

Code of practice for

Safe use of construction hoists

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- Building Employers' Confederation
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- Construction Plant (Hire Association)
- Department of Trade and Industry [Mechanical Engineering and Manufacturing Technology Division (Mmt)]
- Federation of Civil Engineering Contractors
- Federation of Manufacturers of Construction Equipment and Cranes
- Federation of Master Builders
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- Health and Safety Executive
- Independent Engineering Insurers Committee
- Institution of Mechanical Engineers

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Foreword

This code of practice has been prepared under the direction of the Mechanical Handling Standards Policy Committee at the request of the Health and Safety Executive.

The code gives guidance for the safe use of all types of hoist which are designed and constructed for use as temporary installations during construction work. The guidance covers all types of goods only hoists as well as hoists for both passengers and materials, such as those specified in BS 4465.

An appendix lists legislation, regulations and related documents that may be applicable to construction hoists.

The Health and Safety Executive (HSE) commend the use of this British Standard code of practice to those who have duties under the Health and Safety at Work etc. Act 1974 and other relevant health and safety legislation. The code was drawn up with the participation of HSE representatives and will be included in the list of "Standards Significant to Health and Safety at Work" available from HMSO.

A British Standard does not purport to include all the necessary provisions of a contract. Users of British Standards are responsible for their correct application.

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Summary of pages

This document comprises a front cover, an inside front cover, pages i and ii, pages 1 to 24, an inside back cover and a back cover.

This standard has been updated (see copyright date) and may have had amendments incorporated. This will be indicated in the amendment table on the inside front cover.

1 Scope

This British Standard code of practice gives guidance for the safe use of all types of hoist defined in Regulation 4 of the Construction (Lifting operations) Regulations, 1961 as “a lifting machine, whether worked by mechanical power or not, with a carriage, platform or cage the movement of which is restricted by a guide or guides”. Such hoists are designed, constructed and used as temporary installations during construction work. The guidance covers various types of “goods only” hoists as well as hoists for both passengers and materials. The aspects dealt with include safe systems of work, management, planning general recommendations for the selection, installation, testing, examination, operation and maintenance of construction hoists as well as guidance for the selection and duties of erectors and operators.

The legal responsibilities for the safety of persons working on construction hoists, which may be shared by employers of those persons working on construction hoists, by persons working on construction hoists and by persons having effective control of the construction site are summarized in Appendix A together with examples of UK legislation and related documents which may also be applicable to construction hoists, depending upon their location.

A schedule of statutory requirements relating to the use of construction hoists is given in Appendix B.

NOTE The titles of the publications referred to in this standard are listed on the inside back cover.

2 Definitions

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

2.1

appointed person

the person, appointed by the management or organization requiring the hoisting operation to be undertaken, who will be responsible for all aspects of the hoisting operations

2.2

competent person

a person who is deemed to be competent and has such practical and theoretical knowledge and such experience of the construction hoist and its equipment as is necessary to carry out the function to which the term relates in each particular context

2.3

in service

a condition when the cage(s) is in any position other than at the lowest landing position of its travel (whether it is laden or unladen), and when the cage(s) is at the lowest landing position and laden

2.4

mast

a structure that supports and guides the cage (and the counterweight when provided) outside of the mast structure

2.5

out of service

a condition when the cage(s) is at the lowest landing position and unladen

2.6

overspeed governor

a device which, when the hoist attains a predetermined speed, causes the hoist to stop, and if necessary causes the safety gear to be applied

2.7

passenger

any person, including the driver, transported by a hoist

2.8

rated load

the load for which the equipment has been built and for which normal operation is guaranteed by the vendor

2.9

rated speed

the speed of the hoist cage for which the equipment has been built and for which normal operation is guaranteed by the vendor

2.10

safety gear

a mechanical device for stopping and maintaining stationary on the guides the hoist cage or counterweight in the case of overspeeding in the downward direction

2.11

instantaneous safety gear

a safety gear in which the full braking action is almost immediate

2.12

progressive safety gear

a safety gear in which deceleration is effected by a braking action, and for which special provisions are made so as to limit the forces on the suspended part to a permissible value

2.13**stopping distance**

the distance the cage will fall during a safety gear test, measured from the point of release of the stationary cage to the point of arrest

2.14**terminal stopping switch**

a switch or combination of switches arranged to bring the cage to rest automatically at or near a terminal landing, independently of the functioning of the operating control device

2.15**tower**

a structure that supports and guides the cage (and the counterweight when provided) within the tower structure

2.16**ultimate limit switch**

an emergency switch arranged to stop the hoist automatically, in the event of the cage travelling a predetermined distance beyond a terminal landing

3 Selection of personnel**3.1 General**

Safe working depends on the selection of suitable persons who are competent to carry out the required duties. The appointed person should ensure that persons involved in the operation are efficiently organized to ensure good team work in the working situation and that no member of the team has his efficiency impaired because of alcohol or other drugs. All persons in the team should be aware of their duties which should be as listed in **3.2.1** to **3.2.3**. Responsibility should only be delegated to an extent that is appropriate, taking into account the ability, competence and authority of the person concerned.

The appointed person should select and authorize those persons who are competent or who are under appropriate training and supervision. The recommended minimum attributes for personnel working on hoists are given in **3.3.1** to **3.3.3**.

A record of the operators training should be maintained and made available to the appointed person.

3.2 Duties of personnel

3.2.1 Hoist operator. The hoist operator should be responsible for the correct operation of the hoist in accordance with the manufacturer's instructions and the site conditions. In some cases the operator may also be the hoist erector.

3.2.2 Hoist erector. The hoist erector is responsible for the erection, extension and dismantling of the hoist in accordance with the manufacturer's instructions.

Where two or more erectors are required, one should be nominated as "erector in charge" to control the operation. (See also clause **6**.)

3.2.3 Maintenance personnel. The maintenance personnel should be responsible for maintaining the hoist in accordance with the manufacturer's instructions, and to ensure its safe and satisfactory operation. They should carry out all necessary maintenance in accordance with the safe system of work and permit to work. (See also clause **7**.)

3.3 Recommended minimum attributes

3.3.1 Hoist operator. The hoist operator should:

- a) be at least 18 years of age except when under the direct supervision of a competent person for the purpose of training (this is a statutory requirement);
- b) be physically fit, particularly with regard to eyesight, hearing and reflexes to operate the hoist safely and should be able to judge distances, heights and clearances;
- c) be able to work confidently and safely at heights;
- d) be aware of personal responsibilities under the law (civil and criminal), for personal safety and that of others;
- e) have been adequately trained in the type of hoist being driven and have sufficient knowledge of the hoist and its safety devices.

3.3.2 Hoist erector. The hoist erector should:

- a) be at least 21 years of age except when under the direct supervision of a competent person for the purpose of training;
- b) be physically fit with particular regard to eyesight, hearing and reflexes, and have the stature and agility to handle safely the loads involved in hoist erection;
- c) be able to work confidently and safely at heights;
- d) be aware of personal responsibilities under the law (civil and criminal), for personal safety and that of others;
- e) be able to establish weights, and judge heights and distances;
- f) have been trained in the techniques of signalling and slinging;
- g) be capable of selecting lifting gear and equipment from that provided, which is suitable for lifting the load;

- h) be adequately trained in the erection, extension, dismantling and working of the type of hoist, also in the safe use of any lifting appliance used in the course of these duties;
- i) be adequately trained in the setting and testing of the safety devices fitted to the hoist and those on any lifting appliance supplied as part of the hoist.

3.3.3 Maintenance personnel. The maintenance personnel should:

- a) be physically fit, particularly with regard to eyesight, hearing and reflexes to operate the hoist safely and should be able to judge distances, heights and clearances;
- b) be able to work confidently and safely at heights;
- c) be aware of personal responsibilities under the law (civil and criminal), for personal safety and that of others;
- d) have an adequate knowledge of the mechanical and electrical machinery they are required to maintain;
- e) have adequate knowledge of, and access to, the hoist manufacturer's relevant information.

4 Description and features of construction hoists

NOTE The various types of construction hoist may be classified according to the following groups.

4.1 Rack and pinion driven hoists

4.1.1 General. Rack and pinion driven hoists consist of a cage or platform, raised and lowered by means of one or more rotating pinions meshing with a continuous rack fixed to, and parallel with, a supporting structural mast. The drive pinions may be driven by any type of prime mover. The supporting mast acts as the guide for the cage or platform, and it can be freestanding up to a limited height, above which ties are required at regular intervals to support the mast from a building or structure. The hoists are sometimes equipped with counterweights. Except for certain specialist applications rack and pinion hoists have the potential for providing a greater overall travel distance compared with rope driven hoists.

4.1.2 Rack and pinion passenger and materials hoists [see Figure 1(a)]. Rack and pinion passenger and materials hoists have a fully enclosed cage to protect the travelling passengers and all gates are mechanically and electrically interlocked. Materials may be transported in the cage as well as passengers, provided the rated load is not exceeded. The hoists are usually controlled by an operator in the cage.

4.1.3 Rack and pinion goods hoists [see Figure 1(c)]. Rack and pinion goods hoists have a platform which is usually fitted with side panels to retain the load on the platform. Where these side panels are not fitted, an enclosure should be provided for the full height of travel. Persons are permitted to walk onto the stationary platform for purposes of loading and unloading only, but are not allowed to travel on the platform, except for the occasions of erecting, maintaining, inspecting and dismantling the hoist at which time the machine is functioning as a work platform and should be controlled solely from the platform.

When in service, it should be possible for the hoist to be operated from only one position at any one time. This control position is normally at base level or any other position or level which affords good visibility over the entire range of level of travel. They should not be operated from the platform when in service. Gates are required at each landing; it is desirable that these, as well as gates fitted to the platform, are provided with effective interlocks, especially at the ground level.

4.2 Rope driven hoists

4.2.1 General. Rope driven hoists consist of a platform (or cage) raised and lowered by means of a steel wire rope (or ropes).

The following two methods of drive are commonly used:

- a) by traction drive using sheave(s) and steel wire rope(s) with a counterweight;
- b) by wire rope winding drum, without a counterweight.

The drive for a goods only hoist may be derived from any type of prime mover, but in the case of passenger hoists the drive is invariably electric in order to facilitate the operation of all interlocking safety devices.

The platform (or cage) is continuously guided and the guides can be either part of a mast structure or part of an enveloping tower.

Whether the guides are part of a mast structure or an enveloping tower the hoist can be freestanding only up to a limited height, above which ties are required at regular intervals to support it from a building or structure.

Where the guides are part of an enveloping tower, the tower can be freestanding to a height which can be greater than with a mast alone, especially if the tower is formed from structural steel sections.

Where the tower is formed from scaffold components, it is usually tied into the main scaffolding around the building.

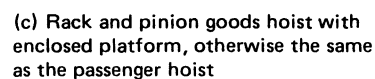
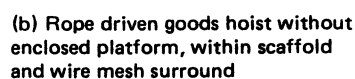
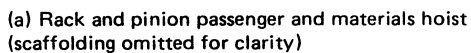


Figure 1 — Examples of construction hoists and the relevant statutory requirements
(see Appendix B)

4.2.2 *Rope driven passenger and materials hoists.*

Rope driven passenger and materials hoists are power driven for both raising and lowering the cage either by traction drive or rope winding drum; the descent is therefore always controlled.

The cage is suspended by at least two independent steel wire ropes and the drive units are normally located at ground level.

Passengers travel inside a fully enclosed cage which has electrically and mechanically interlocked gates. Materials may be transported in the cage as well as passengers, provided the rated load is not exceeded. Hoists have not been made to this design in recent years in the United Kingdom.

4.2.3 *Rope driven goods hoists.* Traditionally the platforms of rope driven goods hoists [see Figure 1(b)] are not provided with side panels and a hoistway enclosure should be provided for the full height of travel. If suitable side panels and gates are provided on the platform a full hoistway enclosure will not be necessary. Persons are not allowed to travel on these platforms, but they are permitted to walk onto the stationary platform for purposes of loading and unloading only.

The platform is suspended by one steel wire rope and is raised and lowered by a winch normally situated at ground level. The winch drum can either be positively driven in both directions or be driven by a friction pinion in the upward direction and allowed to descend by gravity under the control of a brake. The former type is commonly referred to as a geared winch and the latter type as a friction winch.

Rope driven goods hoists are only operated from any one position at any one time. They are not operated from the cage or platform but can be controlled from any other position or level which affords visibility over the whole range of travel.

In the case of a friction winch the control rope is located or protected in such a manner that only the authorized operator has access to it at the position chosen for operation at that specific time.

Gates are required at each landing and it is desirable that these are interlocked.

Because of the potential dangers in operation and the problems in achieving adequate access interlocks, the use of friction winches (other than for small capacity hoists with limited travel distances) is not recommended if other alternatives can feasibly be employed.

4.3 Inclined hoists

Inclined goods/materials hoists (see Figure 2) as defined by the Construction (Lifting Operations) Regulations, 1961, are designed to lift on an incline rather than vertically. They are known variously as roof tile carriers, ladder lifts or elevators, or inclined building elevators. They have a platform, carriage or cage which moves up and down an inclined structure, its movement being restricted by a guide or guides. The inclined structure can be either fixed or telescopic and a ground enclosure is required to be installed to protect the operator, site personnel and the public if applicable.

The operator controls the hoist from outside the enclosure when practicable or alternatively from inside the enclosure from a fixed position where he can be provided with overhead protection against falling objects. All such hoists should be fitted with a safety gear to arrest the platform, carriage or cage in the event of failure of the hoist mechanism together with suitable devices to limit travel at the top and bottom of the incline.

An example of an inclined hoist is shown in Figure 2. Advice on safety requirements for this type of hoist is given in HSE Guidance Note PM 63.

4.4 Mobile hoists

Some wire rope driven and rack and pinion hoists are mounted on a mobile base suitable for towing around the construction site. Once installed at its work station, the hoist base is jacked up and no longer mobile. The descriptions and practical guidance given in 4.1 to 4.3 apply equally to these mobile units.

Unless the base enclosure is integral with the mobile base, an enclosure with a gate, or gates, erected at each work station will be necessary, together with the gates and guarding at each landing level.

Mobile hoists are usually employed to operate at relatively low operating heights. Care should therefore be taken to ensure that a rope driven mobile hoist is not used above the height specified by the manufacturer as the increased numbers of layers of wire rope on the drum may result in the inability of the brake to hold the load.

4.5 Special hoists

Other types of hoist have been developed for special operations, e.g. rope guided hoists (for slip forming), concrete skips, swivel hoists, etc.

Special considerations regarding rope guided hoists and swivel hoists are described in Appendix C and Appendix D respectively.