

# Use of work equipment

Provisions issued by the Swedish Work Environment Authority

Use of work equipment

Provisions of the Swedish Work Environment Authority on Use of Work Equipment,  
together with General Recommendations on implementation of the Provisions

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# Provisions of the Swedish Work Environment Authority on Use of Work Equipment

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The following provisions<sup>1</sup> are issued by the Swedish Work Environment Authority pursuant to Section 18 of the Work Environment Ordinance (SFS 1977:1166).

## Scope

### Section 1

These Provisions apply to the use of equipment at work.

## Definitions

### Section 2

The following definitions shall apply for the purpose of these Provisions.

<i>Work equipment</i>	Any machine, apparatus, tool, implement or installation used at work.
<i>Use of work equipment</i>	Any activity involving work equipment, such as starting or stopping the equipment, its use, transport, assembly, installation, dismantling, repair, modification, servicing, cleaning and maintenance.
<i>Danger zone</i>	Any zone within and/or around the work equipment where the equipment can entail a risk of ill-health or accidents to any person wholly or partly present there.
<i>EEA</i>	The European Economic Area.

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<sup>1</sup> Cf. COUNCIL DIRECTIVE of 30 November 1989 concerning the minimum safety and health requirements for the use of work equipment by workers at work (second individual Directive within the meaning of Article 16 (1) of Directive 89/391/EEC) (89/655/EEC) (OJ L 393, 30.12.1989, p. 3, Celex 31989L0655), last amended by Directive 2001/45/EC of the European Parliament and of the Council (OJ L 195, 19.7.2001, p. 46, Celex 32001L0045).

Information has been communicated in accordance with Directive 98/34/EC of the European Parliament and of the Council of 22 June 1998 laying down a procedure for the provision of information in the field of technical standards and regulations and of rules on Information Society services (OJ L 204, 21.7.1998, p. 37, Celex 398L0034), amended through Directive 98/48/EC of the European Parliament and of the Council (OJ L 217, 5.8.1998, p. 18, Celex 398L0048).

## **Investigation and risk assessment**

### **Section 3**

Investigation and risk assessment shall be carried out to assess whether the work equipment chosen and used is suitable for the intended work, or whether it has been suitably adapted in such a way that it can be used for adequate safety.

The risks caused by the use of the work equipment shall be investigated and assessed.

### **Section 4**

Renewed investigation and risk assessment shall be carried out

1. if follow-up as provided in Section 6 reveals a discrepancy between actual risks and the previous risk assessment,
2. if the measures taken have not had the results expected, or
3. when changes are made to working processes or the operation.

## **Measures to be taken**

### **Section 5**

On the basis of the risk assessment, all necessary measures shall be taken to prevent ill-health or accidents. The stipulations in Sections 7-21 shall always be complied with.

## **Follow-up**

### **Section 6**

The risk assessment and the measures taken shall be followed up regularly to make clear whether the risk assessment is correct and whether the measures taken have had the results expected.

## **Product stipulations**

### **Section 7**

If, when placed on the market or taken into service within the EEA, an item of work equipment was subject to Swedish Provisions transposing EC Directives to Swedish law, the following shall apply. The equipment may only be used if it meets the requirements concerning its conditions and concerning information with regard to its use which applied to it when it was placed on the market or taken into service.

The same applies to work equipment which came under corresponding provisions in some other country outside the EEA. With regard, however, to marking, interactive software and instructions for use, the language requirements which follow from the Swedish Provisions shall always apply in connection with use.

### **Section 8**

An item of work equipment not coming under Section 7 shall meet the requirements of Annex A when used. Work equipment subject to the requirements of Section 7 in certain respects only shall otherwise meet the requirements of Annex A when used.

## **Stipulations concerning use**

### **General**

### **Section 9**

Work equipment shall be stored, installed, placed and used in such a way that there is adequate safety against ill-health and accidents.

#### **Section 10**

An item of work equipment may only be used for the purpose and under the conditions for which it is intended or suited.

#### **Section 11**

The requirements of Annex B shall be satisfied when work equipment is used.

#### **Section 12**

Application of instructions issued shall be followed up continuously.

### **Ergonomics**

#### **Section 13**

Work equipment shall be used with suitable work postures and work movements and in all other respects in an ergonomically appropriate manner.

### **Information to employees**

#### **Section 14**

Employees shall be made aware of

1. the risks of ill-health and accidents to which they are exposed when using the work equipment,
2. the hazards presented by the work equipment in their immediate vicinity in the workplace,
3. any changes affecting the work equipment in their immediate vicinity in the workplace and of possible concern to them even when they themselves are not directly using the equipment.

They shall be given necessary instructions and information concerning use, foreseeable abnormal situations, where applicable, experience of previous use of the work equipment, and the personal protective equipment which they are to use. The instructions accompanying the work equipment when delivered shall be available to the employees concerned and shall when necessary be supplemented by means of written or verbal instructions.

Information and instructions shall be intelligible to the employees concerned.

### **Work equipment involving specific risks**

#### **Section 15**

If an item of work equipment is likely to involve a specific risk of ill-health or accidents, the work shall be arranged in such a way that only the persons tasked with using the equipment are allowed to do so. Those attending to inspection, repair, alteration, servicing, cleaning and maintenance of such equipment shall be specially appointed.

#### **Section 16**

An employer appointing an employee or outsourced manpower to use work equipment as referred to in Section 15 shall have documentation of that person's practical and theoretical knowledge regarding safe use of the equipment.

A worker not coming within the scope of the foregoing but using work equipment as referred to in Section 15 at a common workplace shall have corresponding documentation available at the workplace.



## **Maintenance and inspection**

### **Section 17**

Work equipment shall, for as long as it is in use, be maintained so as to meet current requirements. Any maintenance logbook for the work equipment shall be kept up to date.

### **Section 18**

If safety depends on how the installation has been made, the work equipment shall be inspected after installation but before being taken into service for the first time, to ensure that it is correctly installed and in good working order. The same applies when the equipment has been moved and assembled in a new location.

### **Section 19**

An item of work equipment which is subject to wear and tear, ageing or is exposed to some other negative influence which can lead to dangerous situations shall undergo regular inspections and, if necessary, regular testing.

### **Section 20**

Whenever anything unusual has occurred which can adversely affect the safety of an item of work equipment, e.g. rebuilding, an accident, various natural phenomena or long periods of disuse, special inspections shall be carried out.

### **Section 21**

The results of inspections as referred to in Sections 18-20 shall be documented and an assessment made of the measures needing to be taken. An item of work equipment used outside the undertaking shall be accompanied by a certificate showing when the last inspection took place.

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1. These Provisions enter into force on 1st July 2007.

2. Through these Provisions, the following Notices, Provisions and General Recommendations issued previously by the National Board of Occupational Safety and Health are repealed.

1. Notice 1974:4 Storage Facilities for Bulk Goods.
2. Directions 19:7 Scaffolding etc. – Shipyard Directions.
3. Directions 128 Conveyors.
4. AFS 1985:7 Lawn Mowers and Single-axled Garden Tractors.
5. AFS 1985:9 Work with Wheels and Tyres.
6. AFS 1987:18 Grinding Machines and Grinding Tools.
7. AFS 1991:6 Maintenance of Technical Devices.
8. AFS 1998:4 Use of Work Equipment.

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# **Annex A**

## **Technical stipulations**

### **A 1. Introductory remarks**

The stipulations in this annex apply only when the use of the work equipment entails the risk referred to.

The measures required in order for work equipment to meet the stipulations in this annex are not necessarily the same as those needed to meet the basic requirements for work equipment coming under Section 7.

### **A 2. General stipulations**

#### **A 2.1 Mechanical strength and stability**

Work equipment shall have adequate mechanical strength and stability.

#### **A 2.2 Musculoskeletal ergonomics**

Work equipment shall be conditioned so that the work can be done in suitable work postures and with suitable working movements.

#### **A 2.3 Controls and control systems**

Controls of work equipment shall, if capable of affecting safety, be clearly visible and identifiable and, where necessary, appropriately marked.

If possible the controls shall be positioned outside danger zones. They shall also be positioned in such a way that no risks will be entailed by the handling of them. They must not give rise to risks due to inadvertent operation.

If safety requires operations to be performed in a certain order, there shall be interlocking devices which prevent the operations being performed in the wrong order, or else it shall be otherwise ensured that the operations cannot be performed in the wrong order.

If necessary the operator shall be able to ascertain from the principal control point that no person is present in the risk zones. Failing this, there shall be a secure warning system which, before every start, will automatically emit an audible and/or visible warning signal. A person wholly or partly present within the danger zone shall have the time and possibility to rapidly evade risks due to the work equipment starting or stopping.

Control systems shall be safe and designed with regard to predictable faults, disturbances and stresses.

If a unit in a work equipment can be started and stopped separately, control systems and safety devices shall be designed so that this can be done safely.

#### **A 2.4 Choice of operating mode**

If an item of work equipment can be operated both manually and mechanically, there shall be safety devices for both modes of operation. When switching to manual operation, the relevant safety devices shall be automatically activated.

#### **A 2.5 Start**

Work equipment shall only be possible to start by means of a deliberate action and with a control intended for this purpose.

The same applies

1. in connection with restart, whatever the reason for the stop,
2. when controlling a significant change in the work function (e.g. velocity., pressure etc.), except when a restart or change does not expose the worker to any risk.

This stipulation does not apply if the restart or change of work function forms part of the normal work cycle of an item of automatic equipment.

## **A 2.6 Stop**

All work equipment shall have a control with which it can be safely brought to a complete standstill.

Every work station shall have a control with which all or parts of the work equipment can be stopped, depending on the type of risk, and thereby put in a safe state. The stop controls shall have priority over the start controls.

When the work equipment or its hazardous parts have been brought to a standstill, the energy supply to the drive devices concerned shall normally be cut off.

The stopping of work equipment or of a particular function in it must not entail risk of ill-health or accidents, nor may it cut off the energy supply to operating and driving devices if this could entail a risk or impede rescue operations in the event of an accident.

## **A 2.7 Emergency stop**

Depending on the risks entailed by the use of work equipment and its normal stopping time, the equipment shall, where appropriate, have an emergency stopping device.

The emergency stopping device shall swiftly curtail functions which can entail a risk of ill-health and accidents. Restart after an emergency stop shall not be possible automatically or by resetting one or more emergency stop devices. Restart may only be possible using a control device intended for the purpose.

An emergency stop must not entail danger. Nor may it cut off the energy supply to equipment which has to work under emergency conditions.

After actuation an emergency stopping device shall remain in the actuated position. Restart must not be possible until the device has been manually reset.

Emergency stopping devices shall be constructed, marked and positioned in such a way that they can be quickly located and reached by an operator or some other person.

## **A 2.8 Setting and programming**

If an item of work equipment has to be set or programmed while in motion, this shall be feasible in safe conditions. If regular safety devices have to be suspended while the work is in progress, it must not be possible for the equipment to be put back into production before the safety devices have been activated again.

## **A 2.9 Falling and ejected objects**

Work equipment entailing a risk because of falling or flying objects shall have suitable safety devices adapted to the risks.

## **A 2.10 Extraction device and enclosure**

Work equipment entailing a risk due to falling or ejected objects shall have suitable safety devices adapted to the hazards.

## **A 2.11 Clamping and stabilising**

Work equipment and parts of the same shall, when necessary for safety and health, be clamped or stabilised in some other way.

### **A 2.12 Material failure**

Suitable safety measures shall be taken when there is a risk of work equipment disintegrating or of fractures occurring in parts of it and this can entail safety and health hazards.

### **A 2.13 Safety and safety devices**

Work equipment shall have guards or safety devices if any accident risk is entailed by contact with moving or otherwise dangerous parts. These shall prevent access to the danger zones or stop dangerous functions before any person reaches the danger zones.

A protective guard which can be opened or removed easily without tools shall, failing special reason to the contrary, have interlocking devices so that

1. a dangerous machine function is prevented from starting or continuing if the guard is not in the protective position,
2. restart will not occur automatically as a result of the guard being closed.

Guards and safety devices

1. shall be stoutly constructed,
2. may not entail new hazards,
3. may not be easy to remove or put out of operation,
4. shall be positioned at a sufficient distance from the danger zone,
5. must not obstruct the view of the equipment's operations more than is necessary,
6. shall make possible necessary intervention for the fitting or replacement of parts and for maintenance work. In this connection access may only be possible to the zone where the intervention is to take place and, if possible, without the guard or the safety device needing to be removed.

A two-handed control device for operating a hazardous machine function shall be designed and arranged in such a way that the function

1. cannot start up unless both operating devices are actuated,
2. stops or becomes harmless if either control device is released,
3. cannot start up again until both devices have been released and then actuated again.

### **A 2.14 Adjustable guards**

If, for technical reasons, a machine tool cannot be kept inaccessible when in use, there shall be guards which are designed and can be set in such a way as to reduce the accident risk.

### **A 2.15 Interlocking guard with start function**

If equipment can be started by closing a guard, it must not be possible for any part of the body to be inside the guard when the latter is closed.

### **A 2.16 Non-mechanically actuated safety devices**

A non-mechanically actuated safety device shall be designed and arranged in such a way that

1. dangerous functions are stopped and prevented from starting when part of a human body actuates the safety field,
2. the protective function remains in the event of a fault in the safety-related parts of the operating system and then prevents restart,
3. the work equipment, once it has been stopped by the safety device, can only be restarted following manual actuation of a special resetting device.

If an item of work equipment can be started by a non-mechanically actuated safety device ceasing to be actuated, it must not be possible to have any part of the human body inside the safety zone when the latter is unactuated.

### **A 2.17 Pinch points**

Suitable safety measures shall be taken if there is a risk of accidents in connection with material having to be threaded or inserted between rollers.

### **A 2.18 Lighting**

Lighting in zones and places for work with or maintenance of work equipment shall be well adapted to the task.

### **A 2.19 High or low temperature**

Parts of work equipment with a very high or very low temperature shall if necessary be guarded to prevent anyone coming into contact with them or too close to them.

### **A 2.20 Warning systems**

A warning system on work equipment shall be unambiguous and easy to notice and understand.

### **A 2.21 Maintenance**

Maintenance shall in the first instance be possible when equipment is turned off. Failing this, it shall be possible for suitable safety measures to be taken or for the work to take place outside danger zones, so as to afford adequate safety.

### **A 2.22 Disconnection of energy supply**

Every item of work equipment shall have easily identifiable and unambiguous devices for cutting off all energy supply.

The energy supply shall be disconnectable and connectable without risk.

Equipment for disconnecting the energy supply shall, except where this is manifestly unnecessary, be lockable or otherwise securable against unauthorised reconnection.

### **A 2.23 Marking, signage and warning devices**

Work equipment shall have the marking, the signage and the warning devices which safety requires. Signage text shall be in Swedish.

### **A 2.24 Access routes and work zones**

There shall be safe access routes to all zones where presence is required for production, adjustment or maintenance work. It shall also be possible to remain in these zones safely.

The parts of work equipment where personnel stand or move shall be designed in such a way that there will be no risk of slipping, tripping or falling off them.

A work equipment part which needs to be hoisted or raised for cleaning, adjustment or maintenance work shall have an interlocking device or be otherwise securable in the elevated position.

### **A 2.25 Fire hazards and emissions**

Work equipment shall be designed so as to afford protection against the risk of it catching fire or overheating. In addition it shall be designed to afford protection against emission of gas, dust, liquid, vapour or other substances produced by the work equipment, used in its operation or stored in it.

## **A 2.26 Explosion hazards**

Work equipment shall be designed so as to prevent the risk of explosion. This applies both to the work equipment itself and to substances produced by it, used in its operation or stored in it.

## **A 2.27 Electrical hazards**

Work equipment shall be designed so that persons wholly or partly present within the risk zone are protected from the risk of direct or indirect contact with electricity.

# **A 3. Further stipulations for specific types of work equipment**

## **A 3.1 Mobile work equipment, both self-propelled and non-self-propelled**

### **A 3.1.1 Riding workers**

Work equipment with workers riding on it shall be equipped so as to limit the risks to which they are exposed in transit.

This includes any risks of coming into contact with or getting caught in wheels or belts.

### **A 3.1.2 Persons in the immediate vicinity of mobile work equipment**

If mobile work equipment is intended to be moved when there are persons in its immediate vicinity, it must be equipped so as to limit the risks to which they are exposed.

### **A 3.1.3 Driving cab**

A cab for protection from cold or heat shall be provided with a device for good air change and a device capable of maintaining a suitable temperature. The air intakes shall be positioned in such a way that exhaust fumes from the vehicle will not enter the cab.

### **A 3.1.4 Towing device**

A towing device shall be provided with a catch or other device to prevent the object towed from accidentally coming loose.

### **A 3.1.5 Power restriction**

Work equipment connected to or towed by a mobile work equipment unit shall be equipped or arranged in such a way that the power transmitted is cut off or restricted in the event of an obstruction or blockage which can entail hazards.

When obstruction or blockage as aforesaid is unavoidable, every conceivable measure shall be taken to prevent anyone being injured.

### **A 3.1.6 Power transmission shaft**

A power transmission shaft shall be dimensioned for the load, the speeds, the angles and the lengths it is used for. It shall be securable to power takeoffs and inputs.

If a power transmission shaft between different mobile work equipment units can be dirtied or damaged by being dragged over the ground, there must be devices for hanging it up and securing it.

A power transmission shaft with universal joints between a self-propelled machine (or tractor) and a driven machine shall be provided with guards for the full length of the shaft, connected universal joints and shaft journals. The guard must not be able to rotate with the power transmission shaft.

A power transmission shaft and its guard shall be mutually adapted.

### **A 3.1.7 Tilting**

Mobile work equipment with one or more persons riding on it shall be designed so as to limit the risks of injury in the event of it turning over,

1. either by means of a protective structure preventing it from tilting more than 90 degrees, or
2. if it can tilt more than 90 degrees, by means of a structure affording sufficient clearance round the riders, or
3. by means of some other arrangement producing the same result.

The protective structure may be an integral part of the work equipment.

A structure as aforesaid is not necessary if the work equipment is stabilised when in use or is designed in such a way that it cannot overturn when used normally.

When there is a risk of a rider being crushed between the work equipment and the ground in the event of the work equipment overturning, a device shall exist whereby the riders can fasten themselves in position.

### **A 3.1.8 Self-propelled work equipment**

Self-propelled work equipment which when in motion can entail risks to persons shall meet the following stipulations:

- (a) It shall have devices whereby unauthorised starting can be prevented.
- (b) It shall have devices limiting the consequences of a collision when several track-bound work equipment units are in motion simultaneously.
- (c) There shall be braking and stopping devices. When safety so requires, there shall be emergency stop devices with readily accessible controls or automatic systems for braking and stopping the equipment if the devices normally used should cease to function.
- (d) When the driver's direct view is insufficient from a safety viewpoint, there shall be suitable auxiliary equipment for improving the view.
- (e) If the equipment is designed for use at night, or in poorly lit places, it shall have lighting which is suitable for the work and affords adequate safety for the workers.
- (f) If the equipment can entail a risk of fire, due to the possibility of the equipment itself or whatever is being towed or carried by it catching fire, it shall be provided with suitable extinguishing equipment if no such equipment is provided near the place where the equipment is used.
- (g) If it is remote controlled, it shall stop automatically if out of range of the remote control.
- (h) Remote-controlled equipment which under normal conditions can entail a risk of collision or persons being crushed shall be provided with devices affording protection from this risk, unless there are suitable devices on the site which avert the risk of collision.
- (i) Equipment which has been stopped shall be secured against inadvertent movement. Intentional actuation by the driver shall be the only possible way of setting it in motion.
- (j) Equipment with a rider driver shall have a signalling device enabling the driver to attract attention without difficulty.

### **A 3.2 Pallet racks and other warehousing racks**

A warehousing rack intended for varying loads shall be conspicuously and permanently marked with the maximum load per section and maximum load per tier. If collision can entail risks, a collision protector shall be provided.

A pallet rack shall be anchored if there is a risk of instability.

A pallet rack shall be provided with guards which prevent pallets being pushed through the rack (pallet stops), except where manifestly unnecessary.

### **A 3.3 Conveyors**

A conveyor shall have such a gradient or be otherwise so designed that the load will not accidentally slide.

A conveyor shall have a brake which stops it if the speed can increase or the direction of travel change under the influence of the load when the driving power ceases. A brake can be replaced with a back stop if it is only the direction of movement which is liable to change.



## **Annex B**

### **Organisational stipulations**

#### **B 1. Introductory remarks**

The stipulations in this annex apply only when the use of the work equipment entails the risk referred to.

#### **B 2. General stipulations**

##### **B 2.1 Assembly, installation, dismantling, service, maintenance, cleaning and inspection**

Assembly, installation, dismantling, service, maintenance, cleaning and inspection are to be performed in a safe manner. Special consideration shall be paid to manufacturer's instructions. The work shall be planned and prepared and, if necessary

1. written instructions for the work shall be drawn up,
2. a person shall be appointed to take charge of coordinating the work and to take general responsibility for safety.

Normally, when servicing, maintenance and cleaning is in progress, the energy supply shall be disconnected and, except where manifestly unnecessary, the disconnection device shall be locked. Measures shall be taken to ensure that any energy accumulated in the work equipment cannot cause unforeseen movements or other dangerous occurrences.

Signs indicating that servicing, maintenance, cleaning or inspection is in progress shall be put up except where manifestly unnecessary.

##### **B 2.2 Setting of safety devices etc.**

Adjustable safety devices and other devices with a safety function, shall, where the safety function depends on the setting, be correctly set and properly secured.

##### **B 2.3 Malfunction**

Work equipment shall be safely stopped or otherwise secured when malfunctions are being rectified or other temporary work is in progress within the danger zone surrounding the equipment.

##### **B 2.4 De-activated safety devices**

For work requiring a safety device to be temporarily rendered inoperative or temporarily removed, measures shall be taken to ensure that the work can still be done safely. The device shall be reinstated as soon as the work is completed.

##### **B 2.5 Lightning strike**

Work equipment vulnerable to lightning strikes shall when in use be provided with a suitable device affording protection from the effects of a lightning strike, so that nobody will be injured.

## **B 3. Further stipulations regarding use of mobile work equipment**

### **B 3.1 Drivers**

Self-propelled work equipment may only be driven by a person sufficiently skilled to drive it safely.

### **B 3.2 Traffic regulations**

Traffic regulations shall be adopted and complied with whenever mobile work equipment is in motion within a worksite.

### **B 3.3 Pedestrian workers**

Measures shall be taken to prevent pedestrian workers entering a zone where self-propelled work equipment is in operation.

If the presence of pedestrian workers is necessary in order for work to be properly completed, suitable measures shall be taken to prevent them being injured by the equipment.

### **B 3.4 Passenger transport**

Personnel may be carried on mobile, power driven work equipment only if suitable safety measures have been taken. If work has to be done in transit, the speed shall if necessary be adapted accordingly.

### **B 3.5 Air change**

Mobile work equipment with a combustion engine may not be used on worksites if the air change is insufficient to guarantee health and safety.

### **B 3.6 External factors**

Work with mobile work equipment shall be planned according to the special risks which terrain, weather and the work itself may entail.

### **B 3.7 Prevention of inadvertent movement**

Machine parts shall be secured if there is a risk of dangerous inadvertent movements in transit or when the driver has left the driving or operating position.

Work equipment which has been stopped shall be secured against inadvertent movement so that it can only be set in motion intentionally.

## **B 4. Further stipulations regarding use of work equipment intended for temporary work at levels above ground or floor level or other work at height**

### **B 4.1 General**

#### **B 4.1.1 Choice of work equipment**

If temporary work at levels above ground or floor level or other work at height cannot be done safely from a suitable surface and in ergonomically appropriate conditions, the work equipment shall be chosen by which safe working conditions are best guaranteed and sustained.

Collective protection measures shall have priority over the use of personal protective equipment.

The work equipment shall be dimensioned and designed for the work to be done and for the loads which can be foreseen. The work equipment shall also allow passage without danger.

The most suitable manner of access to a temporary worksite involving work at height shall be chosen according to the frequency of passage, the height and the intended duration of the work. In addition, evacuation must be possible in the event of imminent danger. Motion between access equipment and platforms, decks or gangways must not entail any further risk of falls.

#### **B 4.1.2 Rope access**

The use of ropes for access to the worksite, adopting a working position and carrying out work is only permissible when the risk assessment indicates that the work can be done in safe conditions and where the use of safer work equipment is not feasible or justified.

A seat with appropriate accessories shall be provided if occasioned by the risk assessment, and particularly by the duration of the work and the ergonomic load.

#### **B 4.1.3 Risk minimisation measures**

Suitable measures, depending on the type of work equipment chosen on the basis of the above mentioned points, shall be taken to minimise the risks of ill-health and accidents associated with this type of equipment.

Fall protection devices shall be installed if necessary. Their design and mechanical strength shall be such as to prevent or arrest falls so as to prevent injury as far as is possible. Collective fall protection devices may only be omitted at points of access to ladders or stairs.

#### **B 4.1.4 Temporary measures**

Where a collective fall protection device is necessarily and temporarily removed in order for work to proceed, other effective fall protection measures shall be taken. The work may not proceed until these measures have been taken. When the work is completed or temporarily concluded, the collective fall protection devices shall be reinstated.

#### **B 4.1.5 Weather conditions**

Temporary work above ground or floor level or other work at height may only be carried out when weather conditions do not imply any risk of ill-health or accidents.

If light conditions are insufficient, suitable artificial lighting shall be employed.

### **B 4.2 Special Provisions concerning the use of ropes for access to the worksite, adopting a working position and carrying out work**

When ropes are used for access to the worksite, adopting a working position and carrying out work, the following conditions must be satisfied:

- (a) The system shall comprise at least two independently anchored ropes, one for access, lowering and support (the work rope) and the other for safety (the security rope).

The stipulation of at least two ropes does not apply to rescue work undertaken by rescue services, the police or the armed forces.

- (b) The worker shall be provided with, and shall use, a suitable harness coupled to the security rope and the work rope.
- (c) The work rope shall be provided with safe means of ascent and descent. It shall also have a self-locking system to prevent falls in the event of the user losing control of his movements.

The security rope shall be equipped with a mobile fall prevention system which follows the movements of the worker.

- (d) The tools and other equipment used by a worker shall be secured to the workers harness or seat or in some other suitable manner.
- (e) The work shall be organised so that someone other than the worker is present while the work is in progress. The work shall be planned and supervised in such a way that the worker can obtain immediate assistance in an emergency.
- (f) The workers concerned shall be given special training for the work to be done, with particular emphasis on rescue methods.
- (g) A safety helmet with a chinstrap, but with no peak in front, shall be used except where manifestly unnecessary. In other respects personal protective equipment shall be used when needed.

## **B 5. Further stipulations regarding use of grinding machines**

### **B 5.1 Test operation**

When a grinding tool has been fitted to a grinding machine, the machine shall be tested at the highest speed at which it will be operating in the course of the work. The testing shall be conducted in such a way that there is no risk of injury.

## **B 6. Further stipulations regarding work with wheels and tyres**

### **B 6.1 Pumping**

If there is a risk of injury, a tyre shall be inflated in a place or in a safety device designed and dimensioned so as to resist or lead off the shock from the bursting of a tyre and to trap ejected wheel fragments. The safety device shall be designed and positioned in such a way that the person inflating or otherwise in the vicinity is not injured in the event of a tyre bursting. In the case of air pressure adjustment, the above stipulations apply only if the air pressure has been so low that there is a danger of the tyre having been damaged.

Inflation and tyre evacuation in connection therewith must be manageable from a shielded position.

No person may remain in the tyre-burst danger zone while inflation is in progress.

# **General recommendations by the Swedish Work Environment Authority on implementation of the Provisions on Use of Work Equipment**

The following Recommendations are issued by the Work Environment Authority concerning implementation of its Provisions (AFS 2006:4) on Use of Work Equipment.

General Recommendations have a different legal status from Provisions. They are not mandatory. Instead they serve to elucidate the meaning of the Provisions (e.g. by explaining suitable ways of meeting the requirements, instancing practical solutions and procedures) and to provide recommendations, background information and references.

## **General**

The stipulations in these Provisions apply generally to all types of work equipment and are minimum stipulations for the use of work equipment. In addition to these Provisions, more specific stipulations applying to certain kinds of work equipment are contained in special Provisions. The latter are applicable in conjunction with the present Provisions.

## **Background**

As a member of the European Union (EU), Sweden is required to transpose EC Directives to Swedish provisions. The EU rules on workers' safety and health are set forth in a framework directive stating the basic rules of safety in the workplace. A number of individual directives contain minimum requirements which may not be fallen short of in the EU Member States. The second individual directive (89/655/EEC), amended by directives 95/63/EC and 2001/45/EC, contains stipulations for the safe use of work equipment by workers at work. The Provisions on Use of Work Equipment are based on that directive.

These Provisions differ from earlier provisions on the use of work equipment in that special stipulations concerning lifting equipment, lifting accessories and trucks have been deleted. This is part of a wider revision of Work Environment Authority regulations in which special Provisions have been drafted on the subject of lifting equipment and trucks.

The Provisions have also been made to include certain stipulations formerly included in Provisions of the National Board of Occupational Safety and Health which have now been repealed. The instruments repealed are enumerated in the section headed Entry into force.

## **Guidance on certain sections**

### **Scope**

#### **Section 1**

These Provisions apply to the use of work equipment at work. Compliance with the stipulations is primarily the employer's responsibility, the reason being that the Provisions are based on the Work Environment Act (1977:1160)(AML) and have the same scope of application as AML. The employer may be a legal or natural person. If the employer is not in control of the equipment where the work is done, as for example in the case of fixed installations for contracting work, he may be obliged to withdraw his employees from the site.

The same also applies to parties carrying on education (e.g. a municipality or a school), with regard to the pupils' work environment. It also applies to those carrying on an activity where work is done, for example, in the course of criminal welfare or total defence duty, which normally means the national authority concerned. Responsibility corresponding to the employer's responsibility is also incurred by those outsourcing manpower, e.g. from office staffing agencies.

AML lays down that the employer personally, if a natural person, and entrepreneurs with no employees (proprietors of one-person undertakings or a number of persons working jointly) are obliged to comply with AML regarding risks of ill-health and accidents being caused by technical devices and with the rules applying to common worksites.

The person in control of a worksite, e.g. the person carrying on the permanent activity of an office or factory, is responsible for the state of devices supplied to personnel at the worksite by other companies, e.g. purveyors or contractors.

If there are two or more employers carrying on activity in the same place, it is their duty to see to it that they do not expose the employees of others to risks from the equipment they use.

### **Investigation and risk assessment**

#### **Sections 3 and 4**

Man (M), Technology (T) and Organisation (O) are three basic elements of work environment management. It is important that work environment issues should be dealt with in an MTO perspective, with attention paid to all three.

It is important to detect risks of ill-health and accidents before they are built into the system, because remedying defects later on will often be difficult and more expensive.

The Work Environment Act requires working conditions to be adapted to people's differing physical and mental aptitudes. This is an important aspect to be taken into account when supplying work equipment.

Rules on systematic work environment management are contained in special Provisions issued by the Work Environment Authority and applying conjointly with the present Provisions. The rules on systematic work environment management require the employer to regularly investigate working conditions and assess the risks of anyone incurring ill-health or meeting with an accident at work. The risk assessment has to be recorded in writing.

For the identification of hazards and assessment of risks, it is primarily the detailed stipulations of the present Provisions that have to be complied with. Other relevant rules, standards, information and instructions for use from manufactures may also need to be taken into account.

Where the use of work equipment is concerned, the level of detail in the written risk assessment may vary, depending on the complexity of the work equipment and the risks associated with its use. For very simple, uncomplicated work equipment, the risk assessment

can form part of an overarching risk assessment of a work process. Special assessments may be needed if the work equipment is intended for use by minors or in school teaching. Several other aspects will then also have to be taken into account, such as

- safety distances, having regard to young persons' body measurements,
- previous knowledge and skills, experience and risk awareness,
- the possibility of working undisturbed,
- the need for supervision when the work is in progress.

Rules concerning minors are contained in special Provisions issued by the Work Environment Authority.

## **Products**

### **Section 7**

Swedish provisions transposing EC directives on technical devices are not only confined to Provisions issued by the National Board of Occupational Safety and Health and the Work Environment Authority. Legislation, statutory instruments and provisions issued by other Swedish national authorities may also be included.

### **Section 8**

Various types of work equipment may be governed by other Provisions in addition to the present ones. Thus technical stipulations, other than those in Annex A, may be contained in other rules issued both by the Work Environment Authority and by other Swedish authorities.

## **Use**

### **Section 9**

The duty of ensuring that installation, positioning and use afford adequate safety applies to the safety both of the person directly working with the equipment and of others who can be injured at work, e.g. by noise, air contaminants or crushing. This duty refers to the safety both of employees and of any outsourced manpower (Chap. 3, Section 12 (2) of AML). It also applies in relation to contractors' employees carrying out cleaning, transport operations and machine servicing, for example (Chap. 3, Sections 6 and 12 of AML). Chap. 3, Section 7 of AML indicates who is responsible for the co-ordination of measures for the prevention of ill-health and accidents.

It is important, for example, that the space between moving parts of the work equipment and fixed or moving parts in its surroundings should be large enough. It is also important that all energy and all substances used or produced can be supplied and/or removed safely.

When installing and positioning work equipment, it is important to allow for the temporary excess loads which can be foreseen. Allowance must also be made for wind forces and for the effects of climatic conditions, such as precipitation and ice.

### **Section 12**

Checks should be made regularly, e.g. in the course of safety inspection tours, to ensure that instructions are being complied with and that safety systems are not being circumvented.

If it is found that instructions are not being followed, it is important to analyse the causes of non-compliance. If the job is hard to do without evading instructions and safety systems, technical measures will probably be needed to facilitate safe working. A dialogue between all concerned is an important means of bringing about a consensus view concerning the nature of the problems and the measures to be taken in order to overcome them.

## **Ergonomics**

### **Section 13**

The rules on musculoskeletal ergonomics are contained in special Provisions issued by the Work Environment Authority. These contain general rules on work postures, working movements and physical loads.

Ergonomic aspects which it is also important to consider with regard to the use of work equipment are man's capacity for perceiving, processing and understanding information. This has a bearing, for example, on the design and positioning of controls and display windows. These need to be visible, clear and intelligible to everyone using the work equipment.

When supplying work equipment it is important to make allowance for people's differing aptitudes and limitations. Women and men have different physical characteristics, owing to differences in body measurements and physical strength. It is also important when necessary to adapt the work equipment and use of it to employees with functional impairment.

The design of work equipment must be viewed in relation to the employees' exposure, e.g. according to whether use is prolonged and/or frequent.

## **Information to employees**

### **Section 14**

Nowadays the instructions accompanying equipment when it is delivered are often also available electronically, both from the manufacturer direct and from various trade organisations. If so, this provides a simple means of printing out new copies and supplying them to the employees if the original instructions get lost or destroyed.

It is important for the instructions to be revised if working conditions change or if revision is needed in the light of new experience.

It should be emphasised that use does not only include handling and utilisation, It also includes starting and stopping, transport, installation, assembly, dismantling, repair, alteration, servicing, cleaning and maintenance. This stipulation, then, is not attached to a particular form of use. It is the risk of ill-health or accidents which decides whether instructions are needed.

## **Work equipment involving specific risks**

### **Section 15**

The rules on systematic work environment management require the employer to allocate tasks within the operation in such a way that one or more managers, supervisors or other employees are tasked with ensuring that risks in the workplace are prevented and a satisfactory work environment achieved. The employer shall see to it that a sufficient number of persons are allotted these tasks and that they have the powers, resources and competence needed. The allocation of tasks must be documented in writing if there are at least 10 employees in the operation. It is appropriate for the employer to apply the same principles to the allocation of tasks referring to use of work equipment involving specific risks.

"Specific risks" are risks which can lead to serious accidents or severe ill-health if the work equipment is not handled with great skill and sound judgement.

### **Section 16**

The Work Environment Act makes it the employer's duty to ensure that the employee acquires a sound knowledge of the conditions in which work is conducted and that he is informed of the hazards which the work may entail. The employer shall make sure that the employee has received the training necessary and that he knows what measures shall be



taken for the avoidance of risks in the work. This section means, in the case of work equipment involving specific risks, that the employer must have documentation showing how these stipulations of the Work Environment Act have been complied with.

It is important for knowledge concerning the work equipment and its use to include aspects with a vital bearing on safety and health, such as construction, operation, control, properties, range of applications, limitations of use and maintenance and inspection. It is also important that the person using the work equipment should acquire a knowledge of the stipulations for using it and of the special risks involved.

The manufacturer's instructions may include particulars of the stipulations which should be made concerning knowledge and training.

In certain fields there are defined levels of theoretical and practical knowledge, e.g. under agreements between contracting parties, guidelines issued by trade organisations, syllabi commonly accepted in the industry concerned, Swedish standards or specific knowledge and training requirements set forth in special Provisions.

## **Maintenance and inspection**

### **Section 17**

It is important that the employer should have maintenance routines, e.g. indicating how often and in what way maintenance work is to be carried out on a particular item of work equipment, who is to carry it out and how day-to-day work is to be conducted while maintenance is in progress.

### **Sections 18-20**

It is important that the employer should have inspection and testing routines, e.g. concerning when, how often, how and by whom inspections and testing are to be carried out.

In certain cases it is impossible to decide simply from the function of the equipment whether a safety device or a safety component is working as it should. This makes it extra important for the working order of these items to be checked regularly, so that the operator will not be lulled into a false sense of security.

### **Section 21**

It is appropriate for documentation to be designed in such a way that all information can be directly read out of it.

Sometimes work equipment is installed, assembled and/or inspected by a person other than the prospective user. It is important for the user to have access to relevant documentation and also to assess the outcome.

It is important that a certificate showing when the last inspection took place should accompany work equipment if the documentation from the inspection is not available for consulting in or near the equipment.

## **Guidance on Annex A**

### **Introductory remarks**

#### **A 1**

EC directives according to "the new approach" are couched in general terms. More detailed specifications are to be found in harmonised standards, which are not binding. Such standards reflect the level of technical development at the time of their issue. They are primarily intended for products manufactured after their entry into force. But there is nothing to prevent such standards also being consulted with reference to older equipment. If

so it is important to bear in mind that it is not the intention for “old” work equipment to be upgraded to a level matching the stipulations for “new” equipment of a similar kind.

## **Musculoskeletal ergonomics**

### **A 2.2**

It is important that control stations where users spend a large part of their working time should be designed so as not to cause unnecessarily fatiguing or strenuous work postures and working movement and that the space at the control point is large enough for the user to be able to vary his work posture. If these factors are unfavourable, time restrictions may need to be introduced in order to bring the user's exposure down to an acceptable level. Cf. the guidance on Section 13.

## **Controls and control systems**

### **A 2.3**

It is important that dangerous functions, e.g. inadvertent starting, should not be triggered by external disturbances, such as

- impacts and vibrations
- electromagnetic fields,
- mains voltage fluctuations.

It is also important that dangerous functions should not be triggered by switching from one mode of operation to another, e.g. from manual to automatic control.

It is important that the safety level of the safety function of control equipment should be commensurate with the risk of injury occurring in the event of a fault in the equipment. If a fault in the control equipment implies an immediate risk of injury, it is generally necessary for the safety function to remain when a fault occurs in a component. Allowance does not generally need to be made for component faults which are unlikely to occur in practice.

If a unit in work equipment has been separately stopped, e.g. as a result of an interlocking safety guard being opened and a person entering the unit's work zone, it is important that it should not be possible to move from there into a danger zone pertaining to another part of the equipment which has not been stopped. It is also important that material or workpieces from other parts of the work equipment cannot be fed forward.

When designing and using work equipment, allowance must be made to ergonomic aspects of man's capacity for perceiving and understanding information. The equipment and use of the same must be adapted to the way in which

- our senses operate (vision, hearing, touch etc.),
- we interpret things, think, remember and make decisions,
- we act.

A logical connection between the movement of controls and the resultant effect on work equipment is important, e.g. with an upward lever movement being matched by a resultant upward movement when exercising vertical control.

## **Start**

### **A 2.5**

The term “automatic equipment” refers both to the work equipment as a whole and to equipment constituting a part thereof, e.g. safety equipment.

## **Stop**

### **A 2.6**

When stopping work equipment, it is important that accumulated energy should be blocked or relieved.

If a machine has a long roll-out time, this can entail a great risk of the operator or some other person coming into contact with those parts of the machine which have not yet come to a halt. If work equipment requires braking to bring it to a complete standstill safely, it is important that the brake should be directly actuated by the control device.

## **Emergency stop**

### **A 2.7**

The convention colour coding for an emergency stopping device is a red control with, where appropriate, a yellow background. Often it is also advisable to have a sign reading "NÖDSTOPP" (Emergency Stop), especially if the background is not yellow.

## **Setting and programming**

### **A 2.8**

During setting and programming it may be necessary for safety devices used in normal operations to be disconnected. Moreover, the person carrying out the work may have to enter the danger zone of the work equipment, e.g. in order to check and adjust machine functions. If so, it is appropriate for the person doing the work to be able to control the machine's movements directly, e.g. by means of a holding device. It is important that the machine should not be simultaneously controllable from any other control unit.

It is often appropriate for movements during setting and programming to be possible at reduced speed (crawling) or power.

## **Falling and ejected objects**

### **A 2.9**

Examples on safety devices for preventing ejection include:

- A parting knife designed for the purpose and correctly set, preventing kickback in a circular saw used for wood.
- A locking device for a tool spindle in a grinding machine, that allow the grinding tool to rotate without being ejected if the tool spindle can stop so quickly that the grinding tool is liable to come loose.

## **Clamping and stabilising**

### **A 2.11**

One instance of the importance of a work equipment part being secured is when a grinding tool is securely attached to the tool spindle of a grinding machine. This requires the grinding machine to be designed in such a way that the grinding tool can be securely attached to the tool spindle and the grinding tool tightened on the tool spindle contrary to its direction of rotation.

## **Material failure**

### **A 2.12**

Examples of measures to be taken when material failure is a safety hazard:

- Pressure pipes, e.g. hydraulic tubes, are positioned or protected in such a way that they are not exposed to wear, corrosion or other interference capable of impairing their mechanical strength.
- Pressure pipes are attached, positioned or protected in such a way that they cannot cause any injury by bursting.
- A grinding machine is fitted with burst protection if intended for use with large rapidly rotating grinding tools, and the burst protection is designed and attached and

of such strength that it will as far as possible prevent parts of a burst grinding tool from being ejected in such a way as to inflict injury. It is important that the protection should enclose as large a portion of the grinding tool as work permits.

## **Guards and safety devices**

### **A 2.13**

Guards can be fixed or openable. An openable guard is generally mechanically united (e.g. by hinges or guides) with the frame of the work equipment or with a nearby fixed part and can be opened without tools.

The type and frequency of access affect the type of guard which should be chosen.

A fixed guard is appropriate when no access is needed during a work cycle.

Where access is needed during a work cycle, an openable guard is an appropriate choice. This is particularly important if

- the hazardous function is controlled by software or automatically,
- the hazardous function can occur suddenly or unexpectedly,
- there is a risk of someone finding occasion to open the guard in order to intervene while an operation is in progress, or
- there is a risk of someone finding occasion to use the work equipment without having the guards in the safe position.

If justified by the risk, it is appropriate for an openable guard also to have an interlocking function so that it will remain closed and locked as long as the hazardous functions are in progress.

In larger danger zones where a person may be present inside a closed guard, supplementary protection is often advisable, especially if it is difficult to see the whole of the danger zone.

## **Adjustable guards**

### **A 2.14**

In the case of a handheld or manually fed machine, e.g. a saw, milling machine or planer, where the machine tool cannot be completely screened off during machining, it is important that the machine tool guard should be easy to set and adjust if setting is not automatic. Automatically adjusted guards are preferable with a view to a high standard of safety in practice.

## **Pinch points**

### **A 2.17**

Suitable safety measures may be:

- mechanisation of the work by means of entry guides,
- screening off of the danger zone, or
- maintenance of such a low speed that there will be time to stop the equipment before any serious injury occurs.

## **Disconnection of energy supply**

### **A 2.22**

To facilitate disconnection of the energy supply, and to reduce the risk of any disconnection measure being overlooked, it is appropriate for the disconnection devices for one and the same item of work equipment to be grouped together.

## **Marking, signage and warning devices**

### **A 2.23**

Marking, signage and other warning devices are important if there is a risk of ill-health or accidents in connection with incorrect use of work equipment. Marking and signage can, for example, indicate maximum load, speed or capacity. Signage can indicate that the equipment may only be used under certain conditions. Signage can also indicate the personal protective equipment which use requires.

It is important that warning signs should convey sufficient information concerning risks associated by noise and vibrations. Depending on the noise and vibration levels emitted by equipment, an assessment has to be made of the exposure permissible for a user. Rules concerning noise and vibrations are contained in special Provisions issued by the Work Environment Authority.

## **Access routes and work zones**

### **A 2.24**

Accidents are commonly caused by personnel slipping, tripping or falling. It is therefore important that access routes and other zones where people need to be present should be appropriately designed. It is especially important for work equipment to be maintained with the risk of slipping, tripping or falling in mind. For example, worn-out stair treads should be replaced. Old and worn-out rubber and plastic mats should also be replaced with new ones which are more slip-proof.

## **Fire hazards and emissions**

### **A 2.25**

It is important that exhaust fumes should be led off from fresh air intakes and unprotected employees.

It is important to take the fire properties of hydraulic fluid into consideration if in the event of leakage it is liable to come into contact with hot material or a naked flame or to ignite in some other way.

Rules concerning occupational exposure limit values and measures to combat air contaminants are contained in special Provisions issued by the Work Environment Authority.

## **Mobile work equipment**

### **A 3.1**

Self-propelled work equipment is defined here as equipment with some form of mechanical propulsion.

Mobile work equipment can entail risks over and above those caused by mobility. Some such equipment comes under more precise Provisions for special types of work equipment, e.g. mobile cranes, mobile elevating work platforms and trucks.

## **Self-propelled work equipment**

### **A 3.1.8 (i)**

A parking brake is a common device to prevent mobile work equipment from being unintentionally set in motion.

## **Pallet racks and other warehousing racks**

### **A 3.2**

Warehousing racks other than pallet racks include, for example, shelving racks, cantilever racking and deep racks.

A risk of instability is normally considered to exist if the total height of the pallet rack is four times the pallet racking depth or if the racking unit has pull-out units or back stays.

## **Guidance on Annex B**

### **Assembly, installation, dismantling, service, maintenance, cleaning and inspection**

#### **B 2.1**

Experience has shown that planning and preparations reduce the risk of accidents. This applies not least to work like assembly, installation, dismantling, service, maintenance and cleaning. For planning purposes it is vital to take the company's activities as the starting point and to analyse all the risk sources that can conceivably arise. In the event of breakdowns or unexpected stoppages there may be stipulations both express and implied that the maintenance personnel must begin reinstating the work equipment as quickly as possible, but it is equally important that this, often unexpected, work should be planned before it starts.

Working instructions are also important for the avoidance of accidents, especially when several different persons or agents are working together and safety is partly based on all of them together carrying out the measures planned. Instructions are also important when the manufacturer's instructions are deficient or do not include the work which is to be done.

Larger operations often have a maintenance department which is responsible for the co-ordination of assembly, installation, dismantling, servicing and maintenance work within the organisation. When one or more contractors are engaged it is important to establish responsibility for co-ordination; cf. Chap. 3, Section 7 of AML. Regardless of whether the work is carried out under the firm's own auspices or contractors are engaged, information transfer is always important. This applies not least when one or more persons take over a job which has already been started.

Cutting off energy inputs has a decisive bearing on safety in connection with servicing, maintenance and cleaning work. Very often too it may be appropriate to check that the energy inputs really have been cut off, e.g. by trying to test-start the equipment before work commences. If the person or persons carrying out the servicing, maintenance or cleaning work do not have the switching device under constant surveillance, it is also important that the device should be locked in the disconnected position, so that no one else can inadvertently turn on the energy supply to the equipment.

Relief or blockage of accumulated energy is essential for safety. Accumulated energy can, for example, take the form of tensioned springs, components in the elevated or hoisted position, pneumatic components under pressure, charged condensers etc.

The normal procedure, then, in connection with servicing, maintenance and cleaning work is to disconnect energy inputs and lock them in the disconnected position, except where manifestly unnecessary. In addition, any accumulated energy is also relieved. In exceptional cases, however, it may be necessary for the whole or parts of the work equipment to be in

operation in order for the work to be carried out. In such exceptional cases it is very important to take other measures so that adequate protection will be provided against ill-health and accidents; see B 2.4.

To prevent accidents resulting from mistakes or misunderstandings, it is important to have clear signage showing that work is in progress. In certain cases barriers and blocks may also be needed.

## **Malfunction**

### **B 2.3**

Equipment can be considered securely stopped if all its moving parts have been brought to a halt and the equipment cannot start accidentally or otherwise give rise to dangerous situations, e.g. through a malfunction of the start command control system or the influence of transducers or power controls; see also standard SS-EN 1037:1995 Safety of machinery - Prevention of unexpected start-up.

Safety routines used for work inside the danger zone of work equipment are often termed “shut down and lock” routines. These usually comprise the measures taken primarily by maintenance personnel before and after maintenance or repair work. Normally the routines used for maintenance and repair work do not work so well for production personnel. Using the “shut down and lock” routines for brief, repeated stops in connection with operational and production disturbances can involve difficulties, e.g. prolonged downtimes. One reason for longer downtime can be that for every stoppage energy supply has to be cut off manually at disconnecting devices, valves and any barriers.

Achieving a safe stop must be easy, so as to avoid the situation of workers – e.g. in order to save time – entering the danger zone without having reliably stopped the equipment. Otherwise there is a risk of the equipment being stopped in such a way that it accidentally restarts when personnel are present inside the danger zone. Unexpected start-ups can occur, for example, if there is a fault in the control system or when transducers are actuated. After disconnection the work equipment should be test-started to make sure that the disconnection has been properly carried out.

A special risk assessment is advisable in order to make clear whether existing safety devices, such as safety gates and photo cells, afford adequate safety for temporary work inside the work equipment danger zone. The following are important steps in this kind of risk assessment:

- defining the danger zone,
- identifying all risks in the danger zone,
- checking the safety and safety level of the control system,
- taking into account risks of unexpected start-ups,
- taking into account risks when the equipment is manned by several persons or when other personnel categories will be working in the danger zone, e.g. cleaning staff or rescue personnel,
- confirming that all relevant risks are prevented,
- confirming that all the machines concerned will stop, if there are several machines in the danger zone,
- checking that the “safe stop” technology works as intended.

## **De-activated safety devices**

### **B 2.4**

The equipment may sometimes need to be in motion in order for work to be feasible. In connection with such work, e.g. certain setting operations, programming work or fault

diagnosis, it is important to take other measures so as to achieve safety from ill-health and accidents.

## **External factors**

### **B 3.6**

It is important that work equipment conducted by pedestrians on a slope be moved at right angles to the gradient. Rider equipment must be driven up and down the slope, in view of the risk of the equipment overturning.

For lawn mowing it is important to use special machinery when the slope gradient exceeds 50% (1:2).

Air cushion mowers are unsuitable for use on sloping or undulating ground, due to the effects of slipping.

## **Prevention of inadvertent movement**

### **B 3.7**

Most often a machine or machine part can be secured by the engine being turned off and the possibility of machine movement ceasing. In cases where the halting of movement depends on the retention of air pressure, hydraulic pressure or a vacuum, other securing methods may be needed. Excavator buckets or other working members may, for example, rest on the ground or on supports.

Disruptions of work, repairs and maintenance, breaks and planning of work are examples of situations where the driver may need to leave the driving position and where an inadvertent movement of the machine can injure the driver or persons in the vicinity.

## **Use of work equipment intended for temporary work at levels above ground or floor level or other work at height**

### **B 4**

Work at levels above ground or floor level can expose employees to particularly serious health hazards and accident risks. Falls from a height account for a large proportion of serious work accidents, especially fatal ones.

Rules on building and civil engineering work are contained in special Provisions issued by the Work Environment Authority. Those provisions require the party commissioning building or civil engineering work which entails a risk of falls to a lower level and where the difference in level is two metres or more to see to it that a work environment plan is drawn up and is available before the construction site is established.

## **Choice of work equipment**

### **B 4.1.1**

It is important that the employer or other person responsible for safety should, when proposing to have temporary work done at levels above ground or floor level, choose work equipment which affords sufficient protection from the risk of falling.

Common fall prevention measures are generally more effective than personal protective equipment. Common safety devices can be instanced with safety railings.

Ladders and scaffolding are examples of equipment frequently used for temporary work above ground or floor level. The safety and health of the persons working at height greatly depend on correct use of the equipment. It is important for employees to be carefully instructed concerning the safest possible way of using the equipment. It is also important that they be given suitable training.



Stairs are normally the best kind of access route. A vertical ladder is for the most part an unsuitable access route. If there is a great difference between levels and a lot of movement to and from the level concerned, a hoist or a lift may be needed.

Further stipulations and guidance concerning the choice of safety precautions and access and communication routes are contained in other rules issued by the Work Environment Authority.

## **Rope Access**

### **B 4.1.2**

With rope access, a person can work while freely suspended from a rope. It is also possible to move vertically upwards and downwards from a given height and carry out work without any firm support.

Other types of work in which ropes are used but which require a firm base are not normally classed as rope access, e.g. when support equipment systems are used to prevent falls and provide support while work is in progress, e.g. with roofing work or with work from a firm base where fall protection systems are used if there is a risk of free fall.

It is important that rope access equipment should be suitable for the intended purpose and should be used correctly.

Safe use and care of equipment for rope access require training and recurrent practice.

## **Weather conditions**

### **B 4.1.5**

Weather conditions which can imply a risk of ill-health and accidents include strong winds, extreme heat or cold, heavy or frozen rain or snowfall. In the event of thunderstorms, the risk of lightning strikes should be taken into account.

## **Conduct of rope access work**

### **B 4.2**

The equipment used for rope access work is generally derived from mountaineering equipment. Greater safety requirements are involved, however, when this kind of equipment is used commercially, one consequence being that normally two ropes should be used for rope access work. It is important for the equipment to be adapted to the particular stipulations applied to work equipment. Thus mountaineering system components, such as coupling devices, are not always suitable for rope access work. This makes it important to follow the supplier's instructions concerning suitable uses for the equipment concerned.

#### **B 4.2 (a)**

Concerning safety system, safety line requirements, see Swedish Standard SS-EN 353-2 Guided type fall arresters including a flexible anchor line.

Concerning requirements for anchorage points, see Swedish Standard SS-EN 795 Protection against falls from a height - Anchor devices - Requirements and testing.

Rescue work can involve going to the direct relief of a person in distress but can also imply certain forms of police or military action. It is important for exercises and training to be conducted under the safest possible conditions, i.e. with two ropes.

#### **B 4.2. (b)**

When choosing harness it is important to analyse the risks of ill-health and accidents at work. Body harness is used when there is a risk of the user going into free fall. A sit harness is a type of support equipment and is not designed for safely arresting free fall. For requirements

concerning body harnesses, see Swedish Standard SS-EN 361, Full Body harnesses. For requirements concerning sit harnesses, see Swedish Standard SS-EN 813, Sit harnesses.

#### **B 4.2. (c)**

The mobile device can either follow the movement automatically or be operated manually.

#### **B 4.2 (e)**

If special evacuation equipment is needed for bringing down a person in distress, it is important that this equipment should be readily accessible. It is also important for a person who is to evacuate the person in distress to have the right knowledge and competence.

#### **B 4.2.(f)**

It is appropriate for special training to end with an achievement test.

Before rope work begins it is important for the employee to be familiar with work planning and current work environment regulations and to have a close knowledge of

- rope climbing,
- climbing technique,
- abseiling,
- rescue methods,
- materials,
- maintenance and care of the equipment,
- ergonomic factors for the avoidance of unnecessarily fatiguing loads,
- special risks associated with rope access work.

It is important to regularly practise climbing techniques, abseiling and operations and methods rarely occurring in day-to-day work, e.g. rescue methods.

Before an employer allows an employee to carry out rope access work, it is important that he ascertain that the employee has received sufficient training and has the knowledge which the work requires.

## **Use of grinding machines**

### **B 5.1**

It is important that no one should be present in front of the burst protector aperture when grinding tools are being tested.

## **Work with wheels and tyres**

### **B 6.1**

A risk of injury from tyre bursts may occur when tyres for buses, lorries, trucks, tractors and contracting machinery are being inflated and in connection with other work where risk assessment as provided in Section 3 points to the existence of such a risk.

## Information from the Work Environment Authority

### **Directives from the European Communities**

#### *Work environment directives*

COUNCIL DIRECTIVE of 12 June 1989 on the introduction of measures to encourage improvements in the safety and health of workers at work (89/391/EEC) (OJ L 183, 29.6.1989, pp. 1-8, Celex 31989L0391)

COUNCIL DIRECTIVE of 30 November 1989 concerning the minimum safety and health requirements for the use of work equipment by workers at work (second individual Directive within the meaning of Article 16 (1) of Directive 89/391/EEC) (89/655/EEC) (OJ L 335, 30.12.1989, pp. 13-17, Celex 31989L0655)

COUNCIL DIRECTIVE 95/63/EC of 5 December 1995 amending Directive 89/655/EEC concerning the minimum safety and health requirements for the use of work equipment by workers at work (second individual Directive within the meaning of Article 16 (1) of Directive 89/391/EEC) (OJ L 335, 30.12.1995, pp. 28-36, Celex 31995L0063)

DIRECTIVE 2001/45/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 27 June 2001 amending Council Directive 89/655/EEC concerning the minimum safety and health requirements for the use of work equipment by workers at work (second individual Directive within the meaning of Article 16(1) of Directive 89/391/EEC) (OJ L 195 , 19.07.2001, pp. 46-49, Celex 32001L0045)

#### *Directives relating to technical trade barriers*

DIRECTIVE 98/34/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 22 June 1998 laying down a procedure for the provision of information in the field of technical standards and regulations (OJ L 204, 21.7.1998, pp. 37-48, Celex 31998L0034)

### **Legislation and statutory instruments**

The Work Environment Act (SFS 1977:1160)

The Work Environment Ordinance (SFS 1977:1166)

### **Provisions issued by the Work Environment Authority (AFS)**

1990:12 Scaffolding

1996:1 Minors at Work

1998:1 Ergonomics for the Prevention of Musculoskeletal Disorders

1999:3 Building and Civil Engineering Work

2000:42 Workplace Design

2001:1 Systematic Work Environment Management

2001:3 Use of Personal Protective Equipment

2004:3 Ladders and Trestles

2005:15 Vibrations

2005:16 Noise

2005:17 Occupational Exposure Limit Values and Measures against Air Contaminants

2006:5 Use of trucks

2006:6 Use of Lifting Gear and Lifting Equipment

2006:7 Temporary Personnel Hoists using Cranes and Trucks

**Other relevant rules etc.**

Rules, brochures, books etc. are listed in ADI 100 Produktkatalog (obtainable free of charge from the Work Environment Authority, address: Arbetsmiljöverket, Publikationsservice, Box 1300, SE-171 25 SOLNA). Publications can also be ordered via the Authority's website, [www.av.se](http://www.av.se).

The Work Environment Authority also publishes an annual list of all current statutory instruments and General Recommendations adopted.

For updates on current regulations it is also appropriate to visit the Authority's website [www.av.se](http://www.av.se), subheading Law and justice, to check which rules apply to a particular activity. Note, however, that documents on the Internet may be inaccurate and that legally it is the printed text which applies.