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Code of practice for safe working on lifts

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Contents

Summary of pages

This document comprises a front cover, an inside front cover, pages i to iv, pages 1 to 60, an inside back cover and a back cover.

Foreword

Publishing information

This British Standard is published by BSI Standards Limited, under licence from The British Standards Institution, and came into effect on 30 September 2012. It was prepared by Technical Committee MHE/4, *Lifts, hoists and escalators*. A list of organizations represented on this committee can be obtained on request to its secretary.

Supersession

This British Standard supersedes BS 7255:2001, which is withdrawn.

Relationship with other publications

Since the withdrawal of HSE Guidance Note PM 26 [1], BS 7255 can be considered as best practice in the absence of other HSE guidance.

Information about this document

This is a full revision of the standard, and introduces the following principal changes:

a) updates to accommodate new legislation;

b) revisions to accommodate new and revised standards published since 2001;

c) the inclusion of improved safety procedures for working in a lift pit;

d) the inclusion of information on occasions where there is more than one person working;

e) information on working on machine-room-less lift installations

f) the inclusion of recommendations for electrical working.

The standard is supported by the following annexes:

1) Annex A describes suggested improvements for the owner for safe working on older lifts;

2) Annex B describes car top control stations;

3) Annex C shows some typical safety signs;

4) Annex D describes electrical working;

5) Annex E describes additional procedures for installation, major repair and dismantling;

6) Annex F describes situations where there is more than one person working;

7) Annex G gives procedures for working in a pit.

Use of this document

As a code of practice, this British Standard takes the form of guidance and recommendations. It should not be quoted as if it were a specification and particular care should be taken to ensure that claims of compliance are not misleading.

Any user claiming compliance with this British Standard is expected to be able to justify any course of action that deviates from its recommendations.

It has been assumed in the preparation of this British Standard that the execution of its provisions will be entrusted to appropriately qualified and experienced people, for whose use it has been produced.

Presentational conventions

The provisions in this standard are presented in roman (i.e. upright) type. Its recommendations are expressed in sentences in which the principal auxiliary verb is "should".

Commentary, explanation and general informative material is presented in smaller italic type, and does not constitute a normative element.

Contractual and legal considerations

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

Compliance with a British Standard cannot confer immunity from legal obligations.

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1 Scope

This British Standard gives recommendations for safe working practices (supported by training) for:

- owners of permanently installed lifts serving defined landing levels;
- persons having effective control of the premises where such lifts are installed;
- persons responsible for, and involved in, the design, installation, thorough examination, inspection, testing, service, maintenance, repair and dismantling of such lifts.

This British Standard gives recommendations for the safety of persons when gaining access to and from the work area on a lift installation and while working there. The recommendations also relate to the safety of others present in the vicinity, whether they are working or not, who could be endangered by the actions of those working on lifts.

NOTE Hazards in work areas might vary, i.e. occupied/unoccupied buildings, premises being refurbished, construction sites and industrial environments.

This British Standard is applicable to persons working on all types of lift, however, not every recommendation is applicable for all types of lift that are covered by British Standards.

For lifts that have been designed and installed in accordance with the Lifts Regulations 1997 [2], the recommendations that might affect product design do not apply.

This British Standard does not cover stair lifts and other lifting appliances such as paternosters, mine lifts, access lifts to workplaces, theatrical lifts, appliances with automatic caging, skips, lifts and hoists for construction sites, ships' hoists, platforms for exploration or drilling at sea, construction and maintenance appliances, although it may be taken as a useful guide.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

BS 921, *Specification rubber mats for electrical purposes*

BS 5655-6:2011, *Lifts and service lifts – Part 6: Code of practice for the selection, installations and location of new lifts*

BS 7375, *Distribution of electricity on construction and demolition sites – Code of practice*

BS 7671:2008+A1:2011, *Requirements for electrical installations – IET Wiring Regulations – Seventeenth Edition*

BS 9999, *Code of practice for fire safety in the design, management and use of buildings*

BS EN 81-80, *Safety rules for the construction and installation of lifts – Existing lifts – Part 80: Rules for the improvement of safety of existing passenger and goods passenger lifts*

BS EN 60204-1:2006+A1:2009, *Safety of machinery – Electrical equipment of machines – Part 1: General requirements*

BS ISO 7010, *Graphical symbols – Safety colours and safety signs – Registered safety signs*

BS ISO 14798, *Lifts (elevators), escalators and moving walks – Risk assessment and reduction methodology*

Other publications

[N1]IET, *Guidance Note 3: Inspection and testing*. Stevenage: IET Publications, 2011. ISBN: 978 1 84919 275 0.

3 Terms and definitions

For the purposes of this British Standard the following terms and definitions apply.

3.1 authorized person
person given authority and responsible for ensuring that specific plant and equipment are safe for the intended work to be undertaken; or a person, authorized to perform work or particular tasks, who has undergone relevant training, is suitably instructed in the particular task and has sufficient knowledge and experience of the relevant plant, to enable them to recognize potential dangers of the plant and adequately manage any identified hazards

3.2 carrier (car)
part of a lift that carries passengers and/or other loads

NOTE The term carrier is now used in the Supply of Machinery (Safety) Regulations 2008 [3].

3.3 CDM coordinator
person who advises and assists the client to coordinate health and safety aspects of a project

NOTE The CDM coordinator is also the duty holder under the Construction (Design and Management) (CDM) Regulations 2007 [4].

3.4 competent person
person, suitably trained and qualified by knowledge and practical experience, and provided with the necessary instructions, to enable the required work to be carried out safely

3.5 construction site (CDM)
any place where construction work is being carried out or to which the workers have access, but does not include a workplace within it that is set aside for purposes other than construction work

3.6 contractor
person (including a client, principal contractor, lift contractor) who carries out or manages construction work

NOTE The contractor is also the duty holder under the CDM Regulations 2007 [4].

3.7 isolator switch
switch that isolates the electrical supply to a lift on all "live" conductors

NOTE On some installations the electrical supplies to some of the following may not be disconnected by turning off the isolator switch:

a) car lighting or ventilation (if any);

b) socket outlet on the car roof;

c) lighting in the machinery space and any pulley room;

d) socket outlet(s) in the machinery space and any pulley room;

e) lighting in the well;

f) socket outlet in the pit;

g) alarm and communication device;

h) group interconnections;

i) supply to any emergency electrical operation equipment.

3.8 lift
permanent lifting equipment, comprising a guided carrier, serving defined landing levels and designed for the transportation of persons and/or goods irrespective of speed

NOTE 1 This definition is not in line with the Supply of Machinery (Safety) Regulations 2008 [3] or Lift Regulations 1997 [2] definition of lifts but is relevant to this British Standard.

*NOTE 2 See Clause **1** for lifts that are not covered by this British Standard.*

3.9 lift contractor
party that is contracted to supply, install, modernize, repair, service, or dismantle a lift

3.10 lift entrance
complete landing door assembly, together with its surround

3.11 lift landing
space at the entrance to a lift at any defined level to permit the manoeuvring, boarding and alighting of persons and/or goods

3.12 lift machine
unit, including the motor, which drives and stops a lift

3.13 lift maintenance
tasks involving the inspection, cleaning, lubrications, minor adjustment and small repair works not covered by the CDM Regulations 2007 [4]

3.14 lock-off device
device to prevent unauthorized reconnection of electrical energy

NOTE This is often a padlock that prevents movement of the operating handle of the isolator switch.

3.15 machinery space
space(s) inside or outside of the well where the machinery, as a whole or in parts, is placed

3.16 multiple installation
number of lifts installed in separate or common wells and/or sharing a common machinery space

3.17 observation lift
lift that provides a panoramic outlook

NOTE The well for such a lift can be partially enclosed.

3.18 owner
legal entity having right of possession of a lift and responsibility for its safe working

NOTE The owner is usually the landlord or proprietor of the building in which a lift is situated. The person having responsibility for the lift on a day-to-day basis is likely to be the building occupier.

3.19 passenger
person transported within the car

3.20 permit to work
authority in writing that includes details of:

a) work to be undertaken;

b) procedures involved;

c) precautions needed;

d) emergency procedures to be in place;

e) persons to undertake the work;

f) timescale of the work to be undertaken;

g) restrictions on the workplace or equipment

3.21 pit
part of a well situated below the lowest landing served by a car

3.22 positive drive lift
lift (includes hydraulic and drum drive) suspended by chains or ropes and driven by means other than friction

3.23 pulley room
room, not containing a lift machine, in which pulleys are located

NOTE This room can also contain other equipment, such as the overspeed governor(s) and electrical equipment associated with a lift.

3.24 rated load
load which the equipment has been designed to carry

3.25 risk assessment
comprehensive estimation of the probability and the degree of possible injury or damage to health or property, in order to identify appropriate mitigating measures

3.26 safe system of work
formal procedure, resulting from a risk assessment, which specifies safe methods of work to ensure that relevant hazards to the task being undertaken are eliminated and the remaining risks are minimized

3.27 user
person making use of the services of a lift installation

NOTE A user is not necessarily the same as a passenger.

3.28 well
space in which the car, the counterweight or the balancing weight travels

NOTE This space is normally bounded by the bottom of the pit, the walls and the ceiling of the well.

3.29 workplace
premises or part of premises where work is carried out

NOTE 1 This can include:

a) any place that is accessible to those at the workplace;

b) any means of access to/from the workplace, e.g. staircase, corridor.

NOTE 2 A workplace is usually non-domestic, although the term can refer equally to domestic premises.

3.30 work platform
designated area, moving or fixed, for carrying out work tasks

4 Safety management: responsibilities of owners

*COMMENTARY ON Clause **4***

Not every lift is identical, modern or similarly positioned; nor are all machinery spaces of identical size or shape, nor segregated, illuminated or located within similar environments.

*Clause **5** gives recommendations to persons responsible for, and involved in, the design, installation, thorough examination, inspection, testing, service, maintenance, repair or dismantling of lifts.*

4.1 General

The recommendations given throughout Clause **4** should be applied by owners of lifts and by persons having effective control of the premises in which lifts are installed.

NOTE 1 Attention is drawn to the Lifting Operations and Lifting Equipment Regulations (LOLER) 1998 [5] for duty holders.

Owners of lifts that were built before 1 July 1999 should follow the advice given in BS EN 81-80.

NOTE 2 Annex A and Annex B give details of suggested improvements to older lift installations in addition to those given in BS EN 81-80.

Hazards relating to moving and rotating machinery, electrical equipment, falls from height, etc., which are similar to those experienced in other industrial workplaces, should be identified in a risk assessment in accordance with **4.15**.

4.2 Training and competence

All persons, who might be working on a lift or related equipment (within a well, pit, machinery space or pulley room) or carrying out risk assessments, should possess demonstrable competence in basic lift safety and procedures or be under relevant supervision.

NOTE 1 Relevant supervision may be provided by any person who possesses demonstrable competence in basic lift safety and procedures.

NOTE 2 A suitable level of certified competence is the qualification NVQ EOR/202 "Working safely in an engineering environment – Basic lift safety", although other suitable certified achievements exist.

Clear written instructions relating to site emergency and first aid procedures should be issued, by those responsible for the site namely the owner or principal contractor, to employees, visitors, contractors and other authorized persons. Any specific regulations that apply to the premises should also be included in these instructions. If the instructions are complex and/or specific risks exist, they should be supplemented by a specific "site safety awareness" training regime and safe system(s) of work.

Specific training should be provided to all persons who are authorized to carry out the safe release of trapped passengers. Such persons should be made aware that this training is limited to safe release activities only and that this does not authorize them to carry out any additional activities. Training should cover the release procedure and also possible complications that might arise during a release, e.g. failure of the procedure to cause movement of the lift car.

*NOTE 3 The full range of competencies contained within NVQ EOR/202 might not be required for persons carrying out the safe release of trapped passengers. Procedures recommended for the safe release of trapped passengers are given in **4.20** and **5.20**.*

The competency of all trained persons should be assessed and documented annually. Documentation should list the competencies achieved relating to the type of equipment upon which the training was carried out.

Information and instructions should be given to all occupants of the premises who could be affected whenever any works are carried out on lifts, indicating any relevant effects on their working environment or their health and safety.

All employees within the premises should be made aware of the meaning of all signs displayed in public lift areas or when lifts are being worked on.

The ultimate responsibility for safety signs should rest with the owner, although in some cases it may be delegated (see **5.7**).

NOTE 4 There are two categories of signage that might be encountered by employees in a building: those displayed where employees occupy tenant areas, and those displayed where employees enter restricted areas under supervision (see Annex C). Examples of the first category are:

- *lift out of service (see Figure C.1);*
- *rated load plate in the car (see BS EN 81-1:1998+A3, **15.2.1** and BS EN 81-2:1998+A3, **15.2.1**);*
- *machinery space access notices (see BS EN 81-1:1998+A3, **15.4.1** and BS EN 81-2:1998+A3, **15.4.1** and Figures C.2 and C.3).*

Examples of the second category are:

- *reduced headroom (see Figure C.4);*
- *no car safety gear (see Figure C.5);*
- *reduced pit depth and position restraint before working (see Figures C.7 and C.10);*
- *descending counterweight (see Figure C.8).*

4.3 Responsibility for work

The owner should ensure that any work carried out on lifts is performed only by authorized persons.

NOTE Attention is drawn to the Workplace (Health, Safety and Welfare) Regulations 1992 [6].

A person should be appointed by the owner or the site person in charge of the works to be responsible for, at least, the following aspects:

a) familiarization with the relevant parts of any safety assessment undertaken by the contractor;

b) familiarization with the work site from commencement of the work, including the effect the work is likely to have on other persons in the area;

c) directing and managing the work safely;

d) ensuring that the work site is handed back to the owner in a safe condition on completion of the work.

The owner should liaise with the lift contractor or other persons authorized to carry out work on a lift installation in order to understand the risks that could arise as a result of the work and agree the necessary control measures.

4.4 Liaison

The owner should nominate a representative to summon emergency assistance if required, and to give advice on special precautions or procedures required for works being undertaken within the premises.

The owner, together with the site person in charge of the works, should determine whether any special precautions or procedures need to be taken.

NOTE Such precautions might become necessary due to environmental factors, e.g. where children are present in the vicinity.

The site person in charge of the works on the lift(s) should establish contact with the owner's site representative. The owner's site representative should be informed before work is started or any lift(s) taken out of service.

4.5 Personal protective equipment

A risk assessment (see **4.15**) should be carried out to identify the need for any appropriate type(s) of personal protective equipment and/or clothing, before such equipment and/or clothing is issued.

The owner should ensure that appropriate personal protective equipment (see **5.5**) and/or clothing is provided to ensure the health and safety of persons working on lifts who might be exposed to harmful processes or substances encountered within the premises.

4.6 Electrical supplies and equipment

The owner should give the lift contractor access to the electrical supplies.

The owner should ensure that existing permanent electrical supplies, conductors and their terminations (which might give rise to danger) are safe and:

a) of the appropriate rating;

b) insulated;

c) tested at regular intervals;

NOTE 1 See IET Guidance Note 3 [N1] and BS 7671:2008+A1, Chapter 62.

d) have been installed in accordance with the edition of the IEE Wiring Regulations/BS 7671 that were current at the time of installation or modification.

The frequency of inspection and testing of the electrical installation should be determined taking into account the type of installation, its location and the frequency and quality of maintenance.

Where tests are made the owner should be provided with a test certificate detailing the condition of the supply.

NOTE 2 Typically tests are carried out by a competent person working to BS 7671 and IET Guidance Note 3 [N1], where the certification requirements are defined.

The owner should ensure that a risk assessment is carried out regularly on all electrical equipment associated with a lift installation in accordance with IET Guidance Note 3 [N1], to ensure that all precautions have been taken to eliminate or minimize the risks to the health of all persons working on such equipment.

NOTE 3 Attention is drawn to the Electricity at Work Regulations 1989 [7] and Memorandum of guidance on the Electricity at Work Regulations 1989 [8].

The isolating switch of the lift should be appropriately fused so as to avoid the need for lift personnel to enter electrical switch rooms. This switch should have the function to be locked off/tagged off.

The owner should notify the lift contractor before they make any modifications to the electrical supply, e.g. voltage reduction systems.

All exposed conductive parts should be guarded against inadvertent contact.

Work should not be carried out on or near to live electrical equipment ("live working") unless working in this way is unavoidable, see Annex D. Such work applies to the electrical supplies provided by the owner and to equipment provided as part of the lift installation. In such instances, work should be carried out only by a competent and trained person, implementing a safe system of work that has been established by a risk assessment.

4.7 Removal of lift from service

The owner should display a safety sign where a lift is removed from service to warn others that the lift is out of service (see Figure C.1).

4.8 Housekeeping

The owner, in conjunction with the lift contractor, should establish procedures for:

a) the avoidance of build-up of waste materials in wells;

b) the control and disposal of waste and other items and substances that are potentially injurious to health and safety.

*NOTE Attention is drawn to the Control of Asbestos at Work Regulations 2012 [9] (see **4.14**) and the Control of Substances Hazardous to Health Regulations 2002 [10]. Examples of potentially hazardous items and substances include hypodermic needles, human waste and radioactive materials.*

4.9 Health and safety file

*COMMENTARY ON **4.9***

Attention is drawn to the CDM Regulations 2007 [4] where construction work, including dismantling, is undertaken and exceeds a defined period of time or involves the employment of a number of persons. In relation to lifts, these regulations are likely to apply to the installation of new lifts into new or existing buildings and to the modernization of such equipment.

Not all work is notifiable to the Health and Safety Executive, e.g. it does not normally apply to maintenance tasks or small repairs (e.g. motor replacement) that do not involve alterations to the structure or equipment attached to it, assuming the work does not exceed the requirements for notifiable work. It can apply to major maintenance tasks such as re-roping of a large lift but such work would not normally be notifiable work. It also applies to modernization work such as new controller or car, but is not normally notifiable unless it exceeds the defined time. It always applies to the dismantling or removal of old lifts and installation of a new lift into an existing or new building.

*The CDM Regulations 2007 [4] place responsibilities on owners, designers and contractors. In addition, they place responsibilities on the client to appoint a suitably qualified principal contractor and CDM coordinator, who gathers the relevant information from all of the contractors and draws up a health and safety file for the works that is passed to the client on completion of all works. The typical contents of the file are given in **5.9**.*

The client should ensure that potential contractors for any new work are given view of any existing safety file prior to bidding or commencement of any work.

NOTE 1 Attention is drawn to the CDM Regulations 2007, Regulation 17(1) [4], which requires the client to provide the CDM coordinator with health and safety information relating to the project. Such information needs to include the location of hidden services in relation to the lift and any substances used in the construction of the lift well liable to give rise to a hazard, etc.

Following the initial installation or major modernization of a lift, the health and safety file should be made available to all persons who subsequently work on the lift(s).

For safety, the owner should provide a copy of the maintenance instructions to the lift maintenance contractor or any other contractor prior to the commencement of any work on the lift. Where the owner does not hold a copy of the maintenance instructions, they should obtain a copy from the original installer, where possible.

NOTE 2 The original installer is obliged by the Lift Regulations 1997 [2] and Supply of Machinery (Safety) Regulations 2008 [3] to retain a copy of such information for a minimum of 10 years.

4.10 Effects on the occupants

Potential disruption, e.g. dust, noise, access restrictions, etc., to the occupants of the premises from the lift work should be assessed and minimized.

4.11 Access to tools, equipment and materials

Arrangements should be made between the owner and the lift contractor for:

a) safe access to all tools, equipment and materials at workplaces;

b) the provision of suitable and clearly identified storage space for tools, equipment, materials and any portable access equipment;

c) the provision of alternative access routes as might become necessary during the works being undertaken.

NOTE These are some elements of the provision of safe systems of work.

4.12 Permits to work

There should be a safe system of work (see **3.26**) for all those undertaking tasks within designated workplaces.

A safe system of work should include the provision of lock-off/tag-on devices on all electrical isolator switches.

Where appropriate, the lift contractor should obtain a permit to work from the owner (see **5.11**). After the owner has issued the permit to work no further permits should be issued unless discussed with the lift contractor.

4.13 Installation, major repair and dismantling

Where installation, major repair or dismantling is taking place, the procedures given in Annex E should be followed.

*NOTE The procedures given in Annex E are specific to the activities associated with installation, major repair and dismantling. They are additions not alternatives to the procedures detailed throughout Clause **4**.*

4.14 Asbestos

The owner of a building should hold a register of asbestos that might be present on the premises. Visiting tradespersons should be advised of the location, etc., of asbestos so they can plan their work accordingly.

NOTE Attention is drawn to the Control of Asbestos at Work Regulations 2012 [9].

4.15 General safety measures and risk assessment

The owner should carry out a risk assessment to ensure that all workplaces are safe to accommodate:

- the work activity being undertaken;
- all lift contractors together with their work equipment.

The owner should provide a safe means of access to and egress from all workplaces, including for suitable access equipment if necessary.

NOTE 1 This includes the provision of access to all workplaces that are free from obstacles, tripping hazards and projections. It also includes the provision of a safe means of access through potentially hazardous areas and the provision of adequate lighting, both inside and outside the lift well for access to and egress from workplaces.

Emergency lighting and, where necessary, temporary electrical supplies should be provided for all workplaces.

NOTE 2 BS 5266-1 gives recommendations for emergency lighting.

The owner should ensure that authorized persons can easily gain entry to a workplace.

Access to machinery spaces should be restricted to authorized persons or persons under the supervision of authorized persons.

The owner should provide safety signs for persons accessing machinery spaces to follow (see Figure C.2).

The owner and the lift contractor should undertake risk assessments to establish safety measures that ensure the safety of persons engaged in work and persons using the premises and lifts. Risk assessments on lifts should be carried out in accordance with BS ISO 14798 [1)].

NOTE 3 Risk assessments require periodic review as improvements in technology and/or materials could reduce the element of risk beyond that achieved by any existing arrangements.

The safety measures identified by risk assessment should be implemented wherever practicable. All measures should be undertaken that could improve the safety of those persons engaged in the works or using the lifts, including any recommendations issued by the manufacturers, the maintenance company or competent persons.

NOTE 4 Attention is drawn to the Management of Health and Safety at Work Regulations 1999, Regulation 3 (i) [11] and LOLER 1998 [5].

All works should be planned in advance in order to eliminate or reduce to a controllable level the risks to those persons undertaking the works and all persons who might be affected by them.

The owner should plan the works, where appropriate, to coincide with the "shut-down" period of hazardous processes or for when public areas are less busy or closed.

Details of any changes to the risks that can be encountered during the progress of the works, and which become apparent from subsequent risk assessments, should be recorded in the health and safety file and made known to the responsible person.

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1) At time of publication, BS ISO 14798 is being considered for adoption at the European level.

Lift pits and lift areas, in general, are not confined spaces within the meaning of the Confined Space Regulations 1997 [12], but there are exceptions, e.g. where a lift is located within a facility dealing with hazardous chemical, gases, etc.; and in such cases a suitable and sufficient risk assessment should be carried out to determine if special provisions are required.

4.16 Well-being of persons working alone

Where a risk assessment identifies specific hazards (e.g. in the absence of a car top control station) a person should not work alone (see Annex F). In such cases the person should be accompanied by another person who has received appropriate instruction and training.

*NOTE 1 This is an element of the provision of a safe system of work (see **3.26**).*

The owner should ensure that the following procedures are adopted.

a) Before commencing work, the person should register their presence with the owner's site representative.

b) Suitable arrangements should be made to confirm the continued well-being of the person periodically.

c) Suitable arrangements should be made to organize assistance in the event of an emergency.

d) The specific arrangements and frequency for confirming a person's continued well-being should be described in the relevant safe working procedure and should be acted upon.

NOTE 2 These procedures are particularly important if a person is working alone in unoccupied premises.

4.17 Working within the well

4.17.1 General

Control measures should be taken when work is being carried out in the well, for example, re-roping, replacement of trailing flexes, etc., and where full height division screens are not provided between lifts in a common well.

NOTE 1 This may include taking adjacent lift(s) out of service.

Where practicable, counterweight screens, reaching to a height of not less than 2.5 m above the pit floor, should be provided to reduce hazards created by descending counterweights. Where the space between the counterweight and the car does not permit the fitting of a screen, a suitable warning sign should be provided (see Figure C.8).

Counterweight screens should not be provided at the midpoint of travel owing to the increased risk of collision between a person on the car roof and the screen.

For all work activities carried out by authorized persons within the well, at least the recommended average levels of lighting (50 lux 1 m above the car top) in accordance with BS EN 81-1 and BS EN 81-2 should be provided.

NOTE 2 Other lighting to enable work activities to be carried out might be provided by the lift contractor.

Temporary lighting within a well should be at either:

- a voltage not exceeding 110 V in an occupied building, derived from a supply with centre-tapped earth (see BS 7375); or 230 V, protected by residual current devices (RCDs);
- a voltage not exceeding 110 V on a construction site, derived from a supply with centre-tapped earth (see BS 7375).

Temporary lighting within a well should be protected against damage.

The owner should display permanent safety signs in clearly visible positions where a risk exists, including:

a) where access is via an inspection door or trap (see Figure C.3);

b) where headroom is less than that specified in BS EN 81-1:1998+A3, **5.7** and BS EN 81-2:1998+A3, **5.7** (see Figure C.4);

c) where the car roof is unsuitable for carrying persons (see Figure C.6);

d) where no car safety gear is provided (see Figure C.5);

e) where a reduced pit depth is less than that specified in BS EN 81-1: 1998+A3, **5.7** or BS EN 81-2+A3, **5.7** (see Figure C.7);

f) where, in the pit, there is potential danger from a descending counterweight (see Figure C.8);

g) where a risk of falling exists (see Figure C.9);

h) where a restraint is needed (applicable to positive drive and hydraulic lifts only) (see Figure C.10).

The owner should ensure that all persons working within a well are made aware of all relevant safety signs.

4.17.2 Working on the car top

On lift installations that do not have any safety gear or other means to prevent free fall, and where access to the car top is necessary, a device that prevents free fall of the car should be installed for the duration of the task to be undertaken.

On lift installations that do not have any safety gear or other means to prevent free fall, the owner should ensure that a safety sign is displayed in a prominent position on the top of the car (see Figure C.5).

NOTE Persons working on lifts can be exposed to risk of falling from height. The Work at Height Regulations 2005 [13] require a specific assessment to be made, recorded and retained for such risks.

Where a space exists into which a person could fall (see BS EN 81-1:1998+A3, **8.13** and BS EN 81-2:1998+A3, **8.13**), the precautions below should be taken in order of preference:

a) a vertical screen;

b) a horizontal extension of the car top;

c) the provision of balustrades on the car top;

d) a safe system of work, which might involve the use of appropriate personal fall protection system, e.g. work restraint.

The use of a fall arrest system can be unsatisfactory and should be avoided.

A particular safe system of work should be employed only where a), b) and c) cannot be accommodated.

The owner should ensure that, where there is a risk of a person working on the car top becoming trapped and where no means are provided for escape via either the car or the well, an alarm or voice communication system is installed. This system should be of at least the same specification as that provided in the car and should be connected to a lift rescue service (see BS EN 81-28). The lift rescue service is not the public emergency service and auto dialling systems should not be programmed with the emergency service "999" number.

Where a car roof is not sufficient to support a person, a sign should be displayed (see Figure C.6). Where it is not possible to strengthen the roof, a safe system of work should be developed from a risk assessment.

4.17.3 Working in the pit

*COMMENTARY ON **4.17.3***

*Persons who might need to enter and work in lift pits can possess varying degrees of training and knowledge. Lift industry trained personnel, include those listed in **5.2.2** to **5.2.5** and other persons, who are not trained lift personnel, include those listed in **5.2.6**.*

Attention is drawn to the Workplace (Health, Safety and Welfare) Regulations 1992 [6].

Procedures for working in the pit should be carried out in accordance with Annex G.

A stopping device conforming to BS EN 81-1:1998+A3, **14.2.2** and **15.7** and BS EN 81-2:1998+A3, **14.2.2** and **15.7** should be provided to enable trained lift industry personnel to gain safe access to a pit. This stopping device should be accessible on opening the door(s) to the pit. Any existing stopping device of the toggle type should be replaced, owing to the high risk of accidental operation.

Trained lift industry personnel should only enter and work in a pit in accordance with **5.17.3**.

Any person, who is not trained lift personnel, should not enter or work in a pit unless:

a) they are under the supervision of trained lift personnel at all times;

b) trained lift personnel have secured the lift against movement in either direction, both electrically and mechanically.

NOTE 1 Securing the lift would typically include landing the weights and tripping the car safety gear. The main brake does not always prevent all movement even with power off.

Where option b) is taken, trained lift personnel do not need to remain in attendance unless requested to do so, but should be informed when the work is complete so that the lift can be safely returned to service by the lift contractor.

Where a permanent means of access to the pit cannot be provided, a suitable, portable means of access, in the form of a ladder that can be secured in an accessible position when placed in the pit, should be made available. This ladder, when not in use, should be stored and locked in a position as close to the pit as practicable and in an accessible position. A sign should indicate the location of where the ladder is stored.

In areas likely to be subject to vandalism, this sign should be located within the lift well and be visible when the door giving access to the pit is opened.

Where ladders are installed in pit areas, they should not reduce the safety clearances or the refuge spaces for persons in the pit area when either stored or deployed. It should be possible to deploy the ladder from a safe position before entering the pit.

Where the refuge space below a car is less than that specified in BS EN 81-1 or BS EN 81-2 (see Figure C.7), a mechanical restraint should be provided by the owner together with a safety sign (see Figure C.10). The mechanical restraint should be used to create a space between the underside of the car and the bottom of the well before working.

NOTE 2 This does not apply where a lift is built to BS EN 81-21 or lifts subject to specific Notified Body approvals.

Where a restraint is not permanently fitted, it should be stored in a safe location in the pit or stored and locked in a position as close to the pit as practicable. The storage location should be identified by a sign.

Provision should be made to allow visual inspection of the counterweight, associated switches and over-travel.

NOTE 3 A suitable provision for the visual inspection of a counterweight might be the provision of a mesh screen or a gap below the screen of not more than 300 mm.

When more than one lift is installed within a common well, division screens rising from the pit floor to a height of at least 2.5 m above the lowest landing sill should be provided to prevent persons passing from one well to another.

Where there is a risk of a person working in the pit becoming trapped, the owner should install an alarm or voice communication system. This system should be of at least the same specification as that provided in the car and should be connected to a lift rescue service (see BS EN 81-28). The lift rescue service is not the public emergency service and auto dialling systems should not be programmed with the emergency service "999" number.

Where a door other than a landing door is provided for access to the pit, which gives access to a hazardous zone, the owner should ensure that it is electrically interlocked with the lift, an appropriate warning notice is displayed (see Figure C.3) and suitable barriers are in place (see **5.17** and **5.18**) before any work commences.

4.18 Landing entrances

4.18.1 General

*COMMENTARY ON **4.18.1***

Persons engaged in the maintenance and the examination of lifts, or in effecting the emergency release of passengers, might need to open a landing door while the car is not at that landing, e.g. in order to gain access to the pit or to the roof of the car.

Whenever a landing door is unlocked, or open with the car not stationary or at the level of that landing, there is a foreseeable possibility that persons at that landing might be at risk.

Potential hazards and risks at landings include:

a) persons falling down the well from the landing;

b) persons gaining access to the car when it is not at the level of the landing or gaining access to parts of the car or well that are not normally accessible;

c) persons coming into contact with moving parts of a lift.

These hazards might endanger any persons in the vicinity of the landing entrance, e.g. occupants of the building and members of the general public, including children, the elderly, the infirm or disabled persons.

On older installations, where a landing door unlocking device is not provided, one should be fitted at each floor.

All protective barriers should incorporate relevant safety signs in accordance with BS ISO 7010.

Where a fall hazard and/or falling objects exist, or where other persons might be in the vicinity, effective precautions should be provided to protect an open landing entrance (see **E.2**). For construction sites, these precautions could, as a minimum, take the form of one of the following:

a) a fixed barrier, which comprises a guard rail at least 950 mm high with a mid-rail and a toe-board that is fixed across the landing entrance threshold. Any gaps should not exceed 470 mm;

b) a fixed solid full height hoarding.

In addition to the above requirements, additional precautions should be taken to prevent objects falling into the well, where this hazard has been identified:

1) when carrying out minor repairs, maintenance and adjustments (and where the existing landing doors are in position), this should take the form of a portable barrier similar to that shown in Figure 1 that can be secured to prevent easy removal or collapse (see **5.17**);

2) when carrying out major repairs and modernizations, this should take the form of a fixed solid full height hoarding together with a fixed barrier, which comprises a guard rail at least 950 mm high with a mid-rail and a toe-board that is fixed across the landing entrance threshold. Any gaps should not exceed 470 mm.

NOTE 1 It might be necessary to provide an unattended barrier extending to the full height of the entrance when it is foreseeable that persons might climb over a barrier, e.g. vandals or children playing.

NOTE 2 Built-in arrangements for locating and fixing barriers at landing entrances are not normally provided on lift installations, and aesthetic considerations could cause difficulties when special provisions for the fixing of barriers are requested. Several designs of easily portable barriers have been produced that can be fixed quite rigidly at landing entrances of lifts with sliding doors open, without any structural alterations being necessary. Such barriers could be stored at strategic locations so as to be readily available to personnel when required.

Where a landing door has been removed, and if the carrier is to be moved under power, the following conditions should be applied:

- the carrier should be moved at inspection speed;
- hold to run controls should be operated from a safe position;
- a line of sight with the carrier should be established;
- an audible and visual warning should operate automatically;
- a full height enclosure with an access door should be provided;
- the access door should be lockable and should be able to be opened without a key from inside the enclosure.

*NOTE 3 See **E.3.2** where the fire integrity of an existing building needs to be maintained.*

*NOTE 4 On multiple lift installations, each lift may be uniquely identified at every landing entrance. This identification is the same as the identification within the machinery space (see **4.19**). This ensures that persons working on lifts can easily establish the correct relationship between a specific machine and its corresponding well and associated equipment.*

4.18.2 Temporary lighting

Depending on the type of building, temporary lighting at a landing entrance should be either:

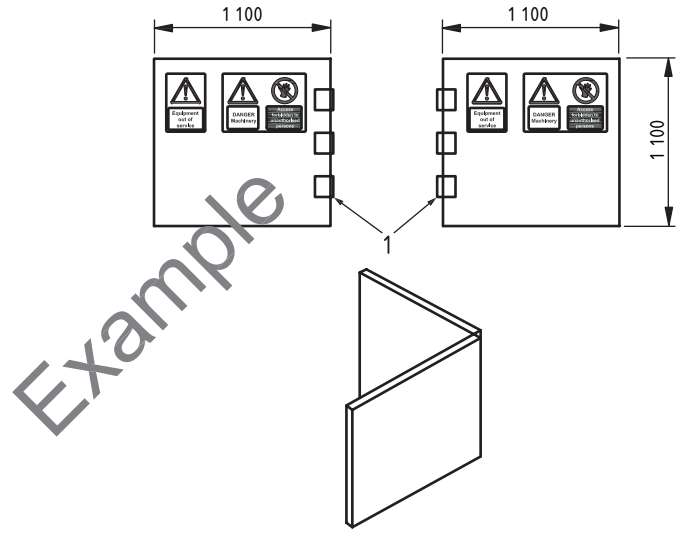
a) for an occupied building: at a voltage of not more than 110 V derived from a supply with centre-tapped earth in accordance with BS 7375 or 230 V protected by RCDs; or

b) for a construction site: at a voltage of not more than 110 V derived from a supply with centre-tapped earth in accordance with BS 7375.

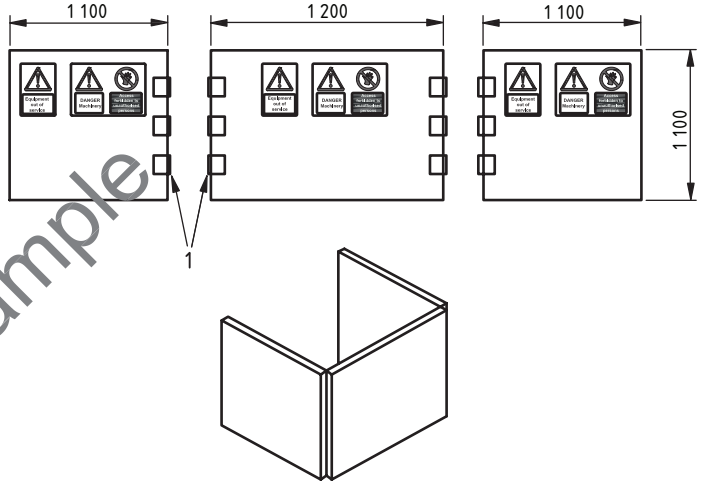
Temporary lighting on landings should be protected against damage.

Figure 1 **Examples of lift landing entrance barriers**

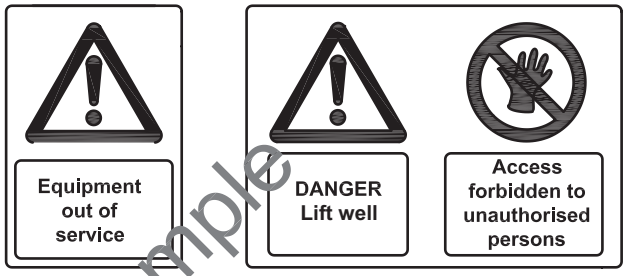
Dimensions in mm



a) Triangular lift landing door safety barrier



b) Rectangular lift landing door safety barrier



c) Signs to be displayed on landing entrance barriers

Key

1 Hinges

4.19 Machinery spaces and pulley rooms

*COMMENTARY ON **4.19***

Not every lift machine is identical, modern, compact or similarly positioned; neither are all machinery spaces of identical size or shape, nor are they segregated, illuminated or located within similar environments. In addition, the space available for persons to work could vary significantly between installations; the means of access to various parts of the machinery could also differ. Some machinery spaces might also contain more than one lift machine, perhaps sited within close proximity.

A safe means of access should be provided to all machinery spaces and pulley rooms. The owner should display a permanent safety sign on the outside of machinery spaces and pulley room doors (see Figure C.2).

NOTE 1 Details of safe means of access are given in BS EN 81-1 and BS EN 81-2, as appropriate.

Where access is via an access trap into the machinery space or pulley room, the owner should display a permanent safety sign, conforming to BS EN 81-1:1998+A3, **15.4.1** and BS EN 81-2:1998+A3, **15.4.1**, inside the room adjacent to the access trap (see Figure C.11).

NOTE 2 Details of the strength of access traps are given in BS EN 81-1 and BS EN 81-2.

Any temporary lighting within a machinery space or pulley room should be in accordance with **4.18.2**.

The levels of lighting in the machinery space(s) should provide a safe working environment (see BS EN 81-1 and BS EN 81-2, which requires at least 200 lux at the floor level).

The owner should ensure that switched socket outlets provided in any machinery space or pulley room conform to BS 7671.

Where IP2X protection (as defined in BS EN 60529) is not provided for all exposed conductors at voltages above extra low voltage, i.e. 50 V, electrically insulated mats conforming to BS 921 should be provided for use in front of each controller and also, where necessary, additional mats should be provided for the rear.

Accurate (as installed) electrical and hydraulic circuit and schematic diagrams for each lift installation should be available for maintenance personnel.

Any subsequent modifications to any part of the electrical power and the lift electrical circuits or the hydraulic circuits should be appropriately authorized and legibly recorded on the circuit diagrams by the company responsible for making the modifications. Any such modifications should be subject to recorded design risk assessment. The owner (see **3.18**, Note) should be advised of these modifications.

Means should be provided to ensure that each lift and component part thereof, located within the machinery space, can be easily identified. This identification should be the same as the identification on the lifts (see **4.18.1**), which ensures that persons working on lifts can easily establish the correct relationship between a specific machine and its corresponding well and associated equipment (see **5.19**).

Other than when work activities are being carried out within the machinery space or pulley room, the entrance door(s) to the rooms should be kept locked to prevent unauthorized access.

When first installed and before being used, the owner should ensure that all permanently installed lifting equipment provided in machinery spaces or pulley rooms is thoroughly examined and clearly marked with its safe working load (SWL) and unique identification.

Machine spaces and pulley rooms should only be used to accommodate the storage of materials and equipment associated with the lift installation. They should not be used for the storage of non-lift-related materials or equipment, such as radio transmitters, telecoms equipment, etc.

When the lift machinery and equipment occupies a small space within a larger room (usually with older lifts), such machinery and equipment should be segregated from the rest of the room. In such instances there should be an enclosure at least 2.14 m high, or from floor to ceiling if this is lower, fitted with a lockable access door that has a safety sign, conforming to Figure C.2, permanently displayed on the outside.

Accessible exposed rotating or moving parts or parts providing a risk of electric shock, should be suitably guarded.

NOTE 3 Attention is drawn to the Provision and Use of Work Equipment Regulations 1998, Regulation 11 [14].

4.20 Safe release of trapped passengers

4.20.1 General

*COMMENTARY ON **4.20.1***

*Safe release procedures differ for different types of lift, e.g. traction lifts, drum/chain lifts, hydraulic lifts, geared or gearless lifts. The general procedures given in this subclause are applicable for all types of lifts, though additional procedures are provided in **4.20.2** and **4.20.3** for electric traction lifts and hydraulic lifts.*

Except for exceptional circumstances, e.g. an operating theatre lift in a hospital or nursing home or in the event of a fire in the building, persons trapped in a car are not in any imminent danger, although some degree of anxiety and discomfort can be experienced. Although release procedures are not to be delayed, undue haste may lead to disregard of the recommended procedures for the safe release of passengers.

Means should be put in place to facilitate the safe release of trapped passengers, preferably by a lift rescue company. The owner should ensure that only trained and authorized persons undertake the release of passengers trapped in a car. If these persons are trained in release procedures, such training should be carried out on a regular basis to guarantee those involved know exactly what they should do to avoid injury to themselves and trapped passengers. The release of passengers should be carried out only by authorized persons, who have received the necessary training because it is dangerous for any other persons to attempt to do so.

NOTE Failure to adopt proper procedures could increase the risk to trapped persons or those undertaking the rescue.

The owner should ensure that there is a regular check of the operation of the emergency lighting and emergency alarm in the car so that in the event of a power failure both the emergency lighting and the emergency alarm remain operable.

All release operations to be adopted should be carried out in accordance with the manufacturer's or other authorized instructions for the lift concerned, which should be permanently displayed in the form of a notice in the machinery space.

If there are no site specific health and safety procedures available, or there are access issues regarding where the machinery is positioned, then full method statements and risk assessments should be provided to identify the safe method of manual lowering and the number of trained persons to carry out this procedure.

Lifts installed since 1 July 1999 are provided with instructions for the safe release of trapped passengers; where these instructions are not available the owner should obtain them from the original installer and pass a copy of them to the maintainer.

An appropriate means should be implemented by which all persons affecting the release of trapped passengers are able to communicate with one another.

To assist the safe release of passengers trapped in a car, an authorized person should be stationed at the nearest available landing entrance. This person should be in direct communication with those in the machinery space and the passengers in the car, and should continually reassure the passengers and ensure that passengers do not attempt to leave the car prematurely.

Trapped passengers should be warned of the intention to move the car and that they should not attempt to leave it until they are advised that it is safe to do so.

Before commencing manual movement of a lift machine, the electrical supply should be isolated; if lock-off devices exist, they should be used.

4.20.2 Electric traction lifts

There are many types of hand winding procedures for electric traction lifts resulting from different equipment designs and the location of the lift in the building; reference should be made to the manufacturer's recommendations and instructions for hand winding contained in the health and safety file and information displayed in the machine space in order to identify the number of trained and authorized persons required to undertake the rescue procedure.

NOTE 1 The manual operation of some gearless machines is especially hazardous to trapped persons and those attempting to move the lift to a floor.

Lifting the brake is likely to result in a runaway of the lift, particularly for gearless machines, so the rescue operation should be performed by trained lift personnel and not by persons who are not trained in lift engineering.

The manual operation of some gearless machines is especially hazardous to trapped persons and those attempting to move the lift to a floor and should only be undertaken by trained lift personnel.

NOTE 2 Some gearless equipment might be designed or can be modified to automatically prevent the runaway of the lift.

If a car cannot be moved when an attempt is made to move it in either direction using the trained procedure, then no further attempt should be made to move the car because the safety gear might have engaged. Provided that the car is free to be moved, it should be wound to the nearest floor in the direction that offers the least resistance to motion, preferably in a downward direction. The owner should ensure that any further procedure is carried out only by trained lift personnel and no other, unless the machine is suitably modified to prevent rapid run away.

An emergency electrical release system should be provided when the manual effort for hand-winding is larger than 400 N. In view of the complexity of the emergency electrical winding equipment, the owner should ensure that only authorized and trained persons carry out the emergency electrical procedure.

NOTE 3 Although the emergency electrical procedure for safe release is different to the procedure for the manual release of trapped passengers, most of the procedures detailed in this subclause apply equally to electrical emergency winding.

4.20.3 Hydraulic lifts

The majority of hydraulic lifts can be moved manually in the down direction using the emergency lowering valve; where such means are not available, an emergency lowering valve should be provided.

In the case of rope suspended hydraulic lifts, any manual lowering valve should incorporate a low pressure detection device to prevent lowering if oil pressure is lost for any reason.

Where the car is fitted with safety gear, a hand pump should be provided to enable the car to be manually raised, which in turn enables the safety gear to be released, in order to facilitate the release of trapped passengers from the car.

There are many types of manual lowering procedures for hydraulic lifts resulting from different equipment designs and the location of the lift in the building; reference should be made to the manufacturer's recommendations and instructions for manual lowering contained in the health and safety file and information displayed in the machine space in order to identify the number of trained and authorized persons required to undertake the rescue procedure.

4.20.4 Machine-room-less lifts

*COMMENTARY ON **4.20.4***

Lifts have been introduced that do not have a machine room but have their machinery located in an area in the lift well, on the landing or on the lift car. Such areas are defined as machinery spaces. In general, these lifts have a means provided to enable the lift to be moved in an emergency so as to rescue passengers. The controls for this are usually located within a special panel called an emergency and test panel. This panel contains controls and instructions on how to move the lift in safety.

The owner should familiarize themselves with the location of the emergency and test panel, which can vary from manufacturer to manufacturer.

4.21 Observation lifts and partially enclosed wells

*COMMENTARY ON **4.21***

Although safe working provisions and procedures for observation lifts and partially enclosed wells are essentially the same as for conventional lifts, there are additional features that need to be taken into account. These lifts can create unusual working conditions not normally experienced elsewhere, e.g. the lack of a complete well enclosure (which might unnerve some personnel) and exposure to the elements on building exteriors. Special procedures for the cleaning of the car exteriors and other glazed parts therefore are needed. Additional precautions are needed for the protection of persons below or in the near vicinity, when works on these types of lifts are being undertaken (tools and/or equipment can inadvertently fall from such installations).

When work is to be carried out on observation lifts and partially enclosed wells, the need for additional precautions should be evaluated through risk assessment for hazards, e.g. adverse weather conditions, falling from the car top, etc. Where a risk is identified, the owner should have the equipment modified, as far as is reasonably possible, and display a safety sign to indicate the residual risk (see Figure C.9).

The owner should ensure that only authorized persons clean the glazed exterior of the car and the interior of a glazed well enclosure. Safe systems of work that incorporate a permit to work procedure should be agreed between all parties involved, i.e. owner, lift contractor and cleaning contractor.

NOTE Attention is drawn to the Work at Height Regulations 2005 [13].

4.22 Lifts in unusual environments

When work is to be carried out on lifts installed in unusual environments, e.g. partially enclosed and fully exposed to the elements, mines, aerial masts, etc., a risk assessment should be made to identify the need for additional precautions, such as:

a) work undertaken under adverse weather conditions;

b) whether suitable clothing should be worn to protect against adverse elements;

c) when protection for a person from falling is not incorporated in the design of the car top;

NOTE Attention is drawn to the Work at Height Regulations 2005 [13] regarding preventative measures.

d) only authorized persons should be permitted to clean the glazed exterior of the car or the interior of a glazed well enclosure (see **4.21**);

e) safeguarding persons working on the lift or in its vicinity from falling objects.

5 Safety management: responsibilities of persons working on lifts

*COMMENTARY ON Clause **5***

Not every lift is identical, modern or similarly positioned; nor are all machinery spaces of identical size or shape, nor segregated, illuminated or located within similar environments.

*Clause **4** gives recommendations that are applicable to owners of lifts and to persons having effective control of the premises in which lifts are installed.*

5.1 General

The recommendations given throughout Clause **5** should be applied by all persons (duty holders) responsible for, and involved in, the design, installation, thorough examination, inspection, testing, service, maintenance, repair or dismantling of lifts.

Hazards relating to moving and rotating machinery, electrical equipment, falls from height, etc., which are similar to those experienced in other industrial workplaces, should be identified in a risk assessment in accordance with **4.15**.

5.2 Training and competence

5.2.1 All personnel

All persons who might at any time be working on a lift or related equipment, within a well, pit, machinery space or pulley room, or be carrying out risk assessments, should possess demonstrable competence in basic lift safety and procedures or be under relevant supervision.

NOTE 1 Relevant supervision may be provided by any person who possesses demonstrable competence in basic lift safety and procedures.

*NOTE 2 A suitable level of certified competence is the award for NVQ EOR/202 "Working safely in an engineering environment – Basic lift safety", although other suitable certified achievements might exist (see **5.2.2**, Note 2).*

5.2.2 Lift fitter

A lift fitter should be suitably trained, qualified by knowledge and practical experience, provided with necessary instructions and supported within their organization to enable the required operations to be safely carried out.

NOTE 1 A suitable minimum level of certified qualification is one of the following:

- *Level 3 NVQ Diploma in Engineering Maintenance (QCF) following an appropriate pathway in Servicing (EMG) and/or Repair (EMH); or*

- *Level 3 NVQ Diploma in Installation and Commissioning (QCF) following an appropriate pathway in Traction Lifts (ICC) and/or Hydraulic Lifts (ICD).*

NOTE 2 Older certified qualifications that can be accepted as an equivalent level of qualification include:

- *Level 3 NVQ in Engineering Maintenance with appropriate endorsement for Lift Servicing or Lift Repair;*
- *Level 3 NVQ in Installation and Commissioning with appropriate endorsement for Traction Lift Installation or Hydraulic Lift Installation;*
- *EMTA module/segment certification and apprenticeship certification prior to the existence of the former schemes* [2)]*.*

Other suitable certified qualifications might exist.

5.2.3 Lift inspectors and engineer surveyors

Lift inspectors and engineer surveyors should, as a minimum stipulation, be qualified in their practising professions. They should also possess demonstrable competence in the safe operation of all lift equipment.

NOTE Lift inspectors and engineer surveyors might not have been trained in the lift industry, but might come from an associated activity. They might need to seek appropriate safety training when first practising in the lift industry to ensure their competence in all safety matters.

5.2.4 Lift consultants

Lift consultants should, as a minimum stipulation, be qualified in their practising professions. They should also possess demonstrable competence in the safe operation of all lift equipment.

NOTE Lift consultants might come from any discipline (electrical, mechanical, building services, etc.) and might be qualified at any level (technicians, technician engineers, chartered engineers, etc.).They might need to seek appropriate safety training when first practising in the lift industry, such as that indicated in ***5.2.1*** *or that received by persons detailed in* ***5.2.2*** *or* ***5.2.5****. Alternatively, they might need to work under the relevant supervision of a person who is competent in lift safety.*

5.2.5 Lift adjusters/testers (or persons carrying out such functions)

Lift adjusters/testers should hold qualifications relevant to the products they work on, i.e. lifts.

NOTE A suitable minimum level of certified qualification is a Level 4 NVQ Certificate in Performing Testing Operations in the Lift and Escalator Industry including appropriate Unit Credits in one or both of the following units:

- *TLE4/005 "Performing testing operations on existing/ modernized equipment in the lift and escalator industry";*
- *TLE/006 "Performing commissioning tests on new equipment in the lift and escalator industry".*

Older certified qualifications that can be accepted as an equivalent level of qualification include a Certificate of Verified Achievement LET01 "Lift and escalator – Tester obtaining units UC/401, UC/402" and at least one of Units UT/403 and UT/405.

Other suitable certified qualifications might exist.

Lift adjusters/testers should also be trained in safe working procedures and should have the experience, skill and knowledge to undertake the commissioning of lifts following installation or refurbishment.

[2)] See http://www.emta.org.uk.

5.2.6 Other tradespersons

Other tradespersons such as general cleaners, glass cleaners, rubbish clearers, painters, electricians, welders, builders, etc., working on lift equipment should be competent in their practising trades. They should be under supervision of their employer. They should not enter or work in a pit (see **4.17.3**), nor should they work in the well, on the car or any part of the lift unless:

a) they are under the supervision of trained lift personnel at all times;

b) trained lift personnel have secured the lift against movement in either direction, both electrically and mechanically;

c) where appropriate and subject to risk assessment, a permit to work has been issued.

5.3 Responsibility for work

A suitably qualified person should be appointed to be responsible for all work relating to the lift installation and should be fully aware of their duties.

The site person in charge should ascertain who is acting on behalf of the owner in order that they can report the start, progress and completion of the work.

NOTE Attention is drawn to the CDM Regulations 2007 [4].

Any work carried out on lifts should be performed only by qualified persons, supervised and instructed on the work and on how it is to be carried out safely. The instructions should:

a) where necessary, be in the form of written safe systems of work, which might already be included in training programmes;

b) ensure the safety of other persons who could be at risk even if they are not involved in the actual work being undertaken on a lift, e.g. persons intending to travel in the lift.

The lift contractor or other persons authorized to carry out work on a lift installation should, after carrying out a risk assessment (see **4.15**), advise the owner of risks that could arise as a result of the work.

5.4 Liaison

Before starting work or taking a lift out of service, the lift contractor should advise the owner's site representative of the intention to do so.

The site person in charge should establish contact with the owner's site representative in order that emergency assistance can be summoned if required, and also to determine whether any special precautions or procedures need to be taken.

NOTE Such precautions might become necessary owing to environmental factors, e.g. where children are present in the vicinity.

5.5 Personal protective equipment

Personal protective equipment should be provided as identified by risk assessment, such as head protection, gloves, eye protection, hearing protection, safety harnesses, etc., and used as required.

Such equipment should be maintained in a serviceable condition and replaced as necessary.

NOTE Attention is drawn to the Personal Protective Equipment Regulations 2002 [15].

5.6 Electrical supplies and equipment

The lift contractor should use only the electrical supplies provided by the owner, see **4.6**.

Work should not be carried out on or near to live electrical equipment ("live working") unless working in this way is unavoidable, see Annex D. Such work applies to the electrical supplies provided by the owner and to equipment provided as part of the lift installation. In such instances, work should be carried out only by a competent and trained person, implementing a safe system of work that has been established by a risk assessment.

NOTE 1 Where a person is working on or near to exposed electrical conductors, for example with an open controller door with the power on, this is classed as "live working".

All exposed conductive parts should be guarded against inadvertent contact.

NOTE 2 Attention is drawn to the Memorandum of guidance on the Electricity at Work Regulations 1989 [8], Electricity at work: Safe working practices [16] and the Lift and escalator site handbook [17].

NOTE 3 On multiple installations an electrical hazard might exist. Although an individual lift might be electrically isolated, it is possible for electrical power to be supplied from a common/shared control panel.

NOTE 4 The integrity of the electrical supply is solely the responsibility of the owner.

5.7 Removal of lift from service

A temporary safety sign should be displayed where a lift is removed from service to warn others that the lift is out of service (see Figure C.1).

5.8 Housekeeping

The lift contractor, in conjunction with the owner, should establish procedures for:

a) the avoidance of build-up of waste materials in wells;

b) the control and safe disposal of waste and other items and substances that are potentially injurious to health and safety.

NOTE 1 Attention is drawn to the Control of Substances Hazardous to Health Regulations 2002 [10].

NOTE 2 Examples of potentially hazardous items and substances include hypodermic needles, human waste and radioactive materials.

5.9 Health and safety file

NOTE 1 Attention is drawn to the CDM Regulations 2007, Regulation 14 [4], which requires the client to appoint a CDM coordinator to compile a health and safety file.

Following the initial installation or major modernization of a lift, the health and safety file should be made available to the owner. The health and safety file should, at least, include the following information:

a) record or "as built" drawings and plans used and produced throughout the construction;

b) general details of the construction process and materials used;

c) details of the equipment and maintenance facilities;

d) servicing and maintenance requirements, including cleaning;

e) manuals produced by specialist contractors;

f) any special operations where a particular method needs to be adopted;

g) details of the location and nature of services, including emergency and fire-fighting systems;

h) instructions for the dismantling and disposal of the equipment at the end of its working life.

NOTE 2 The health and safety file alerts persons to the risks to be managed during the repair, service, renovation or demolition of the structure and plant after the lift has been put into service.

NOTE 3 Attention is drawn to the ACOP to the CDM Regulations 2007 [18], which details what needs to be included (paragraph 263) and what should not be included (paragraph 264) in the health and safety file.

The health and safety file should be retained by the owner until further work is carried out on the lift installation, when it should then be made available to persons carrying out the work (see **4.9**). All modifications made after the first installation, e.g. the provision of a new controller, should be recorded and the record passed to the owner to be included in the health and safety file even when one does not exist.

5.10 Effects on the occupants

Potential disruption, arising from the lift works, to the occupants of the premises should be assessed and minimized.

5.11 Access to tools, equipment and materials

Arrangements should be made between the lift contractor and the owner for:

a) safe access to all tools, equipment and materials at workplaces;

b) the provision of suitable and clearly identified storage space for tools, equipment, materials and any portable access equipment;

c) the provision of alternative access routes as might become necessary during the works being undertaken.

NOTE These are some elements of the provision of safe systems of work.

5.12 Permits to work

There should be a safe system of work for all those undertaking tasks within designated workplaces.

Where appropriate, effective control should be imposed over all persons carrying out work, e.g. by the use of permits to work (see **4.12**). The details of any permits to work that might be required, and the conditions imposed by them, for example, workplace access conditions, should be made known to such persons.

A safe system of work should include the use of lock-off/tag-on devices on all electrical isolator switches or other appropriate means of isolation.

5.13 Installation, major repair and dismantling

Where installation, major repair or dismantling is taking place, the procedures given in Annex E should be followed.

*NOTE The procedures given in Annex E are specific to the activities associated with installation, major repair and dismantling. They are additions not alternatives to the procedures detailed in Clause **5**.*

5.14 Asbestos

All lift personnel and tradespersons should be regularly trained in asbestos awareness and should be advised by the owner of the location, etc., of any asbestos so they can plan their work accordingly.

5.15 Risk assessment

The lift contractor should undertake a risk assessment, together with the owner, to establish safety measures to ensure the safety of persons engaged in undertaking the work and persons using the lifts.

NOTE Attention is drawn to the Management of Health and Safety at Work Regulations 1999 [11].

5.16 Well-being of persons working alone

Before any persons are authorized to work alone on a lift, a full site/task-specific risk assessment should be carried out and relevant control measures should be implemented.

When a person is working alone the following procedures and provisions should be adopted.

a) Before commencing work, the person should register their presence with the owner's site representative in accordance with **5.4**.

b) Suitable arrangements should be made to ensure that the continued well-being of the authorized person is confirmed periodically at intervals as identified by risk assessment.

c) Any persons checking the well-being of authorized persons working alone should have knowledge of how to organize assistance in the event of an emergency.

d) The specific arrangements and frequency for confirming the well-being of the authorized person should be described in the relevant safe working procedure.

e) The person working alone should inform a responsible person off-site, such as their manager, of their proposed movements during this period.

NOTE These procedures are particularly important if an authorized person is working alone in unoccupied premises.

5.17 Working within the well

5.17.1 General

All persons working within a well should follow all relevant safety signs.

NOTE 1 Examples of typical safety signs within a well are shown in Figure C.4 to Figure C.10.

Where required, barriers should be erected in front of the landing doors. Landing doors should not be allowed to remain open any longer than is necessary. The barriers should have been provided by the owner.

Prior to any landing door being opened, it should be decided whether the work to be carried out requires the electrical power supply to be maintained, for example, to move the lift car on inspection control. If not, the main switch should be locked in the "off " position and tagged. If the electrical supply needs to be maintained, the normal lift control circuit should be isolated, e.g. placed on inspection control.

Safe means of access and egress should be clearly established before entering the well. The safe means of access and egress should exist during all phases of a work activity and should be readily accessible from the workplace.

Where more than one inspection control station is provided, for example in the pit, special verification methods might need to be applied, as described in the owner information manual supplied with each new lift, and the correct operation of each station should be verified before work commences.

Unauthorized persons should be prevented from entering the machinery space while persons are working within the well (see **5.19**).

The number of persons working within a well at the same time should be kept to a minimum. If possible, the simultaneous activity of persons working independently of each other should be avoided. A permit to work system (see **5.12**) should be put in place where simultaneous employment of different trades is unavoidable. A risk assessment should be carried out to establish a safe system of work and identify whether a permit to work is necessary and who should issue it.

NOTE 2 Significant hazards can arise from the involvement of other tradespersons, e.g. cleaners, electricians, welders and builders. Work carried out within multiple wells presents particular hazards, which can be eliminated or reduced by taking actions identified during a risk assessment.

A lift should not be returned to normal operation after completion of work until it has been ascertained that no persons, tools, temporary access equipment, etc., remain within the well. Any equipment, e.g. a mechanical restraint, should be replaced in its proper storage position and any newly installed parts should be tested and checked to ensure correct operation and security.

5.17.2 Working on the car top

A risk assessment should be carried out prior to the commencement of any work being undertaken from the car top.

Before accessing the car top, the trained lift personnel should prove the effectiveness of both:

a) the landing door electrical interlock circuit;

b) the stopping device(s) and changeover switch(es) on the car top.

On older installations, where the switches are of the toggle type or similar design, it should be replaced as it can be unintentionally operated (see **4.17.2**).

Where full car top inspection control is not provided (see Annex B) and the car top is to be moved and then used as a stationary work platform, a safe system of work should be established based upon a risk assessment.

NOTE 1 Attention is drawn to the recommendations contained within Safe working on lifts – Car top controls [19].

NOTE 2 Working on a car top can be dangerous and a number of industry fatalities have resulted from inadequate provisions. It is extremely dangerous when working without full control being available to the person riding on the car.

Whenever the car is stationary, the stopping device should be operated.

NOTE 3 Persons working on the top of a car are at particular risk when they are unprepared for the lift to be set in motion. Examples of accidents associated with moving cars have been due either to falling or to bodily contact with the well structure and/or equipment.

The correct operation of the car top control station functions should be verified before the car top is accessed or any work activity commenced.

The number of persons travelling on the top of a car at any one time should be kept to a minimum. One person only should be in sole control of the starting and stopping of the car.

The procedures adopted for moving the car are of prime importance, and all persons working on a car top should be aware of when and how the car is to be moved.

Where there is a risk of a person working on a car top becoming trapped and where no means are provided for escape via the car or the well, an alarm or voice communication system should be used (see BS EN 81-28).

Where the safety sign shown in Figure C.9 is displayed, a suitable safe system of work should be employed. Suitable training, information and instructions should be given and extreme care should be exercised in its use when movement of the lift is necessary.

NOTE 4 Attention is drawn to the Work at Height Regulations 2005 [13] regarding suitable safe systems of work.

5.17.3 Working in the pit

5.17.3.1 General

Trained lift personnel should first evaluate whether the type of work to be undertaken is non-invasive or invasive (see Annex G), in order to put in place an appropriate level of safety as determined by a risk assessment.

Trained lift personnel entering the pit should prove the effectiveness of both:

a) the landing door electrical interlock circuit;

b) all stopping devices installed in the pit for use as stop switches.

If there is no stopping device installed or it is not of the bi-stable type, the main power supply should always be isolated, locked and tagged off.

On older installations, where the stopping device is of the toggle type or similar design, they should be replaced as they can be unintentionally operated, see **4.17.3**. The owner should be informed that this is a dangerous situation and that it should be rectified.

5.17.3.2 Non-invasive work

When non-invasive work is being carried out in the pit by trained lift industry personnel, such as general maintenance, cleaning, lubrication, visual inspection, surveys, retrieval of lost items, etc., the person entering the pit should work in accordance with **5.17.3.1** and also:

a) operate all stopping devices;

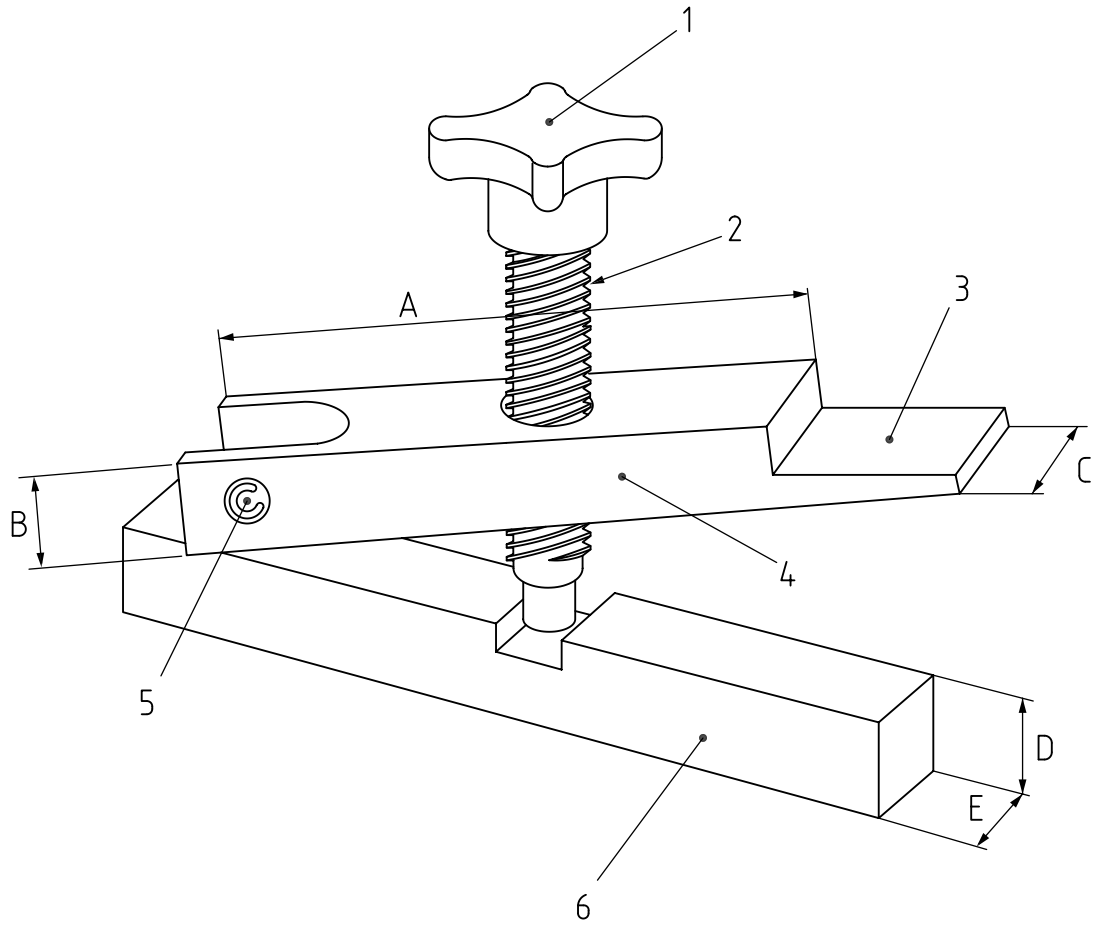
b) fit in place a door blocking device, specifically designed to restrain the landing door(s) after entering the pit. This device should retain the landing door(s) approximately 90 mm from the closed position so that the door(s) cannot be easily pulled open or closed from the landing side (see Figure 2);

NOTE 1 Keeping the car and/or landing doors open in order to interrupt the normal control circuit is not an adequate means on its own to prevent car movement because landing doors can be self-closing.

c) in addition on positive drive lifts (hydraulic or drum drive), position a device such as a mechanical restraint, if this is readily available and easily deployable.

NOTE 2 Where a restraint has been provided, conforming to BS EN 81-21 for reduced pit depth or lifts subject to specific Notified Body approvals, an additional restraint is not required.

Figure 2 **Example of door blocking device**



Key		**Principal dimensions**	
1	Thumb screw	A	Armature length
2	M8 screw	B	Armature height
3	Fork	C	Armature width
4	Armature	D	Blade height
5	Pivot	E	Blade width
6	Blade		

NOTE Dimensions might vary according to the construction of the landing door and sill.

5.17.3.3 Invasive work

When invasive work is being carried out in the pit by trained lift industry personnel, such as repair activities, adjusting, modifying or repositioning equipment, installing or replacing existing equipment, installing new equipment, etc., in addition to the requirements of **5.17.3.1** and **5.17.3.2**, the main power supply should be isolated and locked and tagged off and:

a) on counterbalanced traction lifts the movement of the car in the up direction should be mechanically prevented by an appropriate means, such as landing the counterweight. Downward movement of the car should be mechanically prevented if the car contains a load or if a working car safety gear is not present, e.g. a goods-only lift;

b) on hydraulic and drum drive lifts the movement of the car in the down direction should be mechanically restrained by an appropriate means.

5.17.3.4 Other precautions

Where work is carried out on auxiliary electrical circuits not controlled by the isolator, precautions against electric shock should be taken, such as isolating the circuits being worked on by locking off and tagging the relevant isolator switch.

Persons should not be present in the lift pit while a lift is moved other than in exceptional circumstances and when they have direct access to a stopping device at all times. Where direct access to a stopping device is not available, a task-related risk assessment should be carried out to determine a safe method of work. This risk assessment should, at least, take into account:

- the location of the pit refuge spaces;
- the lack of any pit inspection control station;
- the presence of, or lack of, any counterweight screen or the need for its removal to carry out work;
- the identification of other hazards such as sump holes, projecting brackets, sheaves, travelling cables, compensating chains, etc.;
- any risks resulting from the provision of a ladder or other work platform;
- the additional hazards created where more than one person is working on the lift, specifically by the establishment of a reliable communication system between all persons and the nomination of one person to control all lift movements (see Annex F);
- that the lift should only be moved at inspection speed or manually.

Where appropriate, a safety sign (see Figure C.8) should be permanently displayed in a prominent position in the pit.

If a mechanical restraint is provided, it should be correctly positioned before work is carried out in the pit. If the car is to be moved while authorized persons are in the well, the restraint should be such that the restraint can be retained in its operative position.

The owner should provide a mechanical restraint for electric lifts where the space below the car is restricted, and for all positive drive (hydraulic lifts or drum) lifts (see **4.17**).

5.18 Landing entrances

When the car is not positioned at a landing, the unlocking and opening of a landing door, or gate, should only be undertaken when necessary and then only by an authorized and competent person.

Any unlocking device should be kept in a safe and secure place. On older installations, where a landing door unlocking device is not provided one should be fitted at each floor, wherever possible, or a safe system of work should be established.

On completion of the work, it should be verified that the landing door is closed and locked.

A landing door or gate should not be allowed to remain open any longer than is necessary. If a landing door is to be left unlocked and open for any length of time, a barrier should be erected to protect the open landing entrance.

*NOTE Details of suitable types of barrier, which should be provided by the owner, are given in **4.18**.*

5.19 Machinery spaces and pulley rooms

All persons working within a machinery space or pulley room should follow the instructions given by all relevant safety signs that are displayed.

NOTE An example of a typical safety sign within a machinery space or pulley room is shown in Figure C.11.

Other than when work activities are being carried out within a machinery space/pulley room, the entrance door(s) to the room(s) should be kept locked to prevent unauthorized access.

On multiple installations, a thorough check should be made before commencing work to establish the correct relationship between a specific lift and its corresponding well and associated equipment.

To facilitate this check, the owner should take steps to ensure that each lift and component part thereof is clearly and uniquely identified, both at or adjacent to the lowest and highest landing entrances, and within the machinery space (see **4.18** and **4.19**).

A risk assessment should be undertaken to establish safe working procedures where machinery is in motion or capable of motion.

All permanently installed lifting equipment provided in machinery spaces or pulley rooms should be used only within its safe working load.

5.20 Safe release of trapped passengers

5.20.1 General

*COMMENTARY ON **5.20.1***

*Safe release procedures differ for different types of lift, e.g. traction lifts, drum/chain lifts, hydraulic lifts, geared or gearless lifts. The general procedures given in this subclause are applicable for all types of lift. Additional procedures for electric traction lifts and hydraulic lifts are given in **5.20.2** and **5.20.3** respectively.*

Only trained and authorized persons should undertake the safe release of trapped passengers.

The release of passengers should be carried out only by authorized persons who have received the necessary training because it is dangerous for any other persons to attempt to do so.

*NOTE 1 The full range of competencies contained within NVQ EOR/202 might not be required for persons carrying out the safe release of trapped passengers. See also **4.20**.*

The lift contractor should send the requisite number of trained persons to the site to carry out the safe release of trapped passengers.

All release operations to be adopted should be carried out according to the manufacturer's or other authorized instructions for the lift concerned, and permanently displayed in the form of a notice in the machinery space.

Lifts installed since 1 July 1999 are provided with instructions for the safe release of trapped passengers; where these instructions are not available, the owner should obtain them from the original installer and pass a copy of them to the maintainer. The maintenance company should have sufficient information to conduct a rescue safely.

All persons carrying out the release of trapped passengers should have an appropriate means to communicate with each other.

To assist the safe release of passengers trapped in a car, an authorized person should be stationed at the nearest available landing entrance. This person should be in direct communication with those in the machinery space and the passengers in the car. They should also continually reassure the passengers and ensure that passengers do not attempt to leave the car prematurely.

Trapped passengers should be warned of the intention to move the car and that they should not attempt to leave it until they are advised that it is safe to do so.

Before commencing the manual (hand winding) safe release procedures, the electrical supply should be isolated; if lock-off facilities exist, they should be used.

5.20.2 Electric traction lifts

The manual operation of some gearless machines is especially hazardous to trapped persons and those attempting to move the lift to a floor and should only be undertaken by trained lift personnel.

Lifting the brake is likely to result in a runaway of the lift, particularly for gearless machines, and the rescue operation should only be undertaken by trained lift personnel.

NOTE 1 Some gearless equipment might be designed or can be modified to automatically prevent the runaway of the lift.

Reference should be made to the manufacturer's recommendations and instructions for hand winding contained in the health and safety file and information displayed in the machine space in order to identify the number of trained and authorized persons required to undertake the rescue procedure.

If there are no site-specific health and safety procedures available, or there are access issues regarding where the machinery is positioned, then full method statements and risk assessments should be available on site to identify the safe method of hand winding and the number of trained persons to carry out this procedure.

When the manual effort for hand-winding exceeds 400 N with rated load in the car, an emergency electrical procedure should be carried out. In view of the complexity of the emergency electrical winding equipment, only trained lift personnel should carry out the emergency electrical procedure.

*NOTE 2 Although the procedure for the safe release is different to that for the manual release of trapped passengers, the principles laid down in **5.20.1** apply equally to emergency electrical winding.*

NOTE 3 In a typical gearless installation, operation of the lift machine is achieved by means of a special control panel in the machinery space. This can be on a flexible lead and plugged into a socket on the controller cabinet. The lift machine is usually visible from the control box location so that the direction and degree of movement can be observed and controlled.

5.20.3 Hydraulic lifts

NOTE 1 There are many types of manual lowering procedures for hydraulic lifts resulting from different equipment designs and the location of the lift in the building.

Reference should be made to the manufacturer's recommendations and instructions for manual lowering contained in the health and safety file and displayed in the machine space in order to identify the number of trained and authorized persons required to undertake the rescue procedure.

If there are no site-specific health and safety procedures available, or there are access issues regarding where the machinery is positioned, then full method statements and risk assessments should be provided to identify the safe method of manual lowering and the number of trained persons to carry out this procedure.

NOTE 2 Unlike electric traction lifts, it is typical to have only one person in the machinery space. However, it is advisable for a second person to be present to act as a safety monitor.

When the machinery space for a hydraulic lift is remote from the well, an effective means of communication should be used between the person stationed at the landing entrance and the authorized person in the machinery space. This should be independent of the main electrical supply to the lift, e.g. a telephone or radio link.

5.20.4 Machine-room-less lifts

*COMMENTARY ON **5.20.4***

*Some lifts do not have a machine room but have their machinery located in an area in the lift well, on the landing or on the lift car; such areas are defined as machinery spaces (see **3.15**). In general, these lifts have a means provided to enable the lift to be moved in an emergency so as to rescue passengers. The controls for this are usually located within a special panel called an emergency and test panel, which contains controls and instructions on how to move the lift.*

The lift maintenance company should familiarize themselves with the location and operation of the emergency and test panel, which can vary from manufacturer to manufacturer.

5.21 Observation lifts and partially enclosed wells

The risk of falling can be high from observation lifts and lifts running in partially enclosed wells, therefore a proper assessment of the risk should be made in order to determine what procedures and/or equipment are be required to minimize the risks.

NOTE Attention is drawn to the Work at Height Regulations 2005 [13] for details on making a risk assessment.

5.22 Lifts in unusual environments

When work is to be carried out on lifts installed in unusual environments, e.g. partially enclosed and fully exposed to the elements, mines, aerial masts, etc., a risk assessment should be made to identify the need for additional precautions, for example:

a) work should not be undertaken under adverse weather conditions;

b) suitable clothing should be worn to protect against adverse elements;

c) when protection for a person from falling is not incorporated in the design of the car top, preventative measures should be taken in accordance with the risk assessment;

   NOTE Attention is drawn to the Work at Height Regulations 2005 [13] for details on making a risk assessment.

d) only authorized persons should be permitted to clean the glazed exterior of the car or the interior of a glazed well enclosure;

e) precautions should be taken to safeguard persons below from falling objects.

Annex A (informative) Suggested improvements for consideration by the owner for safe working on older lifts

A.1 General

Lifts tend to fall into the following categories:

a) those built before 1 July 1999 without any modification;

b) those built before 1 July 1999 with modifications;

c) those built in accordance with the relevant part(s) of the Lifts Regulations 1997 [2].

Lifts in categories a) and b) are likely to have lower standards of safety than lifts in category c).

Owners of lifts in categories a) and b) are encouraged to undertake a programme of improvements in accordance with BS EN 81-80 to bring the lifts up to the requirements of current standards.

The improvements described in this annex can be used as the basis of a further series of technical improvements (in addition to those given in BS EN 81-80) that could be made by owners of lifts in all categories, which would raise the safety levels of those lifts for all persons working on them.

A.2 Well

The well lighting could be controlled by at least multi-way switching from the machinery space, the pit and on the car top.

A.3 Car top

Where it is necessary for personnel to travel on top of the car, a car top control station could be provided with a rationalized layout of the controls (see Annex B for a description of a suitable car top control station).

A well terminal switch could be provided that stops an ascending car when on inspection control before a collision occurs between a person and the lift well roof. If when stopped this results in there being no means of escape from the top of a car, an emergency alarm system could be provided on the car roof.

All switched socket outlet(s) installed on the car top could be provided with localized RCD protection.

Emergency lighting could be provided in the event of failure of the normal supply lighting to permit safe egress.

All exposed moving and rotating parts could be suitably guarded.

A.4 Pit

All switched socket outlet(s) installed in the pit could be provided with localized RCD protection.

Emergency lighting could be provided in the event of failure of the normal supply lighting to permit safe egress.

All exposed moving and rotating parts could be suitably guarded.

A.5 Landing entrances

Each lift could be uniquely identified at or adjacent to each landing entrance, with the identification corresponding to that used in the machinery spaces and pulley rooms. Legible, durable and visible floor identification marking could be provided on the well side of the landing doors.

A.6 Machinery spaces and pulley rooms

All switched socket outlet(s) installed in the machinery spaces and pulley rooms could be provided with localized RCD protection.

Emergency lighting could be provided in the event of failure of the normal supply lighting.

Where access to the main switch is difficult or remote from the lift machine and/or controller, either or both of the following could be provided:

a) a suitable stopping device fitted on or adjacent to the lift machine;

b) a means of interrupting the main supply, on or adjacent to the controller.

Notices could be prominently displayed within each machinery space giving appropriate guidance on the treatment for electric shock.

All exposed moving and rotating parts could be painted yellow and suitably guarded.

Equipment necessary to effect safe release could be identifiable and have a means of suitable storage within the machinery space. Hand wheels, as defined in BS EN 81-1 and BS EN 81-2, could be coloured yellow.

Manufacturers or other authorized instructions for the safe release procedures could be clearly described and prominently displayed in the form of a notice in the machinery space (see BS EN 81-1:1998+A3, **15.4.3**).

Each lift and component part thereof, located within a machinery space or pulley room, could be uniquely identified with the identification corresponding with that placed on the landings.

Annex B (informative) Car top control stations (basic functions and enhanced improvements)

COMMENTARY ON Annex B

This annex describes how a car top control system could be enhanced to:

a) establish a safe working environment; and

b) avoid confusion over the various functions of car top control stations.

A car top control station conforming to BS EN 81-1 and BS EN 81-2 provides the following functions:

1) an "inspection operation/normal service control" device;

2) an "up" direction button;

3) a "down" direction button;

4) a "stopping" device;

5) an electrical socket outlet (if not provided elsewhere on the car roof).

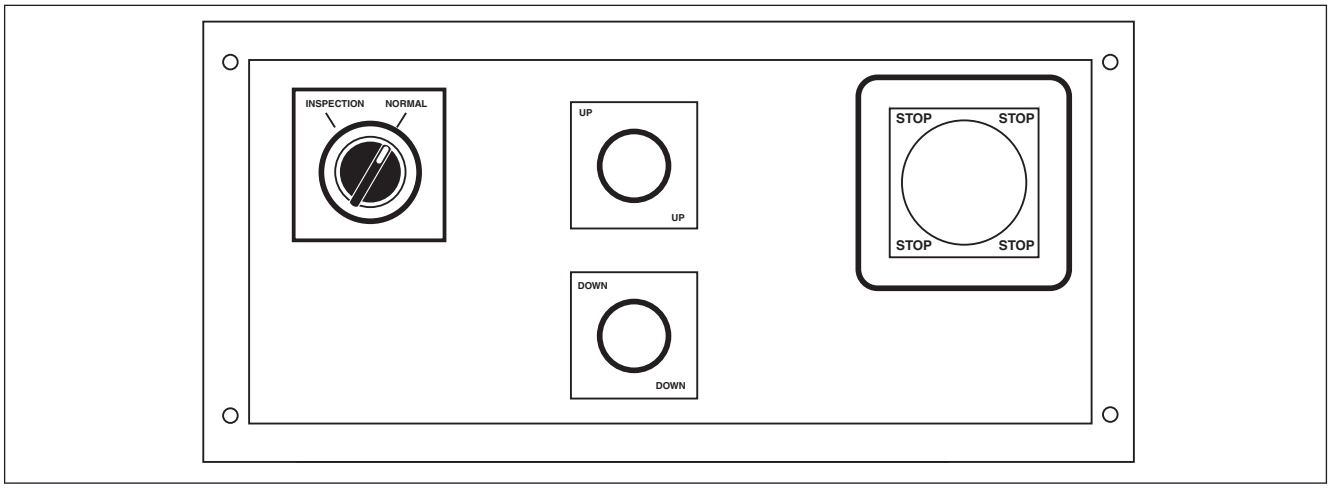
Figure B.1 shows a typical arrangement of basic layout for car top operating buttons and switches as given in BS EN 81-1 and BS EN 81-2.

B.1 General

The controls, conforming to BS EN 81-1 and BS EN 81-2, provide a suitable level of safety. However, they might not be adequate, if connected to an older system that is not designed to these requirements.

The enhanced controls described here include a common button that is important for old lifts where such controls are frequently connected to an existing control system with relays. They do not incorporate the stringent design requirements applicable today for new control switch gear.

Figure B.1 **Typical arrangement of basic layout for car top operating buttons and switches**



In addition to the functions provided by car top control stations conforming to BS EN 81-1 and BS EN 81-2, the car top control station could also provide the following functions, although these have a lesser priority:

a) a door open/close switch;

b) an integral light fitting, with switch, that could incorporate car top emergency lighting;

c) emergency signalling (alarm button or voice communication) at least to the same provision as that provided to passengers;

d) an additional stopping device on the casing of the control station to provide access from the rear of the station;

e) a socket outlet, which is RCD-protected, switched and fused to 5 A.

Figure B.2 shows a typical arrangement of enhanced layout for car top operating buttons and switches.

B.1.1 Construction

The car top control station could be mounted vertically.

The car top control station could be mounted on the car top so that its main control face is towards the landing entrance.

The car top control station could be placed in an easily accessible position and, where practicable, is no more than 1 m from the entry point for inspection or maintenance personnel. Where this is not practicable, an additional stopping device could be provided that is no more than 1 m from the landing entrance.

The enclosure could be constructed to withstand a force of 1 000 N without permanent deformation or damage.

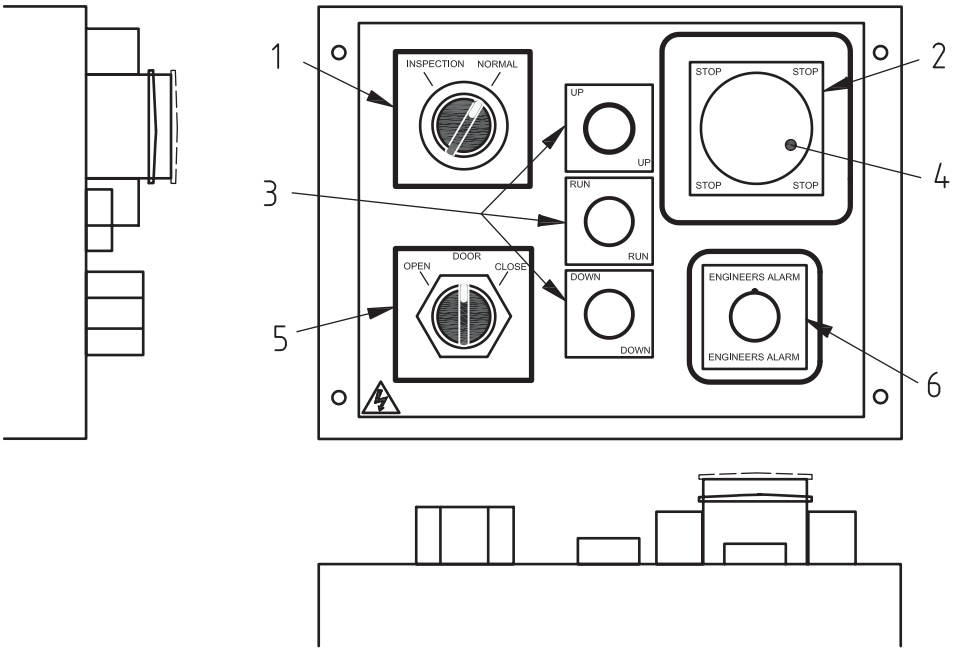
The main control face and any other removable covers could be secured by captive fasteners and not hinged.

All fixings for the operational components could be on the inside of the enclosure.

A permanently affixed electrical hazard symbol could be displayed, when appropriate, together with the text “Danger live mains supply even when supply disconnected”, on the main control face, any removable covers and on the inside of the enclosure.

All operating buttons and switches could be fixed so as to prevent rotation, using a key or similar technique.

Figure B.2 **Typical arrangement of enhanced layout for car top operating buttons and switches**



Key

1	Green background	4	Red stop button
2	Yellow background	5	White background
3	Blue background	6	Red background

NOTE 1 A heavy black line indicates the position of shrouding around each control.

NOTE 2 Stop switch shown in stop position.

NOTE 3 A broken outline indicates the run position.

NOTE 4 A Red L.E.D. illuminated car top alarm button is optional.

B.1.2 Buttons, switches, shrouds, notices and covers

B.1.2.1 General

All control buttons and switches could be independently shrouded.

All shrouds could be of a different geometric shape.

Shroud arrangements could incorporate features that prevent jamming of buttons.

All buttons and switches could be differently coloured in order to provide clear differentiation.

All colouring could be wear-resistant and fade-resistant.

All buttons, except the "stop" button, could be recessed into, or flush with, their shrouds.

Only the "stop" button might coloured red. All other buttons could be coloured to present the maximum differentiation with their respective backgrounds.

B.1.2.2 Stop button

The "stop" button could:

a) be a push/pull type (push to "stop");

b) have a minimum diameter of 50 mm;

c) be always coloured red;

d) be always proud of its shroud, when it is in the "run" position;

e) have a visual indication of both operational positions;

f) have the word STOP placed on or near it;

g) be positioned at the extreme top right position on the panel.

B.1.2.3 "Inspection/normal" switch

The "inspection/normal" operation switch could:

a) be a bi-stable switch, protected against involuntary operation;

b) have the words NORMAL and INSPECTION placed on or near it;

c) be positioned at the extreme top left position on the panel.

B.1.2.4 "Up" direction, "run" and "down" direction buttons

The "up" direction button, the "run" button and the "down" direction button could:

a) be arranged vertically in line, with the "up" direction button at the top;

b) have the words UP, DOWN and RUN placed on or near them;

c) be positioned in the centre of the panel.

B.1.2.5 "Door control" switch

The "door control" switch could:

a) have the words DOOR, OPEN and CLOSE placed on or near it;

b) be positioned at the extreme bottom left position on the panel.

B.1.2.6 "Alarm" button

The "alarm" button (if provided) could:

a) have the word ALARM placed on or near it;

b) be positioned below the "stop" button;

c) illuminate when operated.

Annex C (informative)

Typical safety signs

Figure C.1 to Figure C.11 show black-and-white reproductions of the coloured safety signs that are used when work is being carried out on lifts. The signs conform to BS ISO 7010.

Figure C.1 **Safety sign for use on a landing when a lift is taken out of service**

Symbol	Black exclamation mark, yellow background, black triangle
Panel	Black lettering, yellow background
Remainder	White

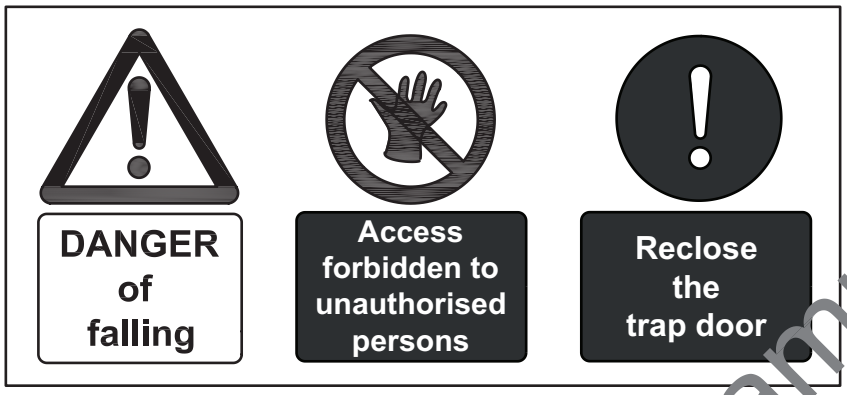
NOTE *See **4.2**, **4.7** and **5.7**.*

Figure C.2 **Safety sign for use on a machinery space or pulley room door**

Symbol	Upper: black exclamation mark, yellow background, black triangle
	Middle: black hand, red ring and bar, white remainder
	Lower: white exclamation mark on blue background
Panel	Upper: black lettering, yellow background
	Middle: white lettering, red background
	Lower: white lettering, blue background
Remainder	White

NOTE *See* ***4.2, 4.15*** *and* ***4.19****.*

Figure C.3 **Safety sign for use on an inspection door or trap giving access to a well**



Symbol	Left-hand: black exclamation mark, yellow background, black triangle
	Middle: black hand, red ring and bar, white elsewhere
	Right-hand: white exclamation mark on blue background
Panel	Left-hand: black lettering, yellow background
	Middle: white lettering, red background
	Right-hand: white lettering, blue background
Remainder	White

NOTE *See **4.2**, **4.17.1**, **4.17.3** and **E.3.2**.*

Figure C.4 **Safety sign for use on a car top where reduced headroom exists**

Symbol	Black exclamation mark, yellow background, black triangle
Panel	Black lettering, yellow background
Remainder	White

NOTE See ***4.2***, ***4.17.1*** and ***5.17.1***.

Figure C.5 **Safety sign for use on a car top on a lift installation with no safety gear or other means to prevent free fall**

Symbol	Black exclamation mark, yellow background, black triangle
Panel	Black lettering, yellow background
Remainder	White

NOTE *See **4.2**, **4.17.1** and **4.17.2**.*

Figure C.6 **Safety sign for use on a car top unsuitable for carrying persons**

Symbol	Black exclamation mark, yellow background, black triangle
Panel	Black lettering, yellow background
Remainder	White

NOTE *See* ***4.17.1*** *and* ***5.17.1****.*

Figure C.7 **Safety sign for use in a pit where the space below the car is restricted**

Symbol	Black exclamation mark, yellow background, black triangle
Panel	Black lettering, yellow background
Remainder	White

NOTE *See **4.2**, **4.17.1** and **4.17.3**.*

Figure C.8 **Safety sign for use in a pit with potential danger from a descending counterweight**

Symbol	Black exclamation mark, yellow background, black triangle
Panel	Black lettering, yellow background
Remainder	White

NOTE *See **4.2**, **4.17.1** and **5.17.3.4**.*

Figure C.9 **Safety sign for use on a car top or other areas where a fall hazard exists**

Symbol	Upper: black exclamation mark, yellow background, black triangle
	Lower: white figure, blue background
Panel	Upper: black lettering, yellow background
	Lower: white lettering, blue background
Remainder	White

NOTE *See **4.17.1, 4.21** and **5.17.2**.*

Figure C.10 **Safety sign for use in a pit of a positive drive (drum and hydraulic) lifts and where the space below the car is restricted**

Symbol	White exclamation mark, blue circle
Panel	Black lettering, yellow background
Remainder	White

NOTE See ***4.2, 4.17.1, 4.17.3*** and ***5.17.1***.

Figure C.11 **Safety sign for use on or near an access trap that gives access to machinery**

Symbol	Black exclamation mark, yellow background, black triangle
Panel	Black lettering, yellow background
Remainder	White

NOTE *See **4.19** and **5.19**.*

Annex D (normative) Electrical working

COMMENTARY ON Annex D

Working on the electrical equipment of lifts is subject to the following factors:

a) the availability of an up-to-date wiring diagram;

b) the potential for exposure to live parts, e.g. on controllers installed before the requirement for IP2X protection (as defined in BS EN 60529);

c) the need for equipment to be energized to enable commissioning, testing or fault finding tasks where the measurement to be taken or fault does not exist when the lift is isolated;

d) the likelihood that, with the lift isolator switched off, either: some electrical equipment can remain live, e.g. circuits fed from the car light supply, equipment to control the despatching of multiple lifts, and equipment; or other services associated with the lift such as on fire-fighting lifts;

e) equipment for other lifts in the same machine room that are left running.

The electrical safety of users and persons working on the lift depends on a number of factors including the following:

1) the insulation and protection of live parts against direct contact (referred to as basic protection);

2) electrical continuity of the protective conductors and the bonding of exposed conductive parts to earth as part of the protective measures for protection against indirect contact (referred to as fault protection);

3) the adequate design, coordination of protective devices and installation to ensure the automatic disconnection of the supply as a means of fault protection;

4) the adoption of safe working practices; the correct selection and the use of personal protective equipment, where no other options exist; and appropriate training and experience.

D.1 Working on isolated electrical equipment

Electrical equipment should be isolated prior to being worked on in all circumstances, unless it is necessary for the work to be undertaken live and suitable precautions should be taken to prevent injury (see **D.2**).

A secure method of isolation should be followed, usually by locking off and tagging off the main lift isolating switch and, if required, other circuits such as the car light circuit, etc. (see **3.7**), since these are typically fed from a separate supply.

Other circuits, which may remain live with the lift isolated, should be identified and precautions taken.

NOTE 1 Such circuits may be identified by a visual inspection of the wiring and from the electrical wiring diagram.

The supply conductors should be proved to be dead with a device that has been confirmed to be working before the test and confirmed to be working again after the test has been undertaken (with a proving unit or on another supply if available). All equipment used should be in good condition and regularly inspected.

NOTE 2 Suitable voltage indicating devices are described in HSE notes HSG85 [16] and GS38 [20].

D.2 Working on live electrical equipment

Live working should only be an option when it is not possible to complete the work activity with a lift isolated.

NOTE 1 This might be the case on commissioning, during testing or while fault finding.

NOTE 2 It might not be possible to identify certain faults, commission or set-up lift equipment or take electrical measurements, unless the lift is electrically powered.

NOTE 3 Working with the power on does not necessarily mean that work is carried out on or near to live exposed parts. It may be possible to conduct many work activities without creating a situation where there is direct exposure to live parts.

Where it becomes necessary to work on or near to live exposed parts then for the work to be completed safely the appropriate working methods should be adopted based on identifying and assessing the risks and identifying measures to control them.

Under such circumstances, the following precautions should be carried out:

- the protection of live parts, not already protected to IP2X, by temporary covers or barriers to prevent inadvertent contact with live parts;
- the provision of adequate working space and lighting;
- employing suitably trained and competent person(s) to undertake the work possibly including a second person acting as a safety monitor;
- the use of an insulating rubber mat conforming to BS 921;

  NOTE 4 A rubber mat can reduce the severity of some electric shocks.
- the use of personal protective equipment such as suitable gloves, glasses etc.;
- the use of insulated tools;
- the use of test equipment suitably protected and insulated (see HSG85 [16] and GS38 [20]).

D.3 Earth continuity testing and verification of conditions for protection by automatic disconnection of the supply

*NOTE The owner's responsibilities for the electrical supply, as set out in **4.6**, ensure that an adequate incoming external protective conductor provides fault protection in a TN-S system.*

A visual inspection should be made to confirm the presence of the protective conductors from the incoming external supply (e.g. connection to the earth termination in the lift isolator).

This visual inspection should be supplemented by tests,
e.g. BS EN 60204-1:2006+A1, Clause **18**, checks the earth continuity and confirms that the fault loop impedance is low enough to cause automatic disconnection of the supply within the required time. The tests for the supply should be conducted by an electrician. In addition, checks of the disconnect time for the machine and drive should be made by the lift contractor.

The fuse protection of the safety circuit should be tested by either a purpose made device or by measuring the resistance of the circuit and calculating the short circuit current. The safety circuit should not be checked by grounding its furthest point.

Prior to powering up newly installed equipment or where modifications have been made, the tests for earth continuity and the resistance of bonding or earthing conductors should be completed with satisfactory results, before making any live measurements, such as the direct measurement of earth loop impedance.

Annex E (normative) Additional procedures for installation, major repair and dismantling: responsibilities of owners and persons working on lifts

COMMENTARY ON Annex E

Many of the activities associated with the installation and dismantling of lifts are similar to those elsewhere in the construction industry. These hazards and safeguards are covered by regulations and well established practices. As it is common practice for lifts to be installed into a completed well and machinery space, only those practices that are particular to the lift industry are described in this annex.

E.1 General

Procedures for the installation, major repair and dismantling should be carried out in accordance with this annex.

E.2 Suspended work platforms

NOTE 1 Suspended work platforms are often used during the construction of lifts. These work platforms can take many forms and may be purpose built as lifting platforms or may be created by using the lift car sling as a work platform and/or the car roof.

NOTE 2 Attention is drawn to LOLER 1998 [5], which contain specific requirements regarding the use of suspended work platforms.

NOTE 3 During installation and/or dismantling works, manually or electrically driven suspended work platforms may be used, but these could present other hazards. These work platforms are often the actual car sling or a "false" car running on the normal guide rails that are normally the first items to be fitted into a well and are used, in most cases, for their erection.

All work platforms should be provided with suitable guard rails, toe-boards and some form of overhead protection.

Calculations should be carried out to determine the safe working load of a work platform, The SWL should be prominently displayed. The safe working load should not be exceeded.

Where the roof of the lift is to be used as a working platform, any guard rail should be at least 950 mm high while the lift is under erection and not being moved under electrical power.

When the lift is to be moved under electrical power using its car top controls, any guard rail should be of the height satisfying the lift design standard being used, typically BS EN 81-1 or BS EN 81-2, as applicable.

NOTE 4 This might result in a handrail height being as low as 700 mm, as high as 1 100 mm or with no handrail depending on distances between car and well walls.

E.3 Temporary protection at landings

E.3.1 New buildings under construction

Where new buildings are under construction, the owner should erect temporary protection at landings.

The type of protection erected should be identical to that used elsewhere on construction sites, e.g. guard rails, mid-rails and toe-boards, and should be in position at all times except during the passage of materials and of persons working on the lift(s).

If a car is to be moved under power and the landing doors are not finally fitted, a full height landing enclosure with an access door should be erected to protect exposed openings into the well. The access door should be fitted with a lock having keys, which can be opened without a key from inside the enclosure. A safety sign should be displayed on all temporary protection at landings (see Figure C.3).

E.3.2 Existing buildings

When existing lifts are being modernized or dismantled, the landing doors should be retained and kept locked, where possible, until they are replaced. Where this is not possible and the doors contribute to the fire resistance of the structure, any temporary enclosure should provide a minimum fire resistance of 30 min.

If the landing doors cannot be retained and locked, a temporary full height enclosure with an access door should be erected to protect exposed openings into the well. The access door should be fitted with a lock having keys, which can be opened without a key from inside the enclosure.

Guard rails, mid-rails and toe-boards should be erected across each landing entrance within any temporary full height enclosures where the landing doors are not in place.

If a landing entrance forms part of the fire integrity of the building, any temporary full height enclosure around that entrance should have a 30 min fire rating conforming to BS 9999 where the landing doors are removed.

A safety sign should be displayed on all temporary protection at landings (see Figure C.3).

E.4 Temporary electrical supplies and lighting

Temporary electrical supplies and lighting for all workplaces should conform to BS 5655-6:2011, **8.3**.

E.5 Environment

Risk assessments for controlling the environment should be carried out.

The generation of excessive noise or toxic fumes in the small spaces usually experienced in lift installations should, wherever possible, be avoided. If this is not possible, persons working on the lift installation should wear appropriate protective equipment (see **4.5** and **5.5**).

E.6 Fire hazards

The accumulation of flammable materials or litter in work spaces should be avoided, especially when flame cutting or welding is in progress. In these latter circumstances, fire extinguishers should be located in the vicinity (see also **E.3.2**).

E.7 Dismantling

Before an installation is dismantled, a risk assessment should be carried out to determine the risks and a method statement agreed to control those risks. Items of equipment should always be lowered under control and should not be allowed to free-fall.

Annex F
(informative)

More than one person working

It is recognized that two persons working can create additional risks. It creates particular issues, for example, when trying to inspect items located below a lift car such as safety gears. In such cases, having a safe working position is dependent on the depth of the pit, length of the toe guard, size of car sling, channels, etc.

When more than one person is working within the well, it is each person's own responsibility to ensure that the necessary means to prevent lift movement have been used, e.g. lock and tag out procedure, use of stop switches, etc.

It is the responsibility of each person working in the well to cross check all actions carried out on their behalf.

Working on safety gears from the pit area is not usually a task that can be performed by a single person in safety, unless some additional provisions are made. Using two persons does not resolve the issue in most cases with sufficient safety. This is because the mechanic in the pit might not always have a means to stop movement of the car if necessary, and once the car is low in the well, it is likely the power cannot be turned off by either of the persons working, or a third person, who is driving the car.

While working off a platform, it is not thought to be the most desirable solution but in this particular case, it is likely to be the safest solution for existing lifts.

The car needs to be positioned such that the toe guard is approximately 1 m above the landing and then lock off and tag out the main supply (see Table G.1, AT 2). Then the use of some form of suitable temporary or folding platform equipped with handrails (such as a "hop up" platform as used by plasterers or a step ladder with handrails or handholds) enables access to the underside of the car. The work can then be undertaken by a single person, thus avoiding the communications issues when two persons work together.

Annex G (normative) Summary of procedures for working in a lift pit

Procedures for working in a pit should be carried out in accordance with Table G.1.

Table G.1 **Summary of procedures for working in a pit**

Pit activity (AT)	Person conducting activity and type of activity within pit	Lift type	
		Traction drive	Positive drive (hydraulic or drum)
		Safety procedure 1 (SP1) **Accessing the pit**	
AT 1	Trained lift personnel conducting **non-invasive** activities, e.g. general maintenance, cleaning, lubrication, visual inspection (from well floor), surveys, retrieval of lost items, etc.	Before entering the pit area, the integrity of the safety devices should be proved by the operation of the landing interlock (DOOR LOCK) and the pit stopping device (STOP SWITCH) independently of each other. Observe that the DOOR LOCK stops the car while it is in motion. Observe that the STOP SWITCH prevents the lift being set in motion. When the above devices are proved, the car should be secured against movement before accessing the pit by the following procedure: a) operate stopping device before entering pit; and b) blocking the landing door with a blocking device once inside lift well.	Before entering the pit area, the integrity of the safety devices should be proved by the operation of the landing interlock (DOOR LOCK) and the pit stopping device (STOP SWITCH) independently of each other. Observe that the DOOR LOCK stops the car while it is in motion. Observe that the STOP SWITCH prevents the lift being set in motion. When the above devices are proved, the car should be secured against movement before accessing the pit by the following procedure: a) operate stopping device before entering pit; and b) blocking the landing door with a blocking device once inside lift well; and c) where an easily deployable mechanical restraint is available, it should be positioned under the car.

Table G.1 **Summary of procedures for working in a pit**

Pit activity (AT)	Person conducting activity and type of activity within pit	Lift type	
		Traction drive	**Positive drive (hydraulic or drum)**
		Safety procedure 2 (SP2) **Turn power off at the main isolator and lock off/tag off**	
AT 2	Trained lift personnel conducting **invasive** activities, e.g. repair activities, adjusting, modifying or repositioning equipment, installing or replacing existing equipment, installing new equipment, etc.	Carry out procedure SP1 and turn power off at the main isolator and lock off/tag off.	Carry out procedure SP1 and turn power off at the main isolator and lock off/tag off and in addition SP3 (mechanically restrain the car against downward movement).
		Safety procedure 3 (SP3) **Mechanically restrain the car against movement**	
AT 3	Trained lift personnel conducting **extended invasive** activities, e.g. repairing, replacing/adjusting suspension, ropes or chains, sheaves, compensating chains, brake or accessing equipment located up the outside of the car or counterweight [A)].	Carry out procedure SP1 and in addition procedure SP2 and in addition mechanically restrain the car or the counterweight, as appropriate, to prevent either, upward or downward movement [B)].	Carry out procedure SP1 and procedure SP2 and in addition mechanically restrain the car against downward movement [B)].
		Safety procedure 4 (SP4) **Untrained persons working**	
AT 4	Untrained lift personnel and trained tradespersons (painter, electricians, plumbers, cleaners, etc., conducting an activity in the lift pit. These activities are to be treated as **extended invasive** activities.	Either: • a trained lift person is present at all times while the work is undertaken and carry out procedures SP1 and SP2 to make the lift safe; or • if the trained lift person is not in attendance all the time, the lift can be made safe by applying procedures SP1, SP2 and SP3, as appropriate.	

Table G.1 **Summary of procedures for working in a pit**

Pit activity (AT)	Person conducting activity and type of activity within pit	Lift type	
		Traction drive	Positive drive (hydraulic or drum)
		Safety procedure 5 (SP5) **Pit working with other work being carried out above**	
AT 5	Trained and untrained lift personnel and trained tradespersons (painters, electricians, plumbers, etc.) performing any activity in the pit area while repair activities are being conducted elsewhere above them, e.g. on the suspension or drive system. This combines invasive work with persons being exposed to falling or falling objects and is an AT4 activity, which needs to be avoided whenever possible.	Where the work activity is unavoidable, a detailed risk assessment should be carried out to develop suitable provisions and working procedures. Such provisions should involve scheduling work to avoid simultaneous working, crash decking, debris netting, fall protection, etc., but should include procedures SP1, SP2, SP3 and SP4, as appropriate.	

[A)] These do not include all the situations that might be encountered, e.g. dismantling and removal of counterweight 2:1 sheaves, which is an extended invasive activity and necessitates the specific and/or unusual work to be planned and supervised after a risk assessment has been carried out to identify suitable procedures.

[B)] Irrespective of any risk assessment the activities should include procedures SP1, SP2, SP3 or SP4, as appropriate.

NOTE 1 Downward movement of a traction lift may be prevented by tripping an instantaneous safety gear, a sheave brake, a rope brake, the use of suitable slings, suitably placed rail clamps or a restraint. Upward movement can be prevented by landing the counterweight, tripping of a sheave brake, rope brake, use of suitable slings, suitably placed rail clamps, etc.

NOTE 2 Downward movement of a positive drive (hydraulic or drum drive) lift can be prevented by tripping an instantaneous safety gear, cylinder clamp, use of suitable slings, rail clamps or restraint(s), etc.

NOTE 3 Unless designed for the purpose, progressive gear might not set properly from low speed and is not therefore considered as a suitable restraint.

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