

BS 8560:2012+A1:2018



BSI Standards Publication

**Code of practice for the design
of buildings incorporating safe
work at height**



Publishing and copyright information

The BSI copyright notice displayed in this document indicates when the document was last issued.

© The British Standards Institution 2018

Published by BSI Standards Limited 2018

ISBN 978 0 539 00237 9

ICS 91.220

The following BSI references relate to the work on this document:

Committee reference B/209

Draft for comment 12/30235507 DC; 18/30374561 DC

Amendments/corrigenda issued since publication

Date	Text affected
31 October 2018	A1: see Foreword

Contents

	Page
Foreword	ii
Introduction	1
1 Scope	2
2 Terms and definitions	2
3 Design development process, including work at height	4
<i>Figure 1 — Design process flowchart</i>	5
<i>Table 1 — Design characteristics affecting the selection of access methods</i>	9
<i>Table 2 — Typical methods of permanent access to roof for maintenance</i>	13
<i>Figure 2 — Flat roof maintenance access: typical section of part of a roof</i>	14
<i>Figure 3 — Access to low-rise pitched roofs for short duration construction work</i>	15
<i>Figure 4 — Ground- and floor-based equipment</i>	16
<i>Figure 5 — Building-mounted access equipment</i>	17
<i>Figure 6 — Building-based personnel access systems</i>	18
4 Communication	20
<i>Figure 7 — Symbols</i>	21
5 Designing for the safety of operatives working at height	21
<i>Table 3 — Work at height control measures (SFARP)</i>	22
6 Buildability	23
7 Occupiers and end users	23
8 Balancing capital and life cycle costs	24
9 Facilities management	24
10 Maintenance strategy	25
Annex A (informative) Project information	33
<i>Table A.1 — An example of a project information table</i>	33
Annex B (informative) Access methods	35
<i>Table B.1 — Access methods</i>	35
<i>Table B.1 — Access methods</i>	37
<i>Table B.1 — Access methods</i>	39
<i>Table B.1 — Access methods</i>	41
Annex C (informative) Options matrix tool	42
<i>Figure C.1 — Template of options matrix</i>	43
<i>Figure C.2 — Example of options matrix</i>	44
Bibliography	46

Summary of pages

This document comprises a front cover, and inside front cover, pages i to iv, pages 1 to 47, 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 31 December 2012. It was prepared by Technical Committee B/209, *General building codes*. A list of organizations represented on this committee can be obtained on request to its secretary.

Supersession

BS 8560:2012+A1:2018 supersedes BS 8560:2012, which is withdrawn.

Information about this document

[Clause 3](#) of this British Standard is broadly aligned with the RIBA Outline Plan of Work [\[1\]](#), in particular the stages of the design process. At the time of publication, the RIBA Outline Plan of Work [\[1\]](#) was being revised and the stages were being updated, however, the stages given in this British Standard are not affected by this change.

The start and finish of text introduced or altered by Amendment No.1 is indicated in the text by tags [A1](#) [A1](#). Minor editorial changes are not tagged.

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.

BSI permits the reproduction of [Table A.1](#) and [Figure C.1](#). This reproduction is only permitted where it is necessary for the user to work and record findings in the table/figure during each application of the standard.

Presentational conventions

The provisions of 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.

The word “should” is used to express recommendations of this standard. The word “may” is used in the text to express permissibility, e.g. as an alternative to the primary recommendation of the clause. The word “can” is used to express possibility, e.g. a consequence of an action or an event.

Notes and commentaries are provided throughout the text of this standard. Notes give references and additional information that are important but do not form part of the recommendations. Commentaries give background information.

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.

Particular attention is drawn to the following specific regulations:

- The Work at Height Regulations 2005 (as amended) [2].
- The Construction (Design and Management) Regulations 2015 [3].
- The Lifting Operations and Lifting Equipment Regulations (LOLER) 1998 [4].
- The Provision and Use of Work Equipment Regulations (PUWER) 1998 [5].
-  The Workplace (Health, Safety and Welfare) Regulations 1992 [6]. 

Introduction

This British Standard encourages designers to assess, as early as possible in the design process, how work at height can be minimized, and where required the provision of practical, efficient, cost-effective solutions for the safety of those who work at height.

NOTE For the purposes of this British Standard, the term “designer” covers either an individual engaged in design or a team, perhaps representing several disciplines. An integrated design team offers benefits in terms of collective design consideration, including knowledge, experience and problem solving. Also see 2.4 and 3.3.

New-build and refurbishment projects require people to work at height over the lifespan of a building in order to construct, clean, maintain and repair it. By its nature, work at height is hazardous and presents the risk of a fall. Falls from height account for a significant proportion of fatalities and serious injuries experienced during construction and maintenance. As a significant safety risk, it is important that everyone, including designers, who work within the construction industry give it the appropriate attention.

To reduce the number of accidents, designers have duties under health and safety legislation [3], so far as is reasonably practicable¹⁾ (see 2.13), to avoid the need for work to be carried out at height. Part of a designer's duty is to adapt the design where this cannot be achieved so that equipment can be provided to prevent falls. If provision of fall prevention equipment is impractical, equipment or systems of work to minimize the distance and consequences of a fall can then be included within the design. By working collaboratively, the design team is in a strong position to make provisions within their designs that reduce the risk of falls occurring.

Designers assess and manage many competing factors as they prepare their designs. At the concept design stage (see 3.4) the form of the building develops and this can be influenced by factors such as function, location, aesthetics, cost and planning. In addition, there are other factors such as building and fire regulations, sustainability, buildability (see 2.2) and maintainability (see 2.9) to be addressed. The best time for designers to consider work at height is during the early stages of the design: how it can be minimized and carried out in a manner that provides an appropriate level of safety. This is the focus for this British Standard.

By early consideration of the extent, nature, duration and frequency of work to be done at height, appropriate equipment and techniques for use in construction, cleaning, maintenance and repair can be identified. Also how access to and from equipment and places of work at height, and the loads equipment imposes on the structure or surrounding ground can be included early in the design process. Early consideration can help to resolve aesthetic or other conflicts between the proposed equipment or work methods and the other factors influencing the design of the building and its surroundings. This should enable accurate costing and planning for the provision of access equipment, its inclusion into the building and its lifetime use.

Where work at height is taken into account later in the design process, there is a greater likelihood of there being difficulties in making adequate provision for access and inclusion of access equipment. There is potential for poorer detailing and additional cost resulting from redesign, structural alterations and inappropriate access arrangements that increase lifetime costs.

By giving due consideration to work at height issues early in the design process, designers assist those who have to organize, manage and carry out the work at height during construction, cleaning, maintenance and repair. It is also vital that contractors and operatives are trained and competent to carry out work at height.

¹ This principle underpins this British Standard.

1 Scope

This British Standard gives recommendations for incorporating safe work at height into the design of buildings during the design process.

NOTE The recommendations in this British Standard can also be applied to other structures.

It gives recommendations for designers on working safely at height and how to take this into account throughout the design process with specific focus on the early strategic and conceptual stages. It also takes into account the requirements of those who are involved in construction, inspection, cleaning and maintenance.

This British Standard does not give designers prescriptive solutions for work at height but does provide useful guidance to help them manage the process. It is for the design team to develop specific solutions for each individual project.

2 Terms and definitions

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

2.1 anchor line

flexible or rigid line connected, at least at one end, to a structural anchor and to which personal protective equipment can be attached

NOTE 1 A flexible horizontal anchor line is often referred to as a "cable system".

NOTE 2 Anchor lines can be designed to be used as part of a work restraint (see 2.15) or fall arrest system (see 2.5). Systems designed for work restraint only are not suitable for fall arrest.

2.2 buildability

design solution that can be safely and practically constructed

2.3 building maintenance unit (BMU)

suspended access equipment intended to be permanently installed and dedicated to a specific building; BMUs consist of a platform, suspended from a suspension rig that is generally a trolley unit with a hoist operating either on rails or on a suitable surface

NOTE For further information see BS EN 1808.

2.4 designer

person who prepares or modifies a design or who arranges or instructs any person to do so

NOTE 1 Attention is drawn to the Construction (Design and Management) Regulations 2015 [3] for a more detailed definition of a designer.

NOTE 2 Designers can include the client, principal contractor, architects, consulting and contractor engineers of various disciplines, suppliers and manufacturers with design or specification responsibilities.

2.5 fall arrest system

personal fall protection system that limits the impact forces on the body of the user during the arrest of a fall

NOTE The height and consequence of a fall depend on the anchor position relative to the fall hazard and the equipment used.

2.6 hazard

any object, circumstance or activity with the potential to cause harm

NOTE See [2.11](#) for a definition of risk.

2.7 lettability

desirability of a building to a potential tenant

2.8 life cycle cost (LCC)

cost of equipment, materials or processes, including their maintenance provision to fulfil their function for the lifetime of the building

2.9 maintainability

ease with which a product, element, structure or building can be maintained in order to isolate defects or their cause, correct defects or their cause, make future maintenance easier or cope with a changed environment

2.10 mobile elevating work platform (MEWP)

mobile machine that is intended to move and raise persons in a platform to working positions

NOTE For further information see BS 8460.

2.11 risk

chance and consequence of harm occurring

2.12 rope access

technique using ropes to suspend or support a person, normally incorporating two separately secured systems, one as a means of access and the other as back-up security, used with a harness in combination with other devices, for getting to and from the place of work and for work positioning

NOTE For further information see BS 7985.

2.13 so far as is reasonably practicable (SFARP)

level of risk that is balanced against the cost, time and effort that is put into averting the risk

NOTE 1 A point at which an action is not reasonably practicable is where the cost or effort of reducing a risk is disproportionate to the level of risk reduction that would be achieved.

NOTE 2  Attention is drawn to the Construction (Design and Management) Regulations 2015 [\[3\]](#) for a more detailed definition. 

2.14 work at height

work carried out at any place above, at or below ground level, including access and egress to that place, where, if precautions are not taken, a person could fall (from a higher to a lower level) a distance liable to cause injury

NOTE Work at height does not include slipping or tripping and falling on the same level.

2.15 work restraint system

personal fall prevention system that uses a body holding device connected to a reliable anchor to prevent a person reaching zones where the risk of a fall exists

2.16 work positioning

personal fall protection system that enables the user to work supported in tension or suspension in such a way that a fall is prevented

2.17 value engineering

organized approach to the identification and elimination of unnecessary cost

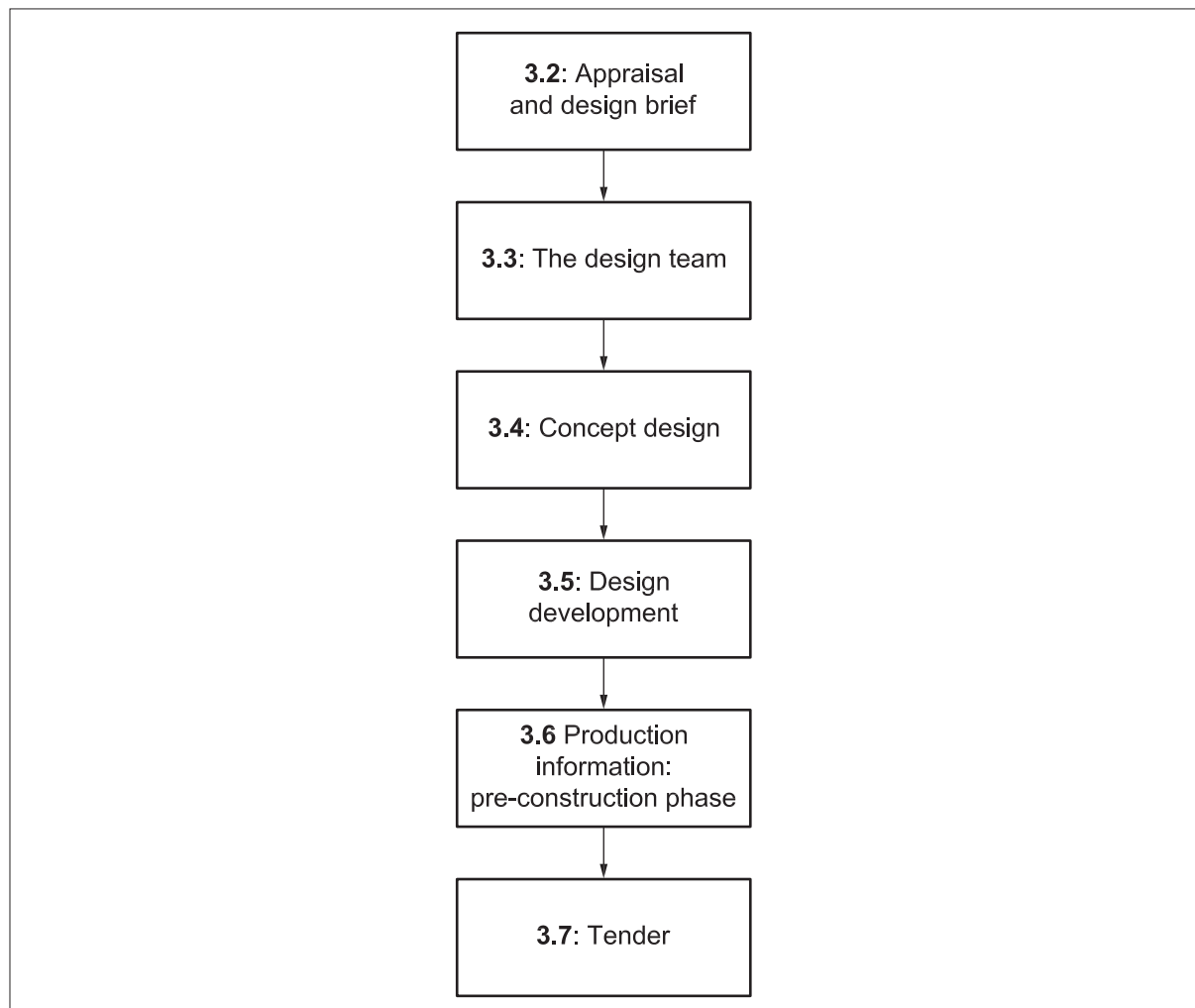
3 Design development process, including work at height

COMMENTARY ON CLAUSE 3

Subclauses 3.1 to 3.7 cover the design development stages (see [Figure 1](#)) that are followed to develop the design of buildings. These stages are typically embedded into appointment contracts and dictate the design progress, client sign off and payment of fees. At each of these stages, recommendations for how safe work at height can be incorporated into the design are given; these stages also broadly follow the RIBA Outline Plan of Work [[1](#)]. Although the stages of the design process broadly relate to those of the RIBA Outline Plan of Work [[1](#)], they are flexible and often merge together within different forms of procurement, e.g. design and build contracts.

Many risks identified during the design process are commonplace and obvious to the design team (see [3.3](#)) who have to address them. During the design process these can be eliminated or reduced by conventional good practice, providing effective solutions for the permanent building, the construction phase and future maintenance. Significant risks are not necessarily those that involve the greatest risks, but those, including health risks, that are not likely to be obvious to other designers and competent contractors, are unusual or are likely to be difficult to manage effectively.

NOTE Attention is drawn to the Construction (Design and Management) Regulations 2015 [[3](#)] and Work at Height Regulations 2005 (as amended) [[2](#)].

Figure 1 — Design process flowchart

3.1 General

The design process and resulting construction and maintenance access strategy should minimize the need for work at height as far as is reasonably practicable. Where work at height is necessary, the design team should ensure practical and effective solutions are adopted to prioritize the prevention of falls in accordance with [3.4](#), [3.5](#), [3.6](#), [3.7](#), [3.8](#) and [Clause 5](#).

3.2 Appraisal and design brief

3.2.1 Appraisal

The client's needs and objectives for the design project should be identified, including possible constraints on development. The client should assess the options and feasibility studies to make a decision on whether to proceed with the further development of the project.

A site or existing building hazard survey should be provided to the designer and the design team should analyse this to identify significant work at height risks associated with the project.

NOTE Site hazard information could be found in an existing health and safety file or from a site survey, existing drawings, documentation or historical information.

At this stage, the designer should also take account of site and other project constraints, for example:

- a) location and topographical features;
- b) town planning limitations;

- c) existing building details;
- d) any project specific issues where work at height could be a significant consideration, e.g. observation platforms, unusual features, high-level lighting, etc.

3.2.2 Design brief

An initial statement of requirements should be developed in the design brief by, or on behalf of, the client, which confirms the key requirements (e.g. visual or aesthetic impact and/or economical design, etc.) and constraints of the project. The proposed procurement method, procedures, organizational structure, range of consultants and others to be engaged on the project should be identified.

A1 An initial statement of requirements should be developed into the design brief by, or on behalf of, the client, which confirms the key requirements, e.g. visual or aesthetic impact and/or economical design, and constraints of the project. The proposed procurement method, procedures, organizational structure, range of consultants and others to be engaged on the project should be identified.

NOTE Attention is drawn to the Construction (Design and Management) Regulations 2015 [3] with regard to the maintenance strategy requirements for all buildings.

For places of work, attention is further drawn to the Workplace (Health, Safety and Welfare) Regulations 1992 [6] to facilitate safe working at height, with particular attention to Regulations:

- a) 5 – Maintenance of workplace, and of equipment, devices and systems;
- b) 13 – Falls or falling objects;
- c) 14 – Windows, and transparent or translucent doors, gates and walls;
- d) 15 – Windows, skylights and ventilators; and
- e) 16 – Ability to clean windows, etc., safely. **A1**

3.3 The design team

The design team should have the appropriate expertise to advise on work at height from the concept stage (3.4) through to the detailed design stage (3.5.3) to achieve the following benefits:

- a) minimizing the need to work at height;
- b) provision of suitable safe access for work at height;
- c) the selection of proprietary or bespoke equipment and solutions for access;
- d) improved buildability;
- e) minimizing the possibility of disruption and increased cost to the design, planning and construction process;
- f) minimizing disruption and costs associated with maintenance and cleaning.

NOTE 1 The design team would benefit from the inclusion and input from the following at the appropriate stages: client; client's facilities management (see Clause 9); principal contractor, architects, consulting and contractor engineers; principal designer; relevant specialist suppliers/contractors/consultants. Multiple roles can be provided by one (or more) person depending on the size, nature and complexity of the project.

NOTE 2 The principal designer and principal contractor are roles defined and set out in the Construction (Design and Management) Regulations 2015 [3].

NOTE 3 **A1** Where lifting equipment is required for safe working at height, attention is drawn to the Lifting Operations and Lifting Equipment Regulations 1998 [4] as referred to in Regulation 12 of the Work at Height Regulations 2005 (as amended) [2]. The necessary "as installed" record including all fixings to primary structure, with the requirement for initial and periodic certified inspections in the LOLER legislation, are explained by the Safety Access Federation in two guides: SAFed LG2 - Guidelines on the Lifting Operations and Lifting Equipment

Regulations 1998 (LOLER) [7] and SAFed LG3 - Guidelines for the Thorough Examinations of Suspended Access Equipment and Building Maintenance Units (Permanently installed) [8].

Where the maintenance strategy in the design brief requires work equipment subject to the PUWER legislation, attention is drawn to the Provision and Use of Work Equipment Regulations 1998 [5].

Any contracted beneficial use during the construction phase should not damage or degrade the work equipment, which should then be refurbished, re-inspected and re-certified.

NOTE 4 Attention is drawn to LOLER [7] with regard to inspection prior to handover to the client. 

Designers should have an understanding of the work methods required for construction, cleaning and maintenance, particularly if the work methods are complex or unusual.

Where there are parts of the design that could create significant risks during construction or future maintenance, they should be highlighted on the design (see [Clause 4](#)) by the design team for those who have to manage them.

Designers should be assisted by the principal designer to facilitate this process if a principal designer has been appointed for the project.

3.4 Concept design

The design team should develop a concept design that meets the design brief (see [3.2.2](#)). This should start with initial proposals for the overall shape of the building, structural form, cladding and building services.

Based on these initial proposals the design team should identify construction, maintenance and access processes where work at height is required and manage these within the design process to avoid or minimize the risk. Where the design team does not have the competence to address these issues within the design process themselves, a specialist should be consulted.

To allow work at height to be carried out safely measures to mitigate and manage risk should be taken, which might include changes to the shape, form and materials to be used for the building and the envisaged provision of access equipment. The design team should prepare sketches and images that include potential work at height solutions, for approval by the client.

NOTE The following might have an impact on the way work at height is carried out and could lead to refinement of the basic shape and form:

- a) the height and form of the building or structure, including elevations, atria, roofs, etc.;*
- b) the "footprint" and the shape(s) of the plan and surroundings of the building or structure;*
- c) the ratio of glazing to general cladding;*
- d) the largest area/size of glazing and therefore the weight of the glass and or cladding panel to be installed or replaced;*
- e) the topography/geographical area in which the building is to be situated might influence the frequency of cleaning and light duty maintenance that might be required;*
- f) conditions and load-bearing characteristics of the ground during construction and lifetime of the building.*

By this stage, and where appropriate earlier in the design process, designers should be identifying and evaluating work at height issues; a document, such as [Table A.1](#), can be used to list project specific characteristics and record designers' rationale for selecting particular equipment and techniques for work at height.

The information available to the design team at this stage should allow decisions to be made about the type of access systems that can be incorporated into the building and their basic requirements included into the design process. The design team should also advise the client on the proposed cleaning and maintenance strategy that could be used throughout the working life of the building.

By the end of this stage the concept design should have been developed into strategic proposals for the overall shape, structural form, cladding and building services. These should include identification of any permanent access equipment necessary for the maintenance and cleaning of the building. Outline specifications and preliminary costs should also have been established. There should be formal agreement with the client of the concept design.

3.5 Design development

3.5.1 General

During the design development stages given in [3.5.2](#) and [3.5.3](#) the concept design should be developed to produce more definitive information.

During these design stages the design team should continue to identify and assess features that might influence work at height, recording significant issues.

[Table 1](#) and [Table A.1](#) give examples of building and topographical design characteristics affecting the selection of access equipment for regular maintenance of external surfaces that the design team should take into account.

NOTE 1 As the project develops [Table A.1](#) can be used to record relevant decisions and information for designers, consultants or contractors. This can be supplemented by [Table B.1](#), which gives examples of means of access for work at height.

NOTE 2 The information recorded in [Table A.1](#) might be useful when compiling any information required for the operation, ongoing maintenance or future alteration of the building. Relevant information from [Table A.1](#) can be included in the health and safety file, which can assist owners, tenants and contractors involved in the maintenance of the completed building, as well as future designers and contractors undertaking alterations or decommissioning.

NOTE 3 Attention is drawn to the Construction (Design and Management) Regulations 2015 [\[3\]](#), which sets out requirements for the health and safety file.

Table 1 — Design characteristics affecting the selection of access methods

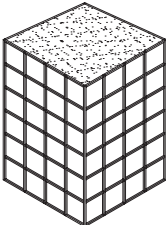
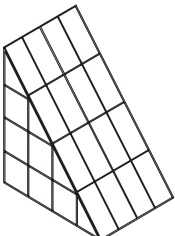
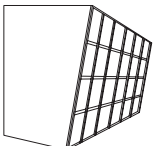
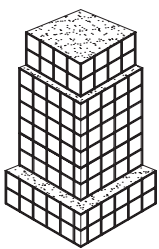
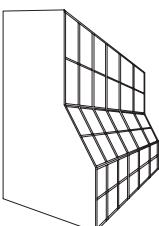
Building and site characteristics	Example	Limitation of access methods
Standard design		
	Vertical plane walls	Can use most methods, however: • Gantries rarely used • 3 or 4 floors for long poles • Ground based systems are typically used up to 6 floors, e.g. MEWPs • Suspended systems are typically used for 6 floors and above • Height greater than 40 m requires restraint ties for suspended equipment • Manually operated suspended equipment is limited to buildings up to about 15 m
Complex surfaces		
	Slope back (including roofs)	Access from ground requires outreach Access from above applies loads to surface unless suspension system provides outreach; cradles generally require mullion guides Gantry system might be applicable where it can span length of slope
	Slope out/negative incline	Access from above might require tie back system
	Step back	Access from below requires outreach to access upper sections Careful selection of MEWP might be required to reach all areas Access from above might be unable to reach whole facade in a single drop; jib supporting cradle might allow cradle to be moved out to accommodate step Separate access arrangement might be required for each section of wall; this requires intermediate roofs to provide suitable access to access equipment
Obstructed walls		
	Canopies, sloping glass roof below vertical wall	Access from below requires outreach Means of exit from bottom of drop required when using rope access Means of emergency escape needed at bottom of drop when using cradles

Table 1 (continued)

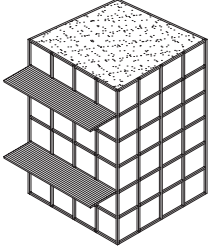
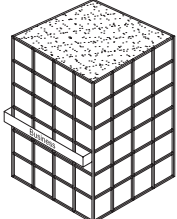
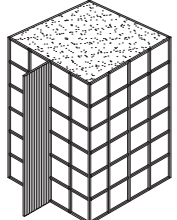
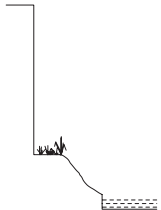
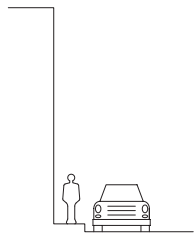
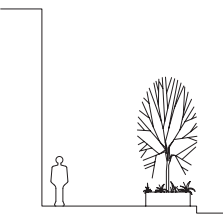
Building and site characteristics	Example	Limitation of access methods
	Horizontal projections, e.g. brise soleil, roof overhangs, supporting structural members, etc.	Might obstruct ground-based access methods Prevents close contact with facade using suspended access but can be overcome with special techniques, e.g. poles or counterweighted cradles Suspended access requires outreach to pass outside line of shading Cleaning might require use of wash poles from access equipment Maintenance (e.g. glass replacement) might require temporary removal of shading to gain close access to facade Brise soleil could be designed to provide a working platform, with other safety equipment Cradles require safety cutouts in case of catching on projections during raising and lowering Access might be required for maintenance of brise soleil
	Signage	Might obstruct access Might require maintenance
	Vertical projections, e.g. brise soleil, columns	Might interfere with movement of access equipment along facade, especially gantries Problem avoided with cradles by raising before moving
Surrounding ground 		
	Soft ground, planting, water feature, slope, weak floor/ground	Unsuitable for ground-based access unless outreach from hard level area is possible Means of exit from bottom of drop needed where using industrial rope access above water When using cradles above water provision of emergency escape is required at the bottom of the drop Deep water requires special measures, e.g. rescue arrangements

Table 1 (continued)

Building and site characteristics	Example	Limitation of access methods
	Trafficked areas including pedestrian	Closure of area during maintenance is required unless access from above can be used and a canopy can be provided to catch falling objects, depending on the nature of the work vertical netting might be required to contain debris For public areas the Highway Authority might place restrictions on work (including areas that only affect pedestrians)
	Obstructed areas, e.g. trees, street furniture, adjacent buildings, narrow doorways/stairs	Might prevent vehicular access to facade for ground-based equipment
Surface characteristics of facade		
—	Fragility	All equipment except gantries might bump against the facade: cradles need suitable buffers, MEWPs need to be carefully operated
	Strength	
—	Marking	Might be caused by rubbing of cradles moving up and down in same position
	Staining	
Roof characteristics ^{A)}		
—	Load capacity	Cradle systems and gantries impose significant loads on structure
	Varying level	Might prevent the same equipment being used for whole facade
	Continuous access to edge	Lack of continuous access might require cradle suspension rail or long jib to support cradle
	Storage area	Required for maintenance equipment
^{A)} Only applicable to suspended access methods. There should be safe means of access to the roof and any suspended access equipment (see 10.5.4).		

3.5.2 Scheme design

At this stage the design should meet the client's brief, be approved by the client and be suitable for the submission of a detailed town planning application.

Detailed decisions should be made about access equipment and working practices for work at height that affects the appearance or function of the building.

The design team should continue to identify hazards and progress the risk management process. The lead consultant should be satisfied that there are no insurmountable problems ahead concerning the integration of the specialist/consultants proposals for work at height provision into the overall design concept.

The client's formal approval should be obtained for the design and the budget prior to the start of the detailed technical design stage (see [3.5.3](#)); this prevents costly and disruptive changes occurring later in the project that might have implications for safe work at height. Any value engineering process carried out at this stage should ensure that the safety objectives with regard to work at height are not compromised.