

Information on access to and movement within and around buildings and on certain facilities for disabled people

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Foreword

This Published Document has been prepared under the direction of the Basic Data and Performance Criteria for Civil Engineering and Building Structures Standards Policy Committee.

The Technical Committee responsible for BS 5810 and BS 5619 is undertaking a review of these codes of practice under the BSI five yearly review procedure.

Since the publication of these codes of practice, there has been considerable debate about their contents and format by organizations of and for disabled people and by professionals involved in the field. Also the introduction of Building Regulations in the United Kingdom which requires access for disabled people has increased the importance of this subject.

The question also arose as to whether these codes of practice should remain separate or be incorporated in a single British Standard.

As a result of these considerations it was decided to analyse the contents and recommendations of these codes of practice with those given in similar foreign national standards and regulations, draft international guides and other international publications and identify the bases on which the recommendations are made.

The analysis is given in this Published Document and is limited to a review of the 'state of the art' only on scope, level of provision and technical requirements. It is being issued to encourage wide consultation and then be used as a basis for work in the preparation of any future British Standard.

It is recognized that research and development may be being undertaken at present, either in the UK or in other countries, and readers are asked to notify BSI of any such work on topics listed in this Published Document. Such a

notification or comments on the recommendations, should be written in English and sent to:

The Secretary
Technical Committee BDB/1
BSI
2 Park Street
London W1A 2BS

Any supporting documentation should contain a summary in English.

The information and recommendations in this Published Document are directed at disabled users of buildings and building environments, architects, Local Government Authorities, Government Departments, BSI Committees, the construction industry and others involved in building provision, management and use.

In various countries the term 'standard' has different concepts. In this Published Document the term has been used to include actual standards, codes of practice, guides or guidelines, and in some cases Building Regulations which are issued by foreign governments in the form of standards.

The draft document entitled Health Building Note 40, was received after the literature analysis had been completed. This document consisted of ergonomics data sheets which are a product of a continuous process of literature searches, user requirement studies, and user studies. However after careful reading of this interesting and useful document, it was concluded that the information does not affect the conclusions reached in section three.

NOTE. The numbers in square brackets used throughout the text of this document relate to the bibliographic references given in appendix A.

Section one. General

1.1 Scope

This Published Document is concerned with access to, movement within and around, buildings by people who are disabled and the options for any future British Standard dealing with these topics. Although egress from buildings is by definition also included, egress in an emergency is not, since this topic is covered in BS 5588 : Part 8.

It does not attempt to define terms such as disabled, buildings and access at the beginning, since this would perhaps restrict the extent of the information examined in the process of developing the document. Instead definitions are considered to be a product of the work rather than a starting point.

It sets out the information currently available in existing British and foreign national standards, ISO publications, and national and international publications produced by organizations for disabled people. It also gives information on the results of research in different countries on various topics concerned with access and use of buildings and their facilities, with comparisons and evaluations of that information.

In addition it describes the approaches used in other national and foreign national standards in terms of the aims, scope, structure, presentation, information included, and other information referred to but not included.

It also considers possible courses of action with regard to any future British Standard.

NOTE. The titles of the publications referred to in this document are listed on page 48.

1.2 General

The data for this Published Document draws on a number of sources. One of these sources was the national standards on accessibility from countries including the USA, British Columbia*, Great Britain, Denmark, Federal Republic of Germany, Hong Kong, Canada*, Finland, Norway, New Zealand, Austria, Switzerland, and Sweden together with the draft standards of Australia and the Netherlands and ISO DIR 9527. A further source of information was the scientific published literature and reports from different researchers in the field. Guidance and recommendations on access for disabled people have been produced by a number of organizations, these have also been examined. Lastly a number of other publications were investigated which did not fall into the previously mentioned sources. All the various sources of information are listed in the bibliography (appendix A).

The document is divided into three sections. Section two describes the analysis of information collected. Section three gives the conclusions reached and gives recommendations regarding any future British Standards in this field. Section four gives a brief summary. The results of the analysis of different features and elements common to buildings and associated areas are given in appendix B.

NOTE. The titles of the BSI and ISO publications referred to in this document are listed on the inside back cover. References to other publications, identified by numbers in square brackets, are given in the bibliography in appendix A.

In order to facilitate easy reference, the foreign standards and draft standards analysed are referred to by their country of origin as follows:

- (a) Austrian Standard [2];
- (b) British Columbian Standard [3];
- (c) Canadian Standard [4];
- (d) Danish Standard [5];
- (e) Finnish Standard [6];
- (f) French Standard [7];
- (g) German Standard [8];
- (h) Hong Kong Standard [9];
- (i) New Zealand Standard [11];
- (j) Norwegian Standard [12];
- (k) Swedish Standard [13];
- (l) Swiss Standard [14];
- (m) US Standard [15];
- (n) Draft Australian Standard [1];
- (o) Draft Netherlands Standard [10].

* It should be noted that reference is made to both the British Columbia Standards handbook and the National Building Code of Canada. They have been treated as separate standards although the former includes the recommendations contained in the latter.

Section two. Analysis

2.1 Status, background and purpose

2.1.1 Status

The status of a standard is very important to its acceptance and use. With several of the standards examined the status was obvious. For example approval of a US National Standard requires confirmation by the American National Standards Institute that the requirements for due process, consensus, and other criteria for approval have been met by the standards developer. In a similar way the status of all British Standards including BS 5810 is set by BS 0 : Part 2 which describes the committee procedures in the development of the standard and the committee structure which seeks to bring together all those with substantial interest in particular projects, wherever possible through organizations representing the views of an industry, sector, trade or other interest.

Although all details were not available in all cases, it would seem that the Draft Australian Standard [1], the Danish [5] and the New Zealand [11] Standards had a similar status to that of the US [15] and British. The standards from Hong Kong [9], Sweden [13], Finland [6] and British Columbia [3] appeared to be issued by government departments within some sort of statutory framework.

With the remaining standards it was not possible to judge their status on the basis of the information given. These included ISO DTR 9527 and the German [8], Austrian [2], French [7], Norwegian [12], and Swiss [14] and Canadian [4].

In several instances the code or standard is mandatory, i.e. called up in law. This was the case with those from Hong Kong [9], Canada [4], British Columbia [3] and Finland [6]. In one or two other cases they supported, or are cited by, building regulations. These included BS 5810 and those of Sweden [13], Germany [8] and Austria [2]. With regard to BS 5810, building regulations either cite or used to cite parts of it as a "deemed to satisfy" document.

2.1.2 Background and introduction

The reason for giving the background as an introduction to a standard can be useful by explaining why a standard exists. A few standards gave specific reasons as to why the document had been produced. For example the Draft Australian Standard [1] was produced at the request of the Australian Uniform Building Regulations Coordinating Council. In some other cases, the reason was to update previous standards. In most cases however no reason was given.

In many instances the philosophy behind the development of a standard on accessibility for disabled people was given. For example the Draft Australian Standard [1], pointed out that there is an increasing number of disabled and elderly people in the community and that at present they represent 13.2 % of the population. The US Standard [15] argued that accessible features and design of buildings and facilities are key factors to enable persons with disabilities

to achieve independence and to allow for the development of human potential regardless of limitation. The Danish Standard [5], in describing different groups of disabled people, emphasized that it is the physical environment that turns an impairment into a handicap and that most people, in one way or another, are handicapped in that they find difficulty in doing things. The Hong Kong Standard [9] argued this view as well and stated that there is no clearly defined line between able bodied and disabled people in that the able bodied are sometimes temporarily disabled and almost all people, later on in life, have some degree of disability. Many other standards argued along these lines and pointed out the need for full integration of disabled people into society. These included the Canadian [4], New Zealand [11], German [8], and Swedish [13] Standards. The French [7] and New Zealand [11] Standards went further and argued that it is more economic to make buildings accessible for all, including disabled people, rather than make other arrangements. Some standards did not give any philosophy including the Swiss [14], Finnish [6] and Norwegian [12] Standards together with BS 5810, BS 5619 and ISO DTR 9527.

Two standards cited research that had been conducted, and which formed the basis for, the standard. The US Standard [15] cited research sponsored by the US Department of Housing and Urban Development (HUD) and the Draft Australian Standard [1] cited a project commissioned by the Australian Uniform Building Regulations Coordinating Council which tested the provisions of the earlier *AS 1428 : 1977.

2.1.3 Purpose and aim

Very few standards had a clear statement of purpose or aim. The New Zealand Standard [11] stated its purpose, who it was aimed at, and what its relationship was to other statutory requirements, as follows:

'The purpose of this standard is to provide design rules for those who are responsible for making buildings and facilities accessible to, and usable by people who have disabilities as required by Section 25 of the Disabled Persons Community Welfare Act 1975'.

The Draft Netherlands Standard [10] stated that its purpose was to:

'... encourage clients, designers and plan assessors to think about ways of improving accessibility in the built environment from the specification stage up to and including the finish of building'.

The US Standard went further and cited the type of disabilities involved and the application of the standard in relation to the functional spaces and technical requirements for accessible elements to be used in those spaces. It also stated that one of its purposes was to achieve uniformity in technical design criteria in building codes and their regulations.

As an example an extract from the US Standard [15], is shown in figure 1.

* Available from the Standards Association of Australia (see reference [1]).

1.1 Purpose

The specifications in this standard are intended to make buildings and facilities accessible to and usable by people with such physical disabilities as the inability to walk, difficulty walking, reliance on walking aids, blindness and visual impairment, deafness and hearing impairment, incoordination, reaching and manipulation disabilities, lack of stamina, difficulty interpreting and reacting to sensory information, and extremes of physical size. Accessibility and usability allow a physically handicapped person to get to, enter, and use a building or facility.

This standard provides specifications for elements that can be used in making functional spaces accessible. For example, it specifies technical requirements for making doors, routes, seating, and other elements accessible. These accessible elements can be used to design accessible functional spaces such as classrooms, hotel rooms, lobbies, or offices.

This standard is intended for adoption by government agencies and by organizations setting model codes to achieve uniformity in the technical design criteria in building codes and other regulations. This standard may also be used by non-governmental parties as technical design guidelines or requirements to make buildings and facilities accessible to and usable by physically handicapped people.

Figure 1. Extract from the US Standard [15], illustrating its aim and purpose

Some standards had very specific aims particularly where it was in relation to a regulation. For example the British Columbian Standard [3] was:

‘to assist users of the British Columbia Building Code’.

A few standards attempted to achieve some kind of social goal in their aims. For example the Finnish Standard [6], aimed to:

‘... place physically handicapped on an equal basis with the general public in gaining access to and use of premises’.

With many of the standards it was difficult to understand what type of standard was intended. Some were obviously stating principles, others mandatory requirements, and yet others guidelines, and some were a mixture of some or all of these.

Where the purpose was not stated, the type of standard not described, or the intended audience not defined, it was very difficult to interpret how the standard was meant to be used.

2.2 Scope and application

2.2.1 General

In general, the scope of most standards dealt with the following three topics:

- (a) the type of disabled people with whom the standard is concerned;
- (b) the types of buildings the standard relates to;
- (c) the relation of the standard to other instruments.

In many cases the scope or application needed to be read in conjunction with definitions given in another section. In some standards the scope referred to the relationship of the standard to other statutory instruments.

2.2.2 Types of disablement

Detailed descriptions of people's different types of disability, the problems they face and their functional requirements were an important inclusion in many standards.

The Hong Kong Standard [9], dealt at some length with the types of disablement for which the manual caters. As an example, an extract from this standard is shown in figure 2.

The Danish Standard [5], went even further by including mental impairment as well as mobility impairment, sight impairment and hearing impairment. It described each of these in detail giving information on the problems that people with these impairments faced in relation to building access, some information on their capabilities and some guidelines on how their problems should be solved. The Danish approach is shown in figure 3.

The Swedish Standard [13], which was also very detailed in describing the different types of handicap and their requirements, also included those with allergy handicaps, brief notes on the elderly, those with psycho-social problems, the incontinent, the epileptic and those with a colestomy. The New Zealand [11] and Swiss Standards [14] included brief lists of the handicapped groups involved.

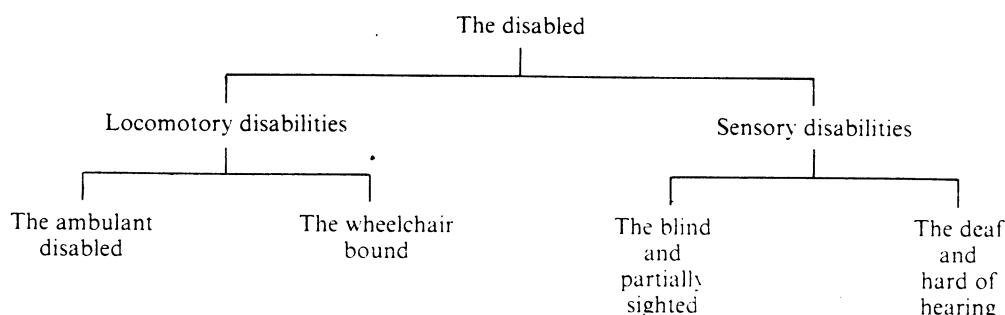
The Draft Netherlands Standard [10] provided great detail on types of handicap such as motor, visual and hearing impairment as well as energy impairment and the types of aids people thus handicapped were likely to use.

The Norwegian [12] and French Standards [7] only applied to wheelchair users. The German [8], Austrian [2], Finnish [6], Draft Australian [1] and US Standards [15] gave only a brief general statement on the part of the population to which the standard applied.

The British Columbian Standard [3] dealt with the capabilities and requirements of disabled people in a unique way. It described the problems relating to different features in each section and then described how the features should be arranged.

None of the standards covered the needs of disabled children or people of restricted growth.

2.2 The types of disablement for which this Manual caters are indicated as follows:



2.3 For the purpose of the regulations, the term "disabled persons" is defined as follows:

"disabled persons" means persons who on account of injury, disease, or congenital deformity, are substantially handicapped in walking.

Building (Planning) Regulation 2 (Amended 1984)

2.4 For the purpose of the Design Manual other terms used are defined as follows:

The disabled The disabled are those people who, as a consequence of physical disability or impairment, may be restricted or inconvenienced in their use of and access to buildings because of:

- (a) the presence of physical barriers, such as steps or doors which are too narrow for wheelchairs; and
- (b) the lack of suitable facilities such as staircase handrails or grab bars beside W.C.s.

Locomotory disabilities People with locomotory disabilities are those with disabilities which affect mobility, i.e. impairment of the trunk, lower limbs, or the trunk and lower limbs. People who have impaired function in one or both upper limbs are manipulatory disabled. Many disabled people with impaired lower limbs also have impaired upper limbs. To satisfy the requirements of such people account shall be taken simultaneously of the limitation imposed by both upper and lower limbs impairment.

The ambulant disabled Ambulant disabled people who are those are able, either with or without personal assistance, to walk on the level and negotiate suitably graded steps provided that convenient handrails are available.

The wheelchair bound The wheelchair bound are those people who are unable to walk, either with or without assistance, and who, except when using mechanised transport, depend on a wheelchair for mobility.

Whilst being unable to walk, a minority of people in this group are not strictly chairbound, inasmuch as they are able to stand on their feet whilst transferring to and from a wheelchair.

Sensory disabilities People with sensory disabilities are those who, as a consequence of blindness, deafness, impaired sight or impaired hearing may be restricted or inconvenienced in their use of buildings because of the lack of suitable facilities.

Figure 2. Extract from the Hong Kong Standard [9] , describing types of disablement considered

2.2.3 Types of buildings

In giving specific information on buildings and their associated areas, the aim in many of the standards examined was to provide guidance to enable architects, planners, designers and others involved in building provision, to design and arrange the features and elements to enable all the various building types, the spaces between the buildings, and the facilities within the buildings to be accessible and usable by disabled people. Private dwelling units or residential units were often incorporated in a general standard on access for disabled people to buildings.

Some standards gave detailed lists of the types of buildings which were covered. For example BS 5810 described building types including transport and industrial buildings, administrative and commercial buildings, health and welfare buildings, refreshment, entertainment and recreation buildings, religious buildings, educational, cultural and scientific buildings, residential buildings other than domestic housing.

Other standards, including the New Zealand [11], French [7], and Finnish [6] Standards, also has detailed lists although the latter, because of its mandatory status, defined the buildings in a legal context.

1.4 Different groups of disabled people

It will always be a disadvantage not to be able to do certain things, e.g. play the violin, walk, read, or play soccer. However, whether this is a handicap depends on what you want to do, what work you are in, and whether your physical environment offers sufficient scope for your activities.

We have all, at one time or the other, experienced something which has set limits to our habitual freedom of action, e.g. straining an ankle or wrist or mislaying our glasses. Any such functional impairment may and will most likely be made considerably worse by physical barriers and inadequate amenities. Very often it is the physical environment that turns a functional impairment, physical or mental, into a handicap.

Children and the elderly often make many of the same demands on their environment as the disabled persons. It is in the order of things that visual and locomotive powers are reduced with age. Failing strength also makes it difficult for elderly people to cope with physical carriers; they move more slowly. Furthermore, they have a special need for well-arranged open spaces in the immediate vicinity of a building, since they are more likely to remain in their local area.

In order to plan to meet the needs of the disabled persons, it is essential that planners are familiar with the various functional impairments which may occur, and with ways and means of alleviating them.

When making plans and projects it is advisable to consult the various groups of disabled people through their respective organisations, see the listing of organizations of and for disabled people in section 6.

A description of the following groups of disabled persons may serve as a brief introduction to the problems:

- mobility impairment
- sight impairment
- hearing impairment
- mental impairment

Part of the information provided below applies to all groups of disabled persons but in order to avoid repetitions, it is only given once.

1.4.1 Mobility impairment

A considerable number of *wheelchair users* avail themselves of the standard hand-operated wheelchair with large wheels at the rear and small at the front. In order to operate the wheelchair the user takes hold of the tyres of the large wheels or, what is a more common practice, grips and metal rings attached to the outer side of the wheels; it is, of course, possible for a helper to push the vehicle. There are also wheelchairs with front-mounted large wheels. Propelling a wheelchair is in fact very hard work, which may well result in cramps in the hands of the wheelchair user if the latter has to operate the wheelchair for a long period of time.

The length of a wheelchair is usually less than 1.25 m, footsupport included, and the width less than 0.76 m. A turning diameter of 1.4-1.5 m is normally required. Electric wheelchairs are somewhat wider, but as hands are kept inside during travel, the total width dimensions are more or less the same in both cases.

The maximum difference in level which a wheelchair user without a helper can cope with is about 25-30 mm, but not all disabled persons can manage this. Many wheelchairs can negotiate bumps on a road surface; wheelchair users may, however, be in for an unpleasant experience unless the wheelchair has a good spring suspension. Thus travelling on surfaces with stone-sett paving, uneven pavements, and the like may be very painful to the disabled person.

A person in a wheelchair can usually reach between 0.4 and 1.2 m across a floor, provided that the function of the arms is normal. The installations to be reached should be positioned at a distance of at least 0.4 m from any one corner.

Figure 3. A detailed description of different groups of disabled people and the problems they face (taken from the English translation of the Danish Standard [5])



There are also hand-operated tricycles available which can be used by disabled persons with good arm and shoulder muscles.

Hence the following demands on planning:

- even surfaces without differences in level
- sufficient space for passing and turning
- handles, switches, and so on to be within easy reach of the wheelchair user.

Persons who have difficulty in walking and who use crutches or walking sticks, find it difficult to cover long distances (50 m may be far too much). Short distances and suitable places for taking a rest are therefore essential.

Persons with difficulty in walking have a particularly hard time when it snows or rains, since many surfaces, e.g. pedestrian crossings and wood and stone-sett pavings, may become very slippery in damp weather.

Hence the following demands on planning:

- short distances with well-arranged places for taking a rest
- even and non-slippery surfaces without any major differences in level.

1.4.2 *Sight impairment*

Blind persons find their bearings by listening, e.g. to the traffic, by smelling, e.g. shops and plants, by feeling their way with their feet, e.g. contrasting textures of surfaces, with the help of a cane, e.g. if the way is clear, and with their hands, e.g. tactile signs. Furthermore they count their way forward: number of steps taken, of cross roads, stops, etc.

The white cane used by blind persons is an important aid to orientation and is a sign of warning to other people in the traffic.

Partially sighted persons need plenty of light, and the colours of things they are trying to locate or on their guard against must stand out plainly in contrast with the background. In the case of entrances with glass doors and/or major glass sections around them, the actual place of entry must be marked. The nosings of steps, if any, should be marked clearly with wide stripes painted white.

The faculty of vision deteriorates considerably, in fact, with age. 40-year-olds need double the intensity of light of what 20-year-olds do, and the 60-year-olds need six times as much light.

When choosing contrasting colours another consideration to be taken into account is the fact that 5 % of the population have a diverging colour perception.

Hence the following demands on planning:

- a simple and well-planned layout of the physical environment
- even surfaces with tactile (perceptible) indications of direction
- no unexpected obstructions in walking areas
- plenty of light, clear and readable street and traffic signs at a convenient height above ground
- sign information, whether by means of a text or by way of visual symbols, to be supplemented with sound information.

1.4.3 *Hearing impairment*

The hearing impaired have little or no possibility of making use of audible information such as sounds of steps, engine noise, or sound signals.

The deaf and the hard-of-hearing have the additional problem that their disability cannot be seen and that it is therefore not noticed by other people. Arm bands and signs with three black dots on a yellow background are intended for those who have difficulties in the traffic. Such signs and arm bands are, however, easily overlooked by other road users.

Figure 3. (continued)

Lip-reading presupposes that the mouth of the person talking is sufficiently illuminated, i.e. sufficient light vertically.

In public places visited by many, wire loop systems are installed to accommodate persons with hearing aids. Permanent microphone installations are combined with wire loops.

Hence the following demands on planning:

- sound signals (especially those of warning) to be supplemented with visual signals
- segregation of traffic (including separate accommodation for pedestrians/bicycles/mopeds)
- wire loops to be installed in public places visited by many people
- permanent microphone installations to be combined with wire loops
- suitable lighting.

1.4.4 Mental impairment

There are many different types of disabilities in this group. In addition to congenital deficiencies and various kinds of central nervous system diseases and brain disorders, it covers disabilities caused by an accident or a cerebral haemorrhage.

Included in the group are the mentally impaired (mentally retarded), confused and psychotic persons, certain groups of spasticity and sclerosis, along with various other types of brain damage (traumatic psychoses), and certain groups of mental disorders.

A considerable number of persons among the mentally impaired are paralytics in addition to being mentally disabled or may have difficulties in coordinating and controlling their movements.

When moving about out-of-doors, persons in this group are confronted with the special problem that they find it difficult to perceive, comprehend, or interpret information such as signs, for instance, and they stumble easily over even minor bumps and fall heavily. They also have spatial orientation difficulties and in some cases lack the ability to distinguish colours or to differentiate between left and right.

It is impossible to set up demands which will ensure a great improvement in the conditions of this group of disabled persons, but minimum provisions would include:

- clear and easy-to-grasp information as an aid to orientation
- even road surfaces.

Figure 3. (concluded)

Some standards referred only to new buildings or buildings which are remodelled or altered (e.g. [15]). The Swiss [14], German [8] and Austrian [2] Standards also included housing, both adaptable and special. The French Standard [7] included normal housing where it belonged to the public or the private sector.

The Hong Kong Standard [9] referred to buildings to which disabled persons have, or may reasonably expect to have, access. With some buildings, however, there were limitations as to the extent of access that was to be provided. For example, not all schools were included, but those providing education for disabled persons were included. In general, however, these limitations were restricted to those areas which are in common use by the public.

In one or two standards, for example the Draft Australian Standard [1], the requirement was that the standard should be applied to the design of buildings and leisure facilities but it did not specify that they should be new buildings.

The Draft Netherlands Standard [10] gave no indication of which building types it applied to although it did state that the dimensions given were generally based on the use of space by a person in a normal hand propelled wheelchair.

2.3 Graphics convention

Only the US Standard [15], gave a graphics convention and a dimensions convention. An extract from the US Standard [15], illustrating this is shown in figure 4.

Although BS 5619 and BS 5810 do not refer specifically to a graphics convention the drawings in all British Standards have to conform with the convention given in BS 308.

2.4 Definitions

It may not always be possible to be precise in the definition of certain terms. The majority of standards have a separate section for definitions. The terms commonly defined were

3.1 Graphic Conventions

Graphic conventions used in the illustrations are shown in Table 1. Dimensions that are not marked "minimum," "maximum," or "normal" are absolute, unless otherwise indicated in the text or captions.

3.2 Dimensions

All dimensions are subject to conventional building industry tolerances for field conditions. Millimeter equivalents for dimensions 3 in and larger have been rounded off to the nearest multiple of 5.

3.3 Referenced American National Standards

This standard is intended to be used in conjunction with the following American National Standards:

ANSI ASME A17.1-1984, Safety Code for Eleva-

tors and Escalators (including supplement ANSI ASME A17.1a-1985)

ANSI/BHMA A156.10-1985, Power Operated Pedestrian Doors

ANSI/BHMA A156.19-1984, Power Assist and Low Energy Power Operated Doors

3.4 General Terminology

comply with. Meet one or more specifications of this standard.

if, if...then. Denotes a specification that applies only when the conditions described are present.

may. Denotes an option or alternative.

shall. Denotes a mandatory specification or requirement.

should. Denotes an advisory specification or recommendation.

Table 1
Graphic Conventions

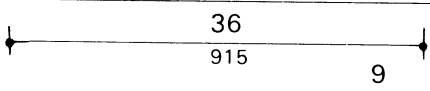
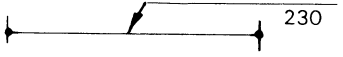
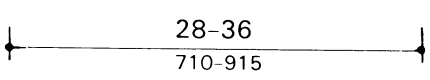
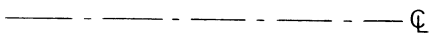
Convention	Description
	Typical dimension line showing U.S. customary units (in inches) above the line and SI units (in millimeters) below
	Dimensions for short distances indicated on arrow
	Dimension line showing range of dimensions
	Direction of approach
max	Maximum
min	Minimum
	Boundary of clear floor area
	Centerline

Figure 4. Extract from US Standard [15], illustrating the convention used

types of buildings, disabled people, and access. The most comprehensive list of definitions was given in the US standard [15]. Nearly all the other standards had either a few definitions or none. It should be pointed out, however, that in cases like the Hong Kong [9], Swedish [13] and

British Columbian [3] Standards the text was so detailed and explanatory that the need for definitions was almost obviated.

The example of a definition list shown in figure 5 is taken from the US Standard [15]

3.5 Definitions

The following terms shall, for the purpose of this standard, have the meaning indicated in this section.

access aisle. An accessible pedestrian space between elements, such as parking spaces, seating, and desks, that provides clearances appropriate for use of the elements.

accessible. Describes a site, building, facility, or portion thereof that complies with this standard and that can be approached, entered, and used by physically handicapped people.

accessible route. A continuous unobstructed path connecting all accessible elements and spaces in a building or facility that can be negotiated by a person with a severe disability using a wheelchair and that is also safe for and usable by people with other disabilities. Interior accessible routes may include corridors, floors, ramps, elevators, lifts, and clear floor space at fixtures. Exterior accessible routes may include parking access aisles, curb ramps, walks, ramps, and lifts.

adaptability. The capability of certain building spaces and elements, such as kitchen counters, sinks, and grab bars, to be altered or added so as to accommodate the needs of persons with and without disabilities, or to accommodate the needs of persons with different types or degrees of disability.

administrative authority. A jurisdictional body that adopts or enforces regulations and standards for the design, construction, or operation of buildings and facilities.

assembly area. A room or space accommodating a number of individuals as specified by the authority having jurisdiction and used for religious, recreational, educational, political, social, or amusement purposes, or for the consumption of food and drink, including all connected rooms or spaces with a common means of egress and ingress. Such areas as conference rooms would have to be accessible in accordance with other parts of this standard, but would not have to meet all of the criteria associated with assembly areas.

authority having jurisdiction. See *administrative authority*.

automatic door. A door equipped with a power-operated mechanism and controls that open and close the door automatically upon receipt of a momentary actuating signal. The switch that begins

the automatic cycle may be a photoelectric device, floor mat, sensing device, or manual switch mounted on or near the door itself (see *power-assisted door*).

children. People below the age of twelve (that is, elementary school age and younger).

circulation path. An exterior or interior way of passage from one place to another for pedestrians, including, but not limited to, walks, hallways, courtyards, stairways, and stair landings.

clear. Unobstructed.

common use. Refers to those interior and exterior rooms, spaces, or elements that are made available for the use of a restricted group of people (for example, residents of an apartment building, the occupants of an office building, or the guests of such residents or occupants).

coverage. The extent or range of accessibility that a particular administrative authority adopts and requires.

cross slope. The slope of a pedestrian way that is perpendicular to the direction of travel (see *running slope*).

curb ramp. A short ramp cutting through a curb or built up to it.

detectable. Perceptible by one or more of the senses.

detectable warning. A standardized surface texture applied to or built into walking surfaces or other elements to warn visually impaired people of hazards in the path of travel.

disability. A limitation or loss of use of a physical, mental, or sensory body part or function.

dwelling unit. A single unit of residence that provides a kitchen or food preparation area, in addition to rooms and spaces for living, bathing, sleeping, and the like. A single-family home is a dwelling unit, and dwelling units are to be found in such housing types as townhouses and apartment buildings.

egress, means of. A path of exit that meets all applicable code specifications of the regulatory building agency having jurisdiction over the building or facility.

element. An architectural or mechanical component of a building, facility, space, or site that can be used in making functional spaces accessible (for

Figure 5. Extract from US Standard [15], showing the definition list used

example, telephone, curb ramp, door, drinking fountain, seating, water closet).

facility. All or any portion of a building, structure, or area, including the site on which such building, structure, or area is located, wherein specific services are provided or activities are performed.

functional spaces. The rooms and spaces in a building or facility that house the major activities for which the building or facility is intended.

housing. A building, facility, or portion thereof, excluding inpatient health care facilities, that contains one or more dwelling units or sleeping accommodations. Housing may include, but is not limited to, one-family and two-family dwellings, multifamily dwellings, group homes, hotels, motels, dormitories, and mobile homes.

marked crossing. A crosswalk or other identified path intended for pedestrian use in crossing a vehicular way.

multifamily dwelling. Any building containing more than two dwelling units.

operable part. A part of a piece of equipment or appliance used to insert or withdraw objects, or to activate, deactivate, or adjust the equipment or appliance (for example, coin slot, pushbutton, handle).

physically handicapped person. An individual who has a physical impairment, including impaired sensory, manual, or speaking abilities, that results in a functional limitation in gaining access to and using a building or facility.

power-assisted door. A door used for human passage, with a mechanism that helps to open the door, or to relieve the opening resistance of the door, upon the activation of a switch or the use of a continued force applied to the door itself. If the switch or door is released, such doors immediately begin to close or close completely within 3 to 30 seconds (see *automatic door*).

principal entrance. An entrance intended to be used by the residents or users to enter or leave a building or facility. This may include, but is not limited to, the main entrance.

public use. Describes interior and exterior rooms or spaces that are made available to the general pub-

lic. Public use may be provided at a building or facility that is privately or publicly owned.

ramp. A walking surface in an accessible space that has a running slope greater than 1:20.

running slope. The slope of a pedestrian way that is parallel to the direction of travel (see *cross slope*).

service entrance. An entrance intended primarily for delivery or service.

signage. Verbal, symbolic, and pictorial information.

site. A parcel of land bounded by a property line or a designated portion of a public right-of-way.

site improvements. Landscaping, pedestrian and vehicular pathways, outdoor lighting, recreational facilities, and the like, added to a site.

sleeping accommodations. Rooms in which people sleep (for example, dormitory and hotel or motel guest rooms).

space. A definable area (for example, toilet room, hall, assembly area, entrance, storage room alcove, courtyard, or lobby).

tactile. Describes an object that can be perceived using the sense of touch.

temporary. Applies to facilities that are not of permanent construction but are extensively used or essential for public use for a given (short) period of time, for example, temporary classrooms or classroom buildings at schools and colleges, or facilities around a major construction site to make passage accessible, usable, and safe for everybody. Structures directly associated with the actual processes of major construction, such as portable toilets, scaffolding, bridging, trailers, and the like, are not included.

vehicular way. A route intended for vehicular traffic, such as a street, driveway, or parking lot.

walk. An exterior pathway with a prepared surface intended for pedestrian use, including general pedestrian areas such as plazas and courts.

walking aid. A device used by a person who has difficulty walking (for example, a cane, crutch, walker, or brace).

Figure 5. (concluded)

2.5 Design information

2.5.1 General information on features, fittings and spaces included.

The most comprehensive range of features, fittings and spaces included was in the US [15], British Columbian [3], New Zealand [11], Swedish [13] and Draft Netherlands [10] Standards. In each of these specific features and elements were described, e.g. handrails, ramps, controls, lifts, toilets etc. This was best exemplified in the New Zealand [11], Draft Australian [1] and Hong Kong [9] Standards.

The remainder, including BS 5810 were not comprehensive in terms of the features, fittings and spaces included and certain obvious items, such as windows, window furniture and wheelchair spaces, had been omitted.

The range of features and elements covered in the New Zealand [11] Standard is shown in figure 6.

2.5.2 Information relating to specific buildings

Some standards categorized types of buildings and for each category, listed the accessible features and elements. This is illustrated in the extract taken from the New Zealand Standard [11], shown in figure 7.

The Hong Kong [9], and British Columbian [3], Standards also used this approach.

In the Swedish Standard [13], an attempt was made to give detailed design advice on a number of buildings and associated areas. The advice frequently, however, was given in terms of desirable goals (e.g. self service desks should be easily utilized) rather than in terms of specific design features and dimensions. The number of building types was also limited (e.g. theatres and temporary buildings were omitted).

Section	Schedules
201 General	A Passenger transport terminals
202 Projections and openings	B Public toilets
203 Car parks	C Banks, commercial buildings and premises and professional offices, municipal offices, government offices, restaurants, taverns, cafes, canteens, and shops
204 Footpaths and ramps	D Churches, chapels, educational and cultural institutions including schools, universities, museums, art galleries, public libraries, theatres, cinemas, concert halls and meeting halls and other places of public assembly
205 Kerb ramps	E Hospitals, medical, and dental consulting rooms
206 Stairs	F Hotels and motels (and other premises providing accommodation for the public)
207 Handrails	G Motor camps, camping grounds, cabins and caravan parks
208 Corridors, doorways and doors	H Sports stadiums, public recreation centres and swimming baths
209 Lifts	J Factories within the meaning of the Factories and Commercial Premises Act 1981
210 Toilet facilities	K Public parking buildings
211 Public counters and desks	
212 Surface finishes	
213 Controls	
214 Alerting devices	
215 Visibility factors	
216 Places of assembly	
217 Signs	
Section	
301 General	
302 Access routes	
303 Car parking	
304 Lifts	
305 Stairs	
306 Toilets	
307 Application	

Figure 6. Extract from the New Zealand Standard [11], showing the list of elements, features and applications