Act 1974: employers must ensure the safety of machinery, **but so also must designers, manufacturers and suppliers**.
(ii) Supply of Machinery (Safety) Regulations 1992 : this introduced an explicit requirement for manufacturers and suppliers to assess the risks arising **during the lifetime of a machine**.
(iii) Provision and Use of Work Equipment Regulations 1998.
(iV) Management of Health and Safety at Work Regulations 1999.

These latter two lay down much more specifically the areas of machine safety that employers should be addressing.

SAFETY ISSUES

*The **general principles** of machinery safety can be placed in a hierarchy as follows:-

(i) identification of hazard(s)
(ii) elimination or reduction of hazard(s) by design
(iii) use of safeguards
(iv) use of safe working practices.

*Machinery hazards can include the following:-

(A) MECHANICAL

- from the movement of machinery parts (i.e. rotary, sliding or reciprocating)
- entanglement or catching (e.g. hair, clothing, jewellery)
- friction and abrasion

- cutting
- shearing
- stabbing and puncture
- impact
- crushing
- drawing in
- compressed air/high pressure fluid.

(B) NON-MECHANICAL

- access problems (e.g. obstructions/projections)
- handling and lifting
- electrical
- chemical
- fire and explosion
- noise and vibration
- temperature
- radiation

Miscellaneous related safety considerations include suitability of controls (including start, stop and emergency stop controls); type and effectiveness of braking systems; feeding devices; workholding devices; lubrication; stability; lighting; safety colours and symbols; access. The British Standard (BS5304) 'Safety of Machinery' provides ergonomic data that establishes safe reach distances for use with guards.

The **selection of safeguards** will be influenced by whether access to the danger area is required during normal operation:-

If NOT can use:-	**If YES** can use:-
Fixed enclosing guard	Interlocking guard
Fixed distance guard	Automatic guard
Interlocking guard	Trip device
	Adjustable guard
	Self-adjusting guard
	2-hand control device **ONLY** if
	hold-to-run control the above cannot be used

Guard designs

include:-

(A) **Fixed guard** - no moving parts; robust; tools needed to remove; preferably captive fastenings e.g. fixed enclosing guard or fixed distance guard.

(B) **Interlocking guard** - movable part(s); movement is inter-connected with the power/control system so that until the guard is closed the power is interrupted OR guard stops locked closed until risk of injury has passed; may be of mechanical, electrical, hydraulic or pneumatic type; need to minimise risk of 'fail to danger' and mustn't be readily defeatable.

(C) **Automatic guard** - moved into position automatically by the machine; physically removes from the danger area any part of a person exposed to danger.

(D) **Adjustable guard** (e.g. woodworking machines) - may be fixed or movable but the adjustment remains fixed during operation; need regular maintenance of the fixing arrangements.

(E) **Self-adjusting guard** - may be fixed or movable and adjusts to accommodate the passage of the material.

(F) **False table** - where power operated feed table carries material to the operating point of the machine.

Safe working practices (in addition to the provision of efficient and effective guarding) should include:-

- ensuring safe access
- a good standard of house keeping
- provision/display of suitable warning notices
- procedures for emergency isolation and dissipation
- adequate degree of supervision (which generally increases with risk, up to written procedures and permit-to-work systems)
- adequate information, instruction and training for operators and supervisors
- effective maintenance (& keeping of records) by competent persons. (**NB** Safe working procedures for maintenance and cleaning are required. This will include effective isolation or locking off, not just switching off).

CHECKLIST - MACHINERY SAFETY

1. Have you carried out risk assessments for all machinery used at your premises? YES/NO
2. Have suitable precautions been taken to safeguard persons against any hazard identified in the risk assessments above? YES/NO
3. Are your machines subject to effective maintenance procedures carried out by a competent person, and are records of such maintenance kept available? YES/NO
4. Is machinery safety enhanced through such factors as good lighting, access, housekeeping, warning notices and procedures for emergency isolation? YES/NO
5. Do you provide sufficient information, instruction, training and supervision for all employees working with machinery? YES/NO

REFERENCES/FURTHER DETAILS

NB There is extensive guidance available on machinery safety. Below are listed two useful publications and a listing of some specific areas of interest for which numerous guidance documents are available. Further information or guidance on these can be sought from your enforcing authority.

General

1. British Standard Code of Practice BS5304: 1988 - Safety of Machinery
2. Machinery Safety : The risk-based approach (practical guidelines on risk assessment, standards and legislation) - Hani Raafat - published by Technical Communications (Publishing) Limited, PO Box 6, Hitchin, Herts SG5 2DB -

   Tel/Fax : (01462) 437075.

Specific Areas

(A) Metal working
- -drilling machines
- -abrasive wheels
- -machine tools
- -milling machines

(B) Food industry-catering; food manufacture.

(C) Agriculture e.g. chainsaws, PTO shafts/tractors.

(D) Woodworking machines.

Free leaflets are available for downloading at the HSE web site

www.hse.gov.uk/pubns/index.htm

www.hse.gov.uk/pubns/puwerind.htm

www.hse.gov.uk/pubns/woodindx.htm

www.hse.gov.uk/pubns/engindex.htm