

Code of practice for

Permanently installed suspended access equipment

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- Associated Offices Technical Committee
- British Telecommunications Plc
- Building Employers Confederation
- Contract Cleaning and Maintenance Association
- Department of the Environment (Property Services Agency)
- Federation of Wire Rope Manufacturers of Great Britain
- Health and Safety Executive
- Institution of Structural Engineers
- National Association of Scaffolding Contractors
- National Federation of Master Steeplejacks and Lightning Conductor Engineers
- National Federation of Painting and Decorating Contractors
- Royal Institute of British Architects
- Suspended Access Equipment Manufacturers' Association

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Foreword

This British Standard has been prepared under the direction of the Civil Engineering and Building Structures Standards Policy Committee. This edition introduces technical changes but it does not reflect a full review or revision of the standard which will be undertaken in due course. It replaces BS 6037:1981 together with its amendments No. 1 and No. 2 which are withdrawn. The principal changes from the previous edition are as follows.

- a) The testing procedure has been modified considerably.
- b) Details are given of a commissioner certificate, test and examination certificates and a rejection note.
- c) Further instructions are given on exchange of information before contract.
- d) The permissible degree of inclination on the platform has been relaxed.

As a code of practice this document is not a specification of the components of a permanent installation. It is a statement of the more important rules that should be followed in the design, construction and use of the components. It is also intended to establish the safe conditions for those persons having access to and from or using the equipment, or otherwise engaged nearby.

For recommendations relating to temporarily installed suspended scaffolds and access equipment, reference should be made to BS 5974.

Some buildings may have permanently installed roof trolleys or other suspension systems for which a temporary cradle, platform or chair, is brought to site and fitted, as necessary, to facilitate window cleaning or facade maintenance operations.

All such equipment should comply with the certification requirements of clause 19.3 of this code. It should, in addition, comply with clause 22 of BS 5974:1990 which recommends that a valid certificate in respect of the temporary components be issued on each occasion the installation is brought into use.

It should be recognized that the requirement for safe and efficient window cleaning and facade maintenance procedures can, in general, only be satisfied by the installation of a permanent system with dedicated cradle.

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.

Compliance with a British Standard does not of itself confer immunity from legal obligations.

Summary of pages

This document comprises a front cover, an inside front cover, pages i and ii, pages 1 to 22, 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.

0 Introduction

A permanent installation is designed and erected to provide a working platform to give access to parts of a permanent structure and to serve only that structure, although parts of the installation may be demountable for storage purposes.

A permanent suspended access system comprises a working platform suspended on ropes from a securely mounted overhead structure. It may be capable of being raised and lowered, and of being moved laterally across the face of the building. Such installations are customarily used for maintenance and window cleaning.

The roof trolley may be mounted on rails or tracks on top of the roof or may be suspended from the underside of a cantilevered portion of the building.

The installation may be power or manually operated or a combination of both. The winches or climbing devices may be mounted either on the overhead structure or on the platform.

It is essential that care is taken to ensure compliance with the manufacturers' design data as recommended in appendix B.

1 Scope

This code of practice sets out the basic recommendations for the construction, installation and use of permanently installed suspended access equipment. When considering a design for a new installation, suspended access equipment, used on a completed building to provide for its continuing routine maintenance, should be classed as permanent and then comes within the scope of this code.

2 References

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

3 Definitions

For the purposes of this code of practice the following definitions apply.

3.1

building

structure or part-completed structure or other facade and soffit against which the working platform is assembled

3.2

minimum breaking load of ropes

the minimum value which is required to be reached in a tensile test to destruction

3.3

climbing device

a lifting appliance manually or power operated through which the suspension rope passes, controlled either by friction grips or by turns of the rope round drums within the machine. The lower end of the rope is not anchored to the climbing device

3.4

cradle

that portion of the assembly designed to carry operatives and their equipment

3.5

cradle restraint systems

systems which limit the lateral movement of the working platform

3.6

cradle trip bar

a mechanism attached to the platform on power operated machines by which the descent power is automatically disconnected if an obstruction is encountered

3.7

brake

a means of arresting the descent or ascent of the cradle

3.8

factor of safety against overturning

the coefficient by which the maximum overturning moment is multiplied in order to calculate the righting moment required to ensure safety against overturning, being the ratio of the sum of the righting moments to the maximum overturning moment

3.9

free fall safety device

an automatically engaging device attached to the main suspension rope or to a safety rope which prevents the free fall of the platform in the event of the failure of the winch or climbing device

3.10

jib

the cantilevered portion of the roof rig or roof trolley from which the cradle is suspended

3.11

maximum overturning moment

the sum of the moments which impose an overturning force on the roof rig, including those imposed by the maximum total suspended load and the self-weight of any outboard portions of the roof rig (cf. righting moments and loading imposed by the wind.)

3.12**maximum total suspended load**

the maximum force which may be imposed on the roof rig including the safe working load on the platform, the self-weight of the platform and the suspension and safety ropes, together with any portion of the means of suspension, and the rope tensions, plus any extra force resulting from the operation of the safety gear, impact surges, stalling torque or other environmental loads

3.13**nominal speeds**

the rated operating speeds declared by the manufacturer

3.14**outrigger arm**

see jib (3.10)

3.15**overload device**

a means of preventing or stopping the movement of the platform in the event of a pre-set load being exceeded

3.16**over-run device**

a means of preventing the over-run of the platform at its normal limits of travel

3.17**over-speed device**

a means of controlling or arresting the platform descent or rise should the pre-set speed be exceeded

3.18**restraint assembly**

the portion of the system attaching the working platform to the mullions or other fixtures on the building

3.19**righting moments**

those moments imposing a righting moment on the roof rig, including those due to the self-weight of the inward portion of the roof rig and any counterbalances. The total righting moment required to ensure the stability of the roof rig is determined by the multiplication of the maximum overturning moment by a factor of safety (see 3.8) against overturning (see 10.2)

3.20**roof fixings**

the structural connections holding the roof rig or track to the building

3.21**roof rig**

that portion of the equipment (excluding the trolley track) mounted on the roof or at the roof level to support and position the suspended platform

3.22**roof trolley**

the mobile portion of the roof rig capable of horizontal movement by power or manual means, such movement usually being guided by means of a trolley track

3.23**rope termination**

the means, including any terminal fitting, by which a rope is terminated to form a connection

3.24**safety gear**

a device or devices acting on a separate safety rope, that will arrest and sustain a cradle in the event of the failure of a suspension rope

3.25**safety ropes**

the ropes capable of carrying all or part of the suspended load in the event of the failure of one or more of the suspension ropes, or any part of the hoisting gear

3.26**spur tracks**

sections of the trolley track that enable the roof trolley to be moved to another position on the roof

3.27**suspension ropes**

the ropes by which the working platform is suspended

3.28**trolley track**

the rail or rails normally installed at roof level which support and guide the roof trolley in its working positions

3.29**winch**

a lifting appliance manually or power operated to raise and lower the working platform by means of a suspension rope reeled on to a drum

3.30**working platform**

see cradle (3.4)

3.31**sacrificial overspeed device**

a safety device which acts as a fail-safe final stop should the primary and secondary brakes fail to sustain the cradle or platform from dropping

4 Access

It is important that adequate and safe means of access to all parts of the installation be provided, and used. This is necessary not only to provide access for the use of the equipment but also to allow for the routine examination and maintenance of the equipment to be carried out easily and in safety. In the case of an underslung installation, a safe place should be provided from which the recommended inspections can be carried out in safety, being a point independent of the equipment being tested.

When access is from the roof of the building a safe route should be provided between the roof and the inside of the building.

All users should be made aware of the approved means of access and egress. The provisions that should be incorporated in the design to allow for safe escape in the case of a malfunction of the equipment are described in 17.4.

5 Preliminary planning and exchange of information

The provision of safe and easy access for activities such as inspection, cleaning and building maintenance is an important factor in the design of a building. A permanent installation can affect the structure and fenestration of a building and therefore the requirements should be considered at the preliminary design stage of the building.

Significant savings and design advantages can result from an early consideration of access requirements. The preliminary design should be based on reliable advice and guidance concerning the various types of system available, and the general planning details should be settled at the earliest possible stage by detailed investigation with the purchaser's representative, reaching agreement with the equipment maker where necessary, before an order is finally placed.

This will enable a check to be made, and information to be exchanged, on such vital matters as:

- a) the number, type, capacity and operating speed of the suspended access equipment required;
- b) the provision of safe access to the roof and equipment;
- c) the wind loading for which the building has been designed;

d) the loads which the equipment will impose on the building structure;

e) the dimensions and clearances required for the operation of, and access to, the equipment;

f) the special requirements of local authorities and other requirements set out in the "planning permit";

g) the requirements for providing and fixing suitable mullion guides or other fixtures to the building face where necessary;

h) the need for the builder to maintain accuracy of building as to roof fixings, mullion guides etc.;

i) the periods of time required for the preparation and approval of relevant drawings for manufacturing and the installation of the equipment;

j) the provision of suitable storage space for roof trolleys etc.;

k) the requirements for anchoring the roof fixings to the building structure;

l) the time at which electric power will be required before completion to allow for testing;

m) the requirements for electrical supply feeders, earthing requirements etc.;

n) delivery and storage of equipment;

o) the need for the future inspection and testing of the equipment.

The use of manual hoisting equipment is not recommended when the operating height exceeds 15 m.

IMPORTANT NOTE The required checks may well vary between one installation and the next and may include items not covered by the above list, which should not therefore be assumed as being exhaustive.

6 Statutory requirements

Attention is directed to Acts, Byelaws, Regulations and any other Statutory Requirements relating to matters dealt with in this code. The equipment should comply with these regulations and requirements. Its performance, use, inspection, testing and maintenance should also be in accordance with the appropriate regulations. Amongst others, the following statutory requirements, current at the date of publication of this code, relate to suspended scaffolds and access equipment:

- a) Health and Safety at Work etc., Act 1974;
- b) Factories Act 1961;
- c) The Electricity (Factories Act) Special Regulations 1908 and 1944;
- d) SI 94 The Construction (Working places) Regulations 1966;

- e) SI 1580 Construction (General provisions) Regulations 1961;
- f) SI 1581 Construction (Lifting operations) Regulations 1961.

7 Identification and registration of components and marking of safe working loads

Where the work carried out from a working platform is the subject of the Construction (Working Places) Regulations 1966 and the Construction (Lifting operations) Regulations 1961, lifting appliances, winches, and lifting gear should have an identification tag and their safe working load plainly marked on them.

Ropes should be similarly identified if separate from the remainder of the installation. An additional marking to show the year a rope is taken into use is considered useful. All ropes should be inspected in accordance with the appropriate regulations and records of the inspections kept.

The roof rig should have the following marked in a position such that it can be easily read:

- a) name of manufacturer;
- b) name or number of model;
- c) serial number or year of manufacture;
- d) the maximum load which may be suspended from the roof rig, in kilograms.

The platform should also be marked with its safe working load and this should include the number of men allowed to be on the platform. This load should also be on a notice clearly exhibited at each access point from the structure to the cradle.

NOTE For conditions for re-rating of safe working loads see 19.4.

8 Materials and components

8.1 General

All materials and components used in the construction and assembly of suspended access equipment should satisfy the requirements of the relevant British Standards and codes of practice where they exist. Where these do not exist the materials should be of sound construction and adequate for the purpose for which they are intended.

The materials and components and their method of assembly should comply with the relevant statutory regulations. A list of the other British Standards which give details of materials and components which will satisfy the recommendations of this code of practice is given in appendix A.

8.2 Assembly

Where electrolytic action is of consequence, direct contact between dissimilar metals should be avoided unless a suitable form of protection is applied. Guidance on the alleviation of this problem will be found in PD 6484.

Welded steel joints should be made in accordance with the requirements of BS 5135 and should be suitably protected against corrosion.

Welds in other materials should comply with the relevant British Standard or with the best practice when there is no standard available.

8.3 Exposure

The whole of the assembly should be suitable for use exposed to the atmosphere. It should be capable of operating in the normal range of UK temperatures and humidity.

All parts of the equipment should be appropriately protected against atmospheric corrosion. For guidance on the protection of iron and steel components BS 5493 and DD 24 may be consulted.

9 Design loads and operating speeds

9.1 Safe working load

The safe working load (see clause 7 and item i) of 20.2) should take account of the number of persons intending to use the platform, and any other known weights generally required on the platform. Each person should be assumed to weigh 90 kg which includes an allowance for small tools and equipment.

The design of all parts of the assembly should take account of the possible grouping of the persons using the platform at one end of the platform either adjacent to the point of suspension or, when cantilevered end extensions are fitted, centred outside this point.

NOTE For conditions for re-rating of safe working loads see 19.4.

9.2 The rope tension

The rope tension on which the choice of the suspension rope is made should be based on the summation of the following:

- a) that portion of the self-weight of the platform and any lifting appliances attached to it acting on the suspension rope, plus the self-weight of that portion of the suspension rope hanging below its upper point of contact with the roof rig, including that portion of it reeled on to a winch on the platform or hanging beneath it through a climbing device and any stabilizing weight attached thereto;

b) the maximum load resulting in the suspension rope from the approved number of operatives and associated imposed loads grouped together or adjacent to it or in a cantilevered portion of the deck;

c) an allowance for impact resulting from the operation of the winch or climbing device of such impacts as are recommended by the manufacturers, but with a minimum of 10 % of the sum of a) and b) above for manual operation, and 25 % of the sum of a) and b) above for power operation.

The above criteria should also be used when choosing a safety rope, with the exception that the following allowance d) should replace that in c) above in those cases where the value of d) is higher than that of c):

d) an allowance for the impact load imposed by the operation of any safety device.

Calculation of the rope tension should take into account the cumulative friction losses arising from the rope reeving system and the number of parts of rope in the purchase.

9.3 The maximum total suspended load

The maximum total suspended load should be calculated having regard to the rope tensions which can be applied to the ropes (see 9.2).

Where there are load limiting devices or an upward acting trip-bar incorporated in the system, the maximum total suspended load should be calculated on the setting of the device. Where no such devices are incorporated, the maximum total load should be based on the force produced from the stalling torque of the motor(s) or hoist unit. The maximum total suspended load should in no case be taken as less than the sum of the suspended dead weight and the safe working load of the cradle irrespective of the settings of the automatic overload safety devices.

9.4 The maximum overturning moment

The maximum overturning moment should be calculated as the summation of the moment imposed by the maximum total suspended load plus the moment of the self-weight of any outboard portion of the roof rig and the effect created by wind forces.

9.5 Wind forces

General guidance should be obtained from CP 3:Chapter V-2. The size and shape of the building and adjacent buildings and the effect this may have on wind speed should be considered when calculating the wind forces on the equipment in its position of maximum exposure.

It is important that consideration is also given to the effect of maximum wind loading on the equipment in its parked position. Special provisions may have to be made to cover adverse wind conditions.

Information from the architect and the consulting engineer on anticipated wind forces incorporated in the basic design for the building is essential.

9.6 Horizontal surges

Horizontal surges due to traversing should be taken as 10 % of the wheel-rail reaction for power traversing, and 5 % of the wheel-rail reaction for manual traversing.

9.7 Operating speeds (powered equipment)

The following operating speeds are recommended:

- a) the traversing speed should not exceed 20 m/min;
- b) the hoisting and lowering speed should not exceed 20 m/min;
- c) when luffing type jibs are employed the speed of the jib head should not exceed 20 m/min;
- d) when the jib is executing a slewing motion the jib head speed should not cause a linear platform speed of more than 20 m/min and should be such that no overstress on the trolley, trolley track, roof fixings or other part of the assembly is caused.

10 Attachment to building structure

10.1 Strength and nature of the building

10.1.1 Forces on the building. The maximum loads should be calculated and submitted to the architect or structural engineer of the building for approval. The building should be strong enough to resist these loads without sustaining damage or permanent deformation.

10.1.2 Other requirements. The attention of the architect or structural engineer should be drawn to the necessity of providing roof anchorages and to the possibility of damage caused by their installation and maintenance.

10.1.3 Anchor bolts. Any anchor bolts joining the roof rig or the track to the building should be of an appropriate grade of austenitic stainless steel, and should be designed in accordance with the allowable stresses recommended in BS 449.

Particular attention should be given to the possibility of stress corrosion in fixings which may be subject to chemical attack, e.g. under high temperature, humid conditions, when chlorine and/or chlorides may be present. The thorough examination detailed in 21.1.5 will also take these factors into account.