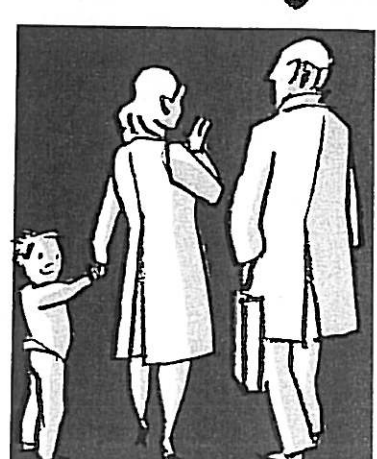
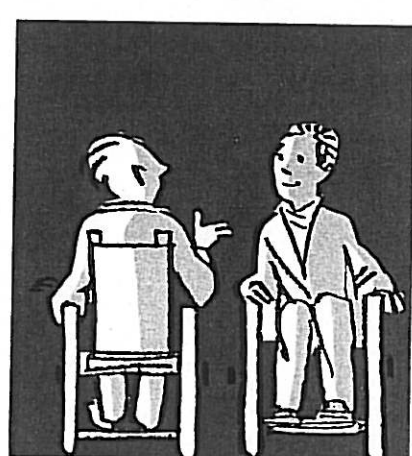


STREETS for EVERYBODY



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PREFACE

Creating a street environment that is accessible to "everybody" is perfectly feasible. All it requires is know-how, the will, resources and the participation of the users. The main aim of "Streets for Everybody" is to promote greater know-how and thus make changes possible.

"Streets for Everybody" aims to give impulses and ideas for measures in street areas. It discusses street and pedestrian areas on private property, footpaths in parks, pavements, pedestrian crossings and parking areas. The goal is to add to the knowledge of municipal decision-makers, planners and builders. This book can also be used as a joint platform for cooperation between these groups and the users.

The Swedish original of this book – "Gator för alla" – is widely used by Swedish local authorities as an important source of knowledge and information when plans are drawn and decisions made concerning public street environment.

The first chapter, "People and Needs", provides a comprehensive picture of *physical ability*. The users address general wishes about goals and policy regarding increased accessibility to the decision-makers.

The chapter "Goals and Methods of Working" discusses the options facing the *decision-makers*. The decision-makers balance the wishes of the users with other considerations. Goals and policies regarding increased accessibility are formulated, resources are earmarked and the assignment is given to planners and builders.

The chapters "Design, Operation and Maintenance" and "Practical Examples" discuss *measures taken by planners and builders* in the street environment in accordance with the goals formulated. The optimum design, together with the most efficient use of resources, is worked out and formulated in cooperation with the users. Detailed information on different functional requirements of the user group is given.

"Streets for Everybody" was written by Roger Johansson, Gothenburg Street & Highway Dept, assisted by a group consisting of Valter Brandberg (chairman), Swedish Association of Local Authorities; Karin Månsson, Swedish Association of the Visually Impaired and Swedish Association of Neurologically Disabled; Elisabeth Svensson, Swedish Institute for Disabled Persons; Inger Eriksson and Gerd Klang, Swedish Federation of Disabled Persons; Jan Ramqvist, Malmö Highways Department; Stig

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The translation into English of the Swedish original "Gator för Alla" was kindly sponsored by Nichido, Nippon Road Co, making this English edition possible. Production was supervised by Björn C Hårdstedt, Swedish Association of Local Authorities.

DEFINITIONS. The street area consists of the street with its carriageways, cycleways, pavements and dividing strips. Also included in this area are the street's "furniture" in the form of signs, railings, posts, benches and flower beds, etc. as well as the street's "walls" with protruding parts of buildings, doors, loading bays, etc.

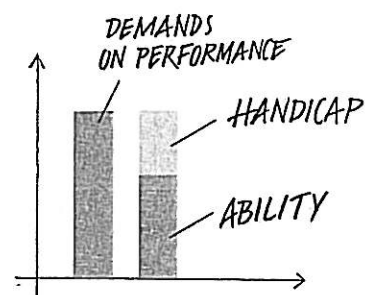
The World Health Organization (WHO) distinguishes between three terms:

Injury is a loss or something abnormal in a person's psychological, physiological or anatomical structure or function.

Functional impairment is the limitation of the capacity of a person to perform an activity in a way that can be regarded as normal. In the majority of cases, functional impairment is a direct result of an injury.

Handicap is the disadvantage or limitation, caused by a functional impairment or injury, that affects the individual in his social role. Consequently, a handicap is dependent on the culture and social environment in which the individual lives. A person with a functional impairment may be handicapped in certain social situations and environments but not in others.

Henceforth, the word handicap will not be used in this book. The term is often related to the capacity of the individual in contrast to its real meaning – the difference between design performance and the capacity of the individual. In this book, we use the term functional impairment, and it is the demands of the street area on performance that must be reduced.



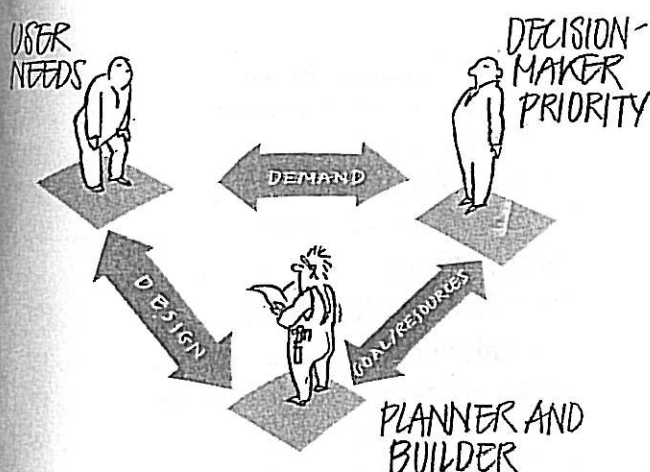
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SUMMARY

THE AIM OF THE BOOK. This book is intended as an aid for building, furnishing and maintaining street areas in such a way that "everybody" can use them. The book can be used in two ways: firstly, as a source of advice and information on how to solve technical problems; secondly, as a joint platform for users and decision-makers when drawing up a local programme for accessibility. The book can be used both to find out what this entails and how to carry out such work.

The interaction between user, decision-maker, planner and builder is illustrated in the following schematic picture:



PEOPLE AND NEEDS. When physically-disabled, mentally retarded, visually- or hearing-impaired people, allergy sufferers, the elderly and children make their way along a street, it is important that the traffic system be adapted to the individual ability. People who are under the age of 12 or are elderly (over 75 years of age) are limited by their age. Some elderly people suffer from several functional impairments. Current and future limita-

tions for each age group are outlined in this chapter. It is important to know the special needs of the individual groups in order to be able to ascertain the optimum measures required for better accessibility. These needs and requirements are described in terms of functional limitations.

It is important to take each functional limitation – in the above groups mobility and strength, sight, sense of touch, hearing, length and range, the capacity to understand and process information, and hypersensitivity into consideration when designing street areas. Ability levels make specific demands on inclination, width, height, siting and detailed design of text, materials, etc.

GOALS AND METHODS OF WORKING.

The adoption of a common approach by users, decision-makers, planners and builders is the key to a successful and effective way of providing "everybody" with better pedestrian areas. The basis for work on setting up goals is found in PBL, the Swedish Planning and Building Act, and the Social Services Act of Sweden. Indeed, the underlying theme in the Swedish legislation is that the country should have a society for everybody. A society for everybody also means streets for everybody.

The methods of working when drawing up plans at different levels contain a crucial difference as regards user influence. In planning work giving rise to a local plan, a model has been developed to show different people how to assert their interests. This is not the case at more detailed levels. The methods of working when planning, operating and maintaining streets should therefore be changed to allow more user influence.

This chapter discusses different ways of formulating goals and the methods of working that provide an effective means of achieving these goals.

STATISTICS

■ 1.14 million people between the ages of 16 and 84 suffer from impaired mobility defined as not being able to run a short distance (100 m) when they are in a hurry (Statistics Sweden 1984-85).

The most common cause of disability is rheumatism.

■ 800,000 people suffer from some form of rheumatism. 250,000 of these have chronic rheumatoid arthritis which, in 90% of all cases, results in hands with reduced strength or flexibility.

■ 590,000 people have problems when walking up or down steps.

■ 500,000 people find it difficult to board a bus or to take a brisk five-minute walk.

■ 250,000 people suffer from reduced strength or flexibility of their hands and/or arms. This impairment is so serious that they have obvious problems in coping with everyday life.

■ 220,000 people need a walking frame, stick, wheel chair or some other aid to enable them to move (Statistics Sweden 1986).

■ At least 30,000 people are dependent on a wheel chair. Electrically powered wheel chairs are becoming increasingly common.

■ About 20,000 people can only use one hand.

Percentage of Swedish population disabled, by age groups 16-84 years (Statistics Sweden 1986).

Age group	Disabled	Severely disabled
16-24	0.7%	0.3%
25-44	1.1%	0.2%
45-64	6.4%	1.7%
65-74	17.8%	8.3%
75-84	39.1%	21.7%
Total	500,000	221,000

WALKING. To walk safely, a person's foot must have a surface to tread on that is even and unbroken, with good friction and a moderate incline. The most common reason for people falling down is a slippery and uneven surface. It is estimated that, at some point in their lives, one in four people in Sweden will trip or slip and hurt themselves badly enough to require a visit to the doctor.

CROSSING THE ROAD. Falling accidents can be the result of a number of events happening at the same time. A pedestrian turns his head to see if it is safe to cross the road and the traffic around him makes him dizzy and stressed. At a pedestrian crossing, he is also affected by the duration of the Cross Now signal, impatient motorists, the length of the pedestrian crossing and the quality of the pedestrian area.

WALKING LONG DISTANCES. Differences in surface levels, incline, the quality of the surface and the opportunities for resting determine how far a person's strength and fitness allow him to walk. Sitting height, the design of arm-rests and back-rests determine whether a person with limited flexibility, balance and strength can sit down on and get up from a seat.

For many people, the car has replaced their legs. Being able to park very close to one's house or flat is a major advantage; for some people, it is a necessity.

WALKING UP AND DOWN STEPS. The height, depth and form of a step and the form of the handrail determine whether a person with short legs and reduced mobility and strength can manage steps. Ramps and heavily sloping footpaths are difficult for people with stiff joints to walk on. In such cases, steps could be a better alternative.

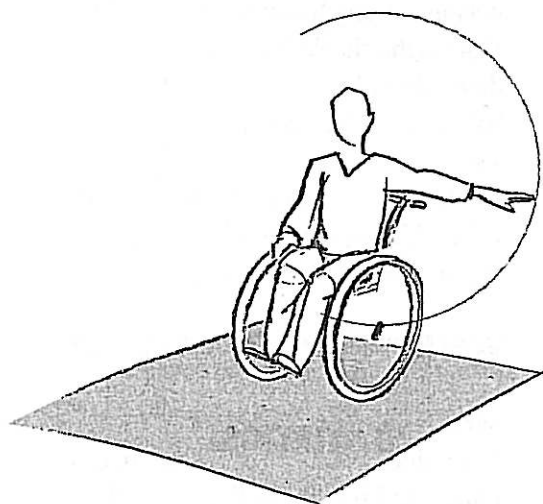
WALKING ON INCLINED SURFACES. A step can be an insurmountable obstacle. Accessibility can be increased considerably by removing the step. Differences in levels, slope, surface quality and opportunities to rest on the ramp or footpath are important factors that determine how a good function can be achieved.

STANDING. Standing and waiting for lengthy periods is difficult for people with back problems and can result in them taking risks when crossing the road (due to long waits) or in not taking a walk at all.

WALKING WITH CRUTCHES, ETC. A person using some form of aid when he is walking (wheel chair, crutch, stick or walking frame) needs more room. Wheel-chair wheels require a non-slip surface without cracks. Dog mess and wet surfaces result in dirty tyres, arms and hands. Sticks, crutches and walking frames must have surfaces, without holes, that can withstand high pressure.

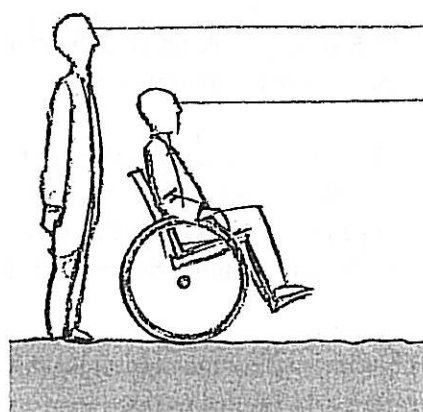
WALKING WITH A GUIDE. Walking with a guide, either human or canine, increases confidence and a sense of security. Pavements should therefore be wide enough for two people to walk abreast and there are pedestrians walking in the other direction.

PRESSING AND GRASPING. The design of buttons, knobs, handrails and handles determines whether a person with hands with reduced flexibility and strength can manoeuvre them properly. In the case of buttons and knobs, the amount of pressure that can be exerted is also important.



REACHING. The height of and distance to buttons and handrails determines whether a person sitting in a wheel chair, or a short person, can reach them.

LOW EYE LEVEL. Parked cars and hedges are just two of the obstacles that short people or people in wheel chairs face. Steps in a footpath are difficult to discern from a low level, they suddenly appear without warning. Short people can find it difficult to see, or even miss completely, information placed at a level for people of normal height.



1.2 IMPAIRED VISION



As people get older, their eyesight changes; a child's field of vision becomes more developed while the visual acuity of elderly people diminishes. The eye's ability to adjust to different distances and large changes in light intensity diminishes with age. The eye can easily be dazzled if it can only adjust slowly to changes from light to dark and vice versa. Since this dazzling effect lasts longer in the case of elderly people (due to the longer time it takes for their eyes to adjust), they run a large risk of meeting with an accident as a result of unsuitable daylight or artificial light conditions in the environment. Impaired vision can also be caused by illness or an accident, or be inherited.

"A person is considered to be visually handicapped if his eyesight is impaired to the degree that it is difficult or impossible for him to read normal print or, with the help of his eyes, orientate himself or if he has corresponding difficulties in his daily life" (WHO). For a visually handicapped person, moving about outdoors is thus a problem of orientation. It is a matter of knowing where one is and not exposing oneself to danger. The visually handicapped do not have access to the orientation points that the sighted have. They are forced to supplement their information with the help of their senses of touch, hearing and smell.

A large number of diabetics are visually handicapped. After a number of years, diabetics may be stricken by a series of functional impairments. Impaired vision is normal, as is bad blood circulation,

which often causes numbness in the feet of a diabetic. A person who has his foot or leg amputated is fitted with an artificial foot or leg with the result that he finds it very difficult, or impossible, to feel the surface he is walking on.

The visually handicapped can be divided into two main groups, the blind and the partially-sighted. There is a large difference between these two groups:

The blind have no residual vision that can be used. They orientate themselves with the help of their senses of touch, hearing and smell and build up a mental map of their surroundings. Here, tactile maps could be a great help. Their sense of touch, mainly in their fingertips but also via the soles of their feet, also gives them information. Information that can be heard and felt is easiest for them. The long white cane is a good aid for orientation and detecting obstacles.

The partially-sighted train themselves to utilize their residual vision and to make use of other senses and aids in order to compensate for their loss of vision. Their residual vision could be anything from being able to distinguish between night and day to having complete vision with a limited field of vision or having reduced visual acuity. The partially-sighted are dependent on contrasts, colour and material contrasts in the environment, and tactile signals. Most partially-sighted persons are sensitive to being dazzled. They can be dazzled by both daylight, lamps and reflections from shiny surfaces. Partially-sighted persons, who see sufficiently well not to need a long white cane, use a short white cane to show that they are partially-sighted and to check edges and obstacles that they can only discern in a diffuse way with their residual vision.

STATISTICS

- 80,000 people require some form of rehabilitation as regards their eyesight.
- 108,000 people between the ages of 16 and 84 years suffer from impaired vision; even when using glasses, etc. they still have difficulties in reading normal print in a newspaper (Statistics Sweden 1986).

**Percentage of people with impaired vision
(Statistics Sweden 1986)**

Age group	Percentage of age group
16-24	<0.1%
24-44	0.3%
45-64	0.8%
65-74	3.5%
75-84	12.2%

ORIENTATING ONESELF WHEN BLIND. The long white cane is an extension of a blind person's hand and can be used to probe the surface just in front of the blind person's feet. The cane also provides audio information since different surface materials and textures sound different when the end of the cane hits them. The surface must be easy to sweep over with the cane and not have any holes or cracks in which the cane can get caught. A logically designed environment makes it easier for a blind person to move.

ORIENTATING ONESELF WHEN PARTIALLY-SIGHTED. It is difficult to discern a street area with few contrasts. A clear, uniform and logical design rich in contrast is good. Signs, information boards, timetables, etc. are important sources of information. The size and type of text, colour and contrast in combination with suitable lighting are factors that affect readability.

DETECTING DANGER. The white cane is used to detect steps, posts, bicycles and other obstacles. The short white cane gives blind people a warning in the zone below wrist level. In the zone above wrist level, there could be protruding parts of buildings, branches, signs, etc. which the blind person cannot detect until he has bumped into them unless they have been marked out at a lower level. A surface material's colour and tactile contrast can facilitate orientation and increase safety.

TREADING ON DIRT. Dog mess and other dirt in pedestrian areas is a scourge that afflicts the blind. It sticks to shoe soles and is brought indoors and onto carpets, etc.

WALKING WITH A GUIDE DOG. A guide dog needs surfaces without cracks, etc. that can injure his paws. The dog's task is to guide his master past

obstacles and to stop at kerbs and where the surface level changes.

WALKING WITH A GUIDE. A guide gives the blind person a sense of security. The pedestrian area must be sufficiently wide for both guide and blind person to be able to walk beside each other and to meet and pass other pedestrians.

BEING DAZZLED. Being dazzled is a major problem for the partially-sighted. The partially-sighted can be dazzled by both daylight and lamps as well reflections from shiny materials. It is important to take the risk of dazzling into account when designing terminals and bus stops where the daylight is allowed to enter. Lamps in the street can also dazzle. In daylight, the partially-sighted are also sensitive to sharp contrasts between light and dark. Being dazzled, for example at the top of a flight of steps, can result in an accident. Even lighting and extra lighting to attract attention constitute a good lighting environment.

HAVING AN IMPAIRED SENSE OF TOUCH. People with poor blood circulation in their feet or with an artificial leg can feel very little, if anything at all, of the surface. Consequently, having even surfaces where there is no risk of tripping is very important.

CROSSING THE ROAD. The blind must have the traffic situation under control if they are to be able to cross the road safely. If there is little traffic and speeds are low, natural gaps in the traffic occur. Traffic lights can also be used to make the road safe to cross.

Noise is the fog of the blind. They need help when crossing a road where there is loud and disorientating noise.

1.3 IMPAIRED HEARING



Impaired hearing causes difficulties in communicating and assimilating acoustic information. People with impaired hearing communicate by reading lips, observing facial expressions and keeping in eye contact. It is important that the light is good so that they can interpret signs and read lips. Sound is heard differently via a hearing aid; it is either amplified or omitted. Noise inhibits people with impaired hearing.

STATISTICS

- 682,000 people of between 16 and 84 years of age (Statistics Sweden 1984–85) suffer from such severely impaired hearing that they find it difficult, even if they wear a hearing aid, to hear a conversation between several persons.
- 200,000–300,000 people are dependent on a hearing aid.
- More than 30% of the people between 75 and 84 years of age have impaired hearing.
- 8,000–10,000 people are estimated to have been deaf since childhood.
- 4,000 people became deaf when they were adults.

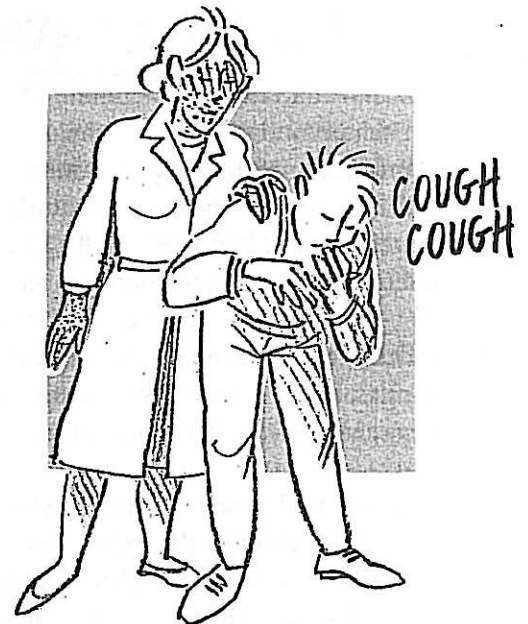
OBTAINING INFORMATION WHEN DEAF.

The deaf compensate for the loss of auditory information mainly via sight and their sense of touch. The information can be presented visually in the form of text or symbols. For persons with both impaired hearing and impaired vision, tactile information is an important complement; in the case of traffic signals, the acoustic signal can be supplemented by a vibrating signal. The ability to read signs or lips is dependent on light conditions – daylight and artificial lighting.

LISTENING WITH IMPAIRED HEARING.

Noise around a person with impaired hearing makes information from loudspeakers difficult to hear. For a person wearing a hearing aid, noise is a serious obstacle to hearing conversations and information. Strong winds distort and camouflage sound.

1.4 ALLERGY SUFFERERS



Buttons, knobs, handles and handrails in the street area maybe made of materials that cause allergic reactions. Exhaust fumes, dust, epithelia from dogs, pollen and the scent of certain plants and chemicals can also cause problems.

A person suffering from asthma or an allergy can react so strongly that he loses his ability to move or communicate. Knowledge of the risk of reactions may result in the allergy sufferer deciding not to move.

STATISTICS

- 3 million people are allergic or over-sensitive (Statistics Sweden 1991).
- 1 million allergy sufferers/asthmatics suffer so much that they have to have medical care at some time or another.
- 450,000 people between the ages of 16 and 64 may suffer from urine incontinence and 44,000 from anal incontinence (Source: Hur många? 1989).
- 400,000 people are allergic to nickel.

BEING ABLE TO USE THE STREET AREA.

The choice of suitable plants and materials makes the street area more accessible to allergy sufferers. Toilets located at regular intervals make it possible for people who are incontinent to use the street area.

DISTANCE TO ENTRANCES. Short distances between vehicle waiting zones and permanent parking and entrances minimize exposure and the effort required of allergy sufferers.

1.5 THE MENTALLY RETARDED

The demands on the environment are increasing as more and more of the mentally retarded move out of institutions and into their own flats, etc. The traffic around us requires quick decisions, determination and consistent behaviour necessary. Not all the mentally retarded have the capacity for this. Uncertainty in the mentally retarded is due to the difference between their ability and the demands made on them.

The Social Welfare Act for the Mentally Retarded covers three groups – the slightly, moderately and seriously mentally retarded. The seriously mentally retarded are often disabled; they are at the same mental level of development as 6–18 month old babies and, consequently, cannot manage by themselves, irrespective of the measures taken in the street environment. Their movements can be facilitated by the same measures as those taken for the disabled.

STATISTICS

- 400,000 people have impaired mental faculties; the majority of these are able to manage with the support provided by society at school, in jobs and in the form of social welfare, etc.

- 40,000 people are seriously mentally retarded as defined by the Swedish Social Welfare Act for the Mentally Retarded. Of these 40,000, 24% are estimated to be slightly mentally retarded, 34% moderately and 41% seriously mentally retarded.

ORIENTATING ONESELF. The mentally retarded often have a poor sense of balance. This makes it difficult for them, among other things, to find their bearings and to find their way. This is particularly the case in complex environments where orientating oneself is dependent on written instructions. The mentally retarded also have problems in monotonously designed housing areas where the form and siting of the buildings are repeated.



CROSSING THE ROAD. Some of the mentally retarded have difficulties in judging distances and direction. They find it hard to comprehend the traffic environment, especially when more than one thing is happening simultaneously. As a pedestrian, it is difficult to cope with situations that assume an overall view of a road with a complicated traffic environment. An example of this is when the design of the street area permits motorists to change lanes in the vicinity of a pedestrian crossing. This is a situation that both confuses and worries a pedestrian. Short pedestrian crossings and clearly defined traffic situations simplify matters. Crossing a road is dependent on interaction between pedestrian and motorist. In such a situation, the pedestrian feels stressed and uncertain.

The way in which motorists drive as they approach can also contribute to the pedestrian's sense of insecurity. He cannot step out into the road until the car has stopped, even if the Cross Now signal is shining. Consequently, the time available to the pedestrian for crossing the road is often too short.

INFORMATION. A mentally retarded person has difficulties in understanding written information. It is easier for him to understand symbols and simple figures, etc. which he recognizes and is familiar with.



UNDERSTANDING AND LEARNING CHANGES. When a pattern followed by a mentally retarded person, moving from one place to another, is changed, the result is a situation he cannot always cope with. The new situation must be learnt, irrespective of whether the change is temporary or permanent. The learning process is a slow one and is made easier if what is to be learnt is clear and simple. Learning can be a difficult process for the mentally retarded. If they are prepared in advance, they have a better chance of coping with such things as diversions in connection with work at a building site.

1.6 THE ELDERLY

Aging is a very individual process; it is impossible to specify an exact age limit when different functions become impaired. Among persons with functional impairments, the elderly are predominant. People change in several respects as they grow older. Physical capacity decreases and is only compensated for in part by greater experience and caution. This can be seen quite clearly in the accident statistics for the group of elderly people aged 75 years or more.

The functional impairments normally suffered by the elderly affect mobility, vision, hearing and reaction time as well as the ability to coordinate information from several events taking place simultaneously. In addition, several functional impairments have a greater combined effect than individually. The flow of information from the surrounding world can be sharply reduced and cause anxiety, insecurity and hesitant behaviour. The capacity of the elderly to cope by themselves is also dependent on how the street area is designed.

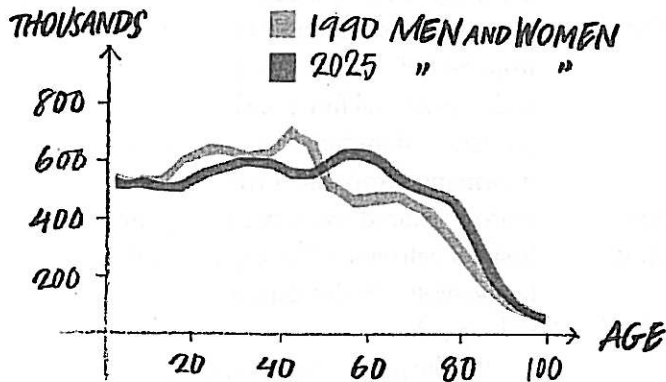
Elderly people usually walk, sometimes the whole distance to their destination, and often to or from public transport.

About 455,000 people in Sweden have a permit that provides them with access to a special mobility service (1989). The number of permits is expected to increase since the percentage of very old people (over the age of 85) is rising. In 1989, mobility service permits had been issued to 57% of all people over the age of 80.

A small percentage of the elderly still drive. Of those who will be pensioners in the next few years, a greater number have a driver's licence and access to a car than today's pensioners. In addition, they are usually better off as a result of better pensions, etc. Consequently, we can expect this group to travel both more and differently. Travelling by car and taxi, in other people's cars and with the mobility service, etc. will together give rise to increased demands for short distances between transportation/parking and entrances.



NUMBER OF PEOPLE IN 5-YEAR INTERVALS



STATISTICS

- In 1987, there were 653,000 people aged 75 years or more (Statistics Sweden 1989).
- In 1995, it is estimated that there will be 747,000 people over the age of 75.
- In 2000, it is estimated that there will be 765,000 people over the age of 75.
- In 2025, it is estimated that there will be 893,000 people over the age of 75 (Statistics Sweden 1989)

BEING ABLE TO MOVE. People who are able to move about in the open air retain their vitality until a more advanced age than do people who are not able to do so. Inactivity is considered to be the main reason for muscles becoming weaker up to the age of 80.

Physical fitness and the ability to move determine a person's speed of movement. In the elderly, the amount of muscle decreases, thus making them weaker. The fast fibres in their muscles are replaced by slow fibres, which makes rapid movements more difficult, and different forms of stress increase uncertainty.

REACTION TIME AND BALANCE. The elderly react more slowly, but this is hardly of any decisive importance. In addition, the older a person is, the more care he or she takes, and, to some extent, slower reactions are compensated for by greater experience.

Decisions take longer or are delayed until somebody else can help. This can be due to the demands made by the traffic environment and to worries about whether one is capable of meeting them. The sense of balance deteriorates. Changes in joints result in stiffness, pain and unsteadiness.

EYESIGHT AND HEARING. The ability of the eye to adjust between light and dark diminishes, with the consequent risk of being dazzled. In addition, an old eye needs much more light and greater contrast in order to achieve the same result as a younger eye. Colours are experienced less intensely. Hearing deteriorates, sounds are heard less clearly and the ability to locate the source of a sound deteriorates. High-frequency engine sounds, such as from a moped engine, may be difficult to hear, while low-frequency sounds, such as a knock on the door, are heard clearly. This means that elderly people find it difficult to distinguish important sounds from irrelevant sounds. It cannot be assumed that an elderly person hears what is most important to hear.

COPING WITH SEVERAL SIMULTANEOUS EVENTS. As we grow older, our ability to perceive and interpret several events occurring simultaneously deteriorates. Children and the mentally retarded also find it difficult to cope with more than one event at a time. Consequently, pedestrian crossings, for example, should be designed in such a way that only traffic in one direction at a time need be observed.

BEING UNCERTAIN. The traffic around us makes demands on speed, decisiveness and consistent behaviour. Not everybody is able to cope with these demands. Uncertainty is due to both our ability and the demands made of us. The pedestrian must interact with the motorist if he is to cross a road safely. The way motorists drive as they approach a pedestrian crossing can also contribute to a continuing sense of insecurity. The pedestrian does not dare step out into the road before the car is stationary, in spite of the Cross Now signal. This means that the pedestrian has less, or possibly not enough, time to cross the road.

WALKING ON COMBINED FOOTPATHS AND CYCLEWAYS. Old people feel stressed, uncertain and insecure when they walk on footpaths combined with cycleways. The cyclist has "the upper hand" because of his speed and can easily crowd the pedestrian to the side. Cyclists make almost no sound, and this results in what are felt by pedestrians to be dangerous situations.

1.7 CHILDREN

The ability of children to cope with the demands made by traffic is largely dependent on their age and how we design traffic solutions. Individual maturity and size are also contributory factors. A short person cannot take long steps. Short arms limit his range. Short and thin limbs also limit the strength of arms and fingers.

STATISTICS

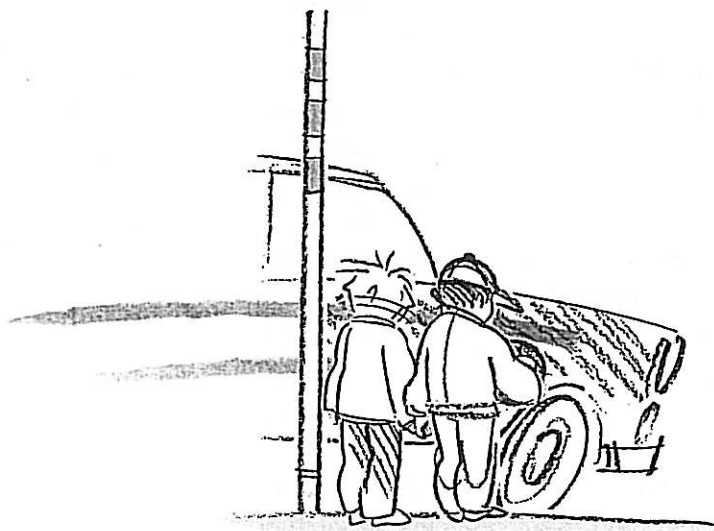
- About 100,000 babies are born every year.
- 104,657 babies were born in 1987, the highest figure since 1974.
- 91,780 babies were born in 1983, the lowest figure of the 1970s and 80s.
- The highest number of births in one year this century was 139,505 (1909) and the lowest was 85,020 (1933).

HAVING A LIMITED FIELD OF VISION.

A person's field of vision develops until the age of 12. Before this age, a child's ability to perceive the world around him is both different and limited in comparison with an adult's field of vision.

LOCALIZING SOUNDS. A child's sense of hearing is not fully developed, which means that its ability to localize sounds is limited.

CROSSING A ROAD. A child gains experience and develops the ability to cope with complicated traffic situations as it grows up. Traffic maturity increases together with age and intellectual development. A short person has a low eye level and, consequently, there is an obvious risk of not being seen due to size and being unable to see due to obstacles blocking the line of vision. It is thus important that there is a clear view at intersections and in other critical places.



2. GOALS AND METHODS OF WORKING

This chapter discusses a street and highway department's reasons for adapting the street environment to the users and how and where in the decision-making and planning process the information provided in "Streets for Everybody" can be used.

Two concepts can be used to illustrate the difference between an outdoor environment where "everybody" has been taken into consideration and a traditionally designed outdoor environment.

Streets for everybody – A design standard that enables the groups described in this publication to move from one place to another.

Streets for some people – The present design standard which is based on people without functional limitations that prevent many people from moving from one place to another.

2.1 MUNICIPAL RESPONSIBILITY

A municipality's responsibility for its inhabitants' welfare and access to social services and public buildings, etc. is based in part on laws, primarily the Swedish Planning and Building Act (PBL), and ordinances stipulating that the municipality must do certain things. This responsibility is also based on the municipality's own programmes. Many municipalities have approved programmes for the handicapped. These programmes describe the goals set up for the traffic environment and accessibility.

In the case of municipal road maintenance, it is the Streets and Highways Department and similar authorities that apply laws and ordinances and, in their daily work, carry out the measures stipulated in the relevant legislation. As a rule, the departments are

familiar with the Planning and Building Act and coordinate their activities with the local housing committee (BN). However, they have practically no experience of the Social Services Act.

What is needed is a comprehensive approach to the adaptation of the physical environment to "everybody". This presupposes direct coordination between the technical and social departments. Consequently, this question should be the responsibility of the municipal administration. A municipality that wants to promote effective and appropriate adaptation should formulate an overall goal. This goal could be included in a general plan and a programme for the handicapped and then form the basis of activity planning and work on drafting the budget. This should be followed by a concrete policy decision in a more detailed general plan and, finally, by a concrete programme at department level.

The constitutional basis of a municipality's goals and policy decisions consists of the following laws and ordinances.

THE SOCIAL SERVICES ACT. § 1 of the Swedish Social Services Act states, among other things, that "society's social services, based on democracy and solidarity, should promote people's economic and social security, equality in living conditions and active participation in social life..."

The municipality has the ultimate responsibility for ensuring that the inhabitants of the municipality are given the support and help they need. This responsibility does not constitute any derogation of the responsibility that rests on other principles." (§ 3)

The social welfare board's tasks include "familiarizing themselves with the living conditions in the municipality, *participating in social planning* and, in collaboration with other public institutions, organizations, associations and individuals, *promoting good environments in the municipality...*" (§ 5)

"The social welfare board's participation in social planning should be based on the board's social experience and should aim in particular at influencing the design and shape of new and old housing areas. The board should also promote efforts to *design public buildings and public communications so that they are easily accessible to everybody*. Furthermore, the social welfare board should also take the initiative, and ensure, that measures are taken to create a *good social environment* and good conditions for children, young people, the elderly and other groups that are in need of society's special support". (§ 7)

"The social welfare board should promote efforts to give people who, for physical, mental or other reasons, face considerable difficulties in their lives, the opportunity to *participate in the community and live like other people*." (§ 21)

In its discussion of the social services bill, the standing committee on social questions emphasized that the term *handicap* should be regarded as a *relative concept*. If the individual is given personal help, technical help or other support, his handicap may diminish. A handicap is thus *the relationship between a person's surroundings and his functional limitation*. This approach makes all public institutions responsible in that the activities carried on must be available to everybody.

The regulations in §1 stipulating that the social services shall, among other things, promote equality in living conditions and active participation in social life also apply to the orientation the Social Services Act should have with regard to people with functional impairments. The general goals in § 1 and the goals of integration and normalization are described in greater detail in § 21.

Certain parts of the social goals, which form the basis of the social welfare board's participation in social planning, are also particularly important to people with different functional impairments. One example of this is the board's task of ensuring that housing areas and service functions are designed to take into account the needs of individuals with different functional impairments.

THE PLANNING AND BUILDING ACT.

The regulations governing the design of public areas, i.e. our streets, footpaths and parks, are laid down in PBL, but taking people with functional impairments into consideration is only required in principle.

Ch. 1 § 1 states that "This act contains regulations concerning the planning of land and water and

concerning building. The aim of the regulations is, while taking into consideration the freedom of the individual, to promote social progress with equal and good social living conditions for people in today's society and in the future."

In ch. 3 § 15, it says "Sites used for building shall be planned in a suitable way, taking into account the townscape, the landscape, cultural values and the natural environment in the area.

Furthermore, it must be ensured that...

Clause 5. The site, unless it is unwarranted by virtue of the terrain and other conditions, can be used by persons with an impaired sense of locality and ability to move."

A site is defined as land intended for building. It includes the land occupied by the building(s) and land directly adjacent which is utilized or needed so that the building(s) can be used for the purpose intended, e.g. open areas for playgrounds, recreation, etc. communication areas and space for parking, loading and unloading.

According to clause 5, persons with an impaired sense of locality and ability to move should normally be able to make use of sites. This includes areas outside the site in a legal sense, such as play and recreation areas. This requirement cannot be satisfied in all types of terrain. Consequently, clause 5 contains the reservation that the requirement must be satisfied, unless it is unwarranted by virtue of the terrain and other conditions.

In ch. 3 § 18, it says: In the case of public places and areas for facilities other than buildings, the stipulations regarding sites in §§ 15-17 shall be applied to a reasonable extent."

REGULATIONS FOR NEW BUILDINGS.

These regulations apply to building sites and buildings as well as streets and pedestrian areas situated on the building sites (local streets). These regulations include the following stipulations:

1:21 Accessibility. Areas in buildings to which members of the public have access should normally be designed in such a way that they can be visited by a person sitting in a wheel chair and that a person with impaired vision can find his way.

1:211 Entrances and passages, etc. Passages and spaces used to move from one area to another by people with impaired vision or an impaired sense of locality should have sufficient room for wheel chairs to manoeuvre. Pillars, protruding parts of buildings, etc.

should be easy to detect and not cause accidents. A corridor or passage should be at least 1.3 m wide. In sections where there are pillars, the width can be reduced to 0.8 m.

1.213 Glass in doors. Large glass areas in doors and glass areas that can be mistaken for doors should be clearly marked.

2.2 OVERALL GOALS

Overall goals are a first and necessary step in carrying out changes from "streets for some people" to "streets for everybody". These goals give a clear indication of a municipality's intentions. Overall goals involving accessibility should be generally formulated and included in *the municipality's operational planning* which is documented in connection with the drafting of the budget. These goals may well be *combined with traffic-safety goals* since they overlap each other. They could, for example, be formulated as follows:

"Accessibility, ease of orientation, safety and security for everybody must be taken into account. In the day-to-day planning, special consideration should be given to people with reduced locomotive power and an impaired sense of locality. This applies particularly as regards:

- a) location of new buildings/housing
- b) work on streets, footpaths and cycleways
- c) operation and maintenance work

These are, in the main, the demands made by PBL on the municipality. The municipality can adopt a more offensive approach by formulating its goals more precisely and with fixed dates:

"Within a period of two years, the existing street, footpath and cycleway systems must give good accessibility, ease of orientation, safety and security to all inhabitants when moving between their homes, jobs, service and recreation."

Goals formulated in this way follow closely the basic principles in TRÅD 92 (General advice for planning a town's traffic network).

At this overall level, the municipality can also specify *different methods of working* in order to achieve these goals, e.g:

■ The improvements shall be carried out neighbourhood by neighbourhood, starting with the neighbourhoods (districts) where many people will benefit from the measures.

■ Improvements will be made first to connecting places and pedestrian areas where many people with functional limitations move, or would move if conditions so permitted.

■ "Opportune" measures will be taken when the street or footpath/cycleway has to be repaired, in connection with excavation work, resurfacing, traffic calming and so on.

■ One type of measure at a time will be carried out over the whole town/city (e.g. first improvements to pedestrian crossings, then the construction of obstacle-free pedestrian areas linking squares and terminals, etc., followed by work on bus stops, and so on).

Most often, it is best to combine two or more types of measures with regard to forming continuous stretches and effective resource utilization.

The overall goal can also include a special policy, regarding operational and maintenance measures, of maintaining accessibility during the winter (this applies particularly to the maintenance of footpaths and pavements in winter).

The *municipal council for the handicapped* and organizations for the handicapped should play an active and constructive role in the formulation of goals and participate in the discussions about direction and method of working. It is at this early stage that solid opportunities are created for exerting influence and collaboration. The ultimate responsibility, however, always rests with the municipality.

OPERATIVE GOALS. In conjunction with the detailed general plans that are drawn up for the urban areas, the overall goals can be made more detailed and the measures in principle illustrated in, for instance, the form of plans for interconnecting pedestrian areas in the districts covered by the plan in question.

2.3 METHODS OF WORKING

PLANNING WORK. The degree of detail increases from the general plan down to the detailed plan. The following questions may need to be discussed:

- Topography – Is it possible to create a continuous and attractive network of footpaths that connects the most important starting and finishing points?
- Demography – In which subareas will the population consist of a high proportion of e.g. elderly people.
- Building technology – Which areas contain listed buildings? Will there be a large element of old tradition in the design of the buildings and the land? Is it possible to reconcile these demands with the functional demands of the users?

In the case of listed buildings, it was noted in the preliminary work on PBL that: "The care requirement, which is motivated to a high degree by social considerations, should, however, not be applied when it prevents changes that are designed to satisfy other important goals set up by society." This applies primarily in the case of improved accessibility for the disabled, an improved work environment and more efficient energy economy.
- Traffic engineering – How does the division into neighbourhoods, either natural or artificial, tally with the movement patterns of the different groups? Where does the traffic flow become so intense that it makes difficult or prevents pedestrians from moving?
- Public transport – Is it possible to create an easily accessible public transport system in the area?

ACCESSIBILITY PROGRAMMES.

The following points should be included:

- Formulation of improvement goals.
- An adaptation level should be determined for different environments.
- Starting points, goals and routes taken as well as the suppressed demand for moving from one place to another, etc. should be mapped and analysed.
- A classification of the "importance" of different interconnecting pedestrian areas and places.

- An analysis of shortcomings in the existing street environment in the context of goals.
- Linkage to housing programmes, social service area, geriatric care and topography.
- Costing.
- Decisions on final improvement goals.
- Proposals for improvement programmes.
- Implementation.
- Evaluation.

STREET PLANNING. When planning streets, decisions must be taken as to which design elements must be taken into consideration and checked as regards people with functional limitations. At the planning stage, this is a question of both design standard and choice of materials for the elements in the street that affect accessibility, ease of orientation, etc.

ENTRANCES

- Surface, size and slope
- Level difference, steps or ramp
- Marking, contrasting surface materials
- Heating

PAVEMENTS AND FOOTPATHS

- Width
- Surface, evenness, friction and contrast
- Slope, resulting slope
- Freedom from obstacles
- Physical guide lines: railings, walls, kerbstones or contrasting materials
- Separation from cyclists

STEPS

- The step: form, depth and height
- Number of steps
- Rest area
- Handrails on both sides
- Marking before steps begin, both at top and bottom, warning
- Heating

RAMPS

- Slope
- Rest area
- Handrails on both sides
- Flush with the ground
- Marking of beginning and end

BUS STOPS

- Marking
- Rest area, bench or back support
- Weather protection
- Clearly visible timetable and information

PEDESTRIAN CROSSINGS

- Location
- Marking
- Length
- Traffic island
- Traffic lights, light, sound, tactile, etc.
- Form of pavement edge, ramp or low kerb

TEMPORARY AND PERMANENT PARKING

- Number of reserved parking spaces
- Distance to objective
- Protected location
- Measurements, division and marking
- Accessible from wheel chair
- Signal to entrance

INFORMATION

- Media, text symbols, tactile, acoustic beacons, auditory information, etc.
- Location, height, distance from observer
- Contents
- Readability, text size, colour, contrast
- Lighting

ARTIFICIAL LIGHTING AND DAYLIGHT

- Places with priority, e.g. steps, ramps, entrances, bus stops, intersections, pedestrian crossings, information, etc.
- Evenness of lighting
- Dazzling and contrast

APPARATUS (parking meters, etc.)

- Knobs, force, form
- Location, height and distance
- A contact group with representatives of the users presenting opinions could be very useful at this stage

OPERATION AND MAINTENANCE. The objective is to maintain the standard of accessibility and counteract the effects of the climate. Generally speaking, the work could follow this pattern:

1. Inspection – does the street and highway department have sufficient know-how?
2. Measurement – how well and how quickly are faults or disruptions rectified?
3. Responsibility – who?
4. Document – is the policy in writing and has it been approved?

Accessibility round – A walk around one's own town can result in open and realistic discussions with the officials, politicians and users.

Pedestrian information – What information are pedestrians given about changes, obstacles, closed pedestrian areas and other changes affecting pedestrians?

Maintenance of pedestrian areas – What is the level of ambition when it comes to how quickly a fault is rectified? What condition are the pedestrian areas kept in, standard? At what rate are the pedestrian areas refurbished? Does the street and highway department have a fixed policy for the inspection and maintenance of pedestrian areas?

Street cleaning – Does the obligation to remove dog mess apply to all pedestrian areas? Does the street and highway department have an established policy for how often pedestrian areas are cleaned?

Prevention and removal of icy surfaces – Does the current division of responsibility and labour as regards prevention and removal of icy surfaces in pedestrian areas function satisfactorily from the pedestrian's point of view? Does the street and highway department have an established policy for the prevention and removal of icy surfaces in pedestrian areas?

Snow clearance – How soon after a snowfall does snow clearance begin? Does the current division of responsibility and labour as regards snow clearance in pedestrian areas function satisfactorily from the pedestrian's point of view? Does the street and highway department have an established policy for snow clearance in pedestrian areas?

Vegetation – What policy does the street and highway department have as regards inspection of vegetation adjacent to pedestrian areas? What is the level of ambition when it comes to how quickly a fault is rectified?

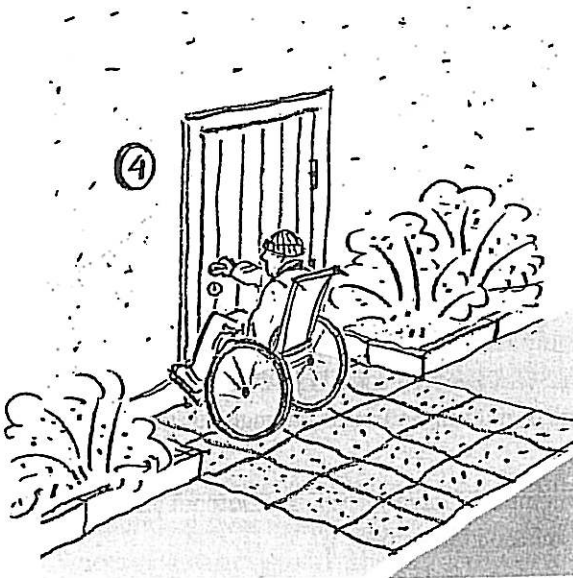
Temporary obstacles in pedestrian areas – What policy does the street and highway department have as regards temporary obstacles in pedestrian areas? Have guide-lines been drawn up for temporary obstacles in pedestrian areas? Who is responsible for ensuring that the regulations are followed? How quickly is a fault rectified?

Contact group – A contact group, with representatives of the users, can provide very useful input in the form of opinions about policy and work routines. This means that problems can be prevented from arising after the work has been done. Such a group could contain representatives of organizations for the handicapped, pensioners' organizations and other activity groups representing the users.

3. DESIGN

This chapter describes links in a chain that makes up the route along which a person moves. If the design is to have a consistent standard, the different street and highway departments must have the same views and approaches as regards their choice of design. Consequently, it is extremely important that no link in this chain contain a design that makes demands that cannot be met. This chapter also describes the general conditions that are important for avoiding any increase in the demands on people's ability.

3.1 ENTRANCE AREAS



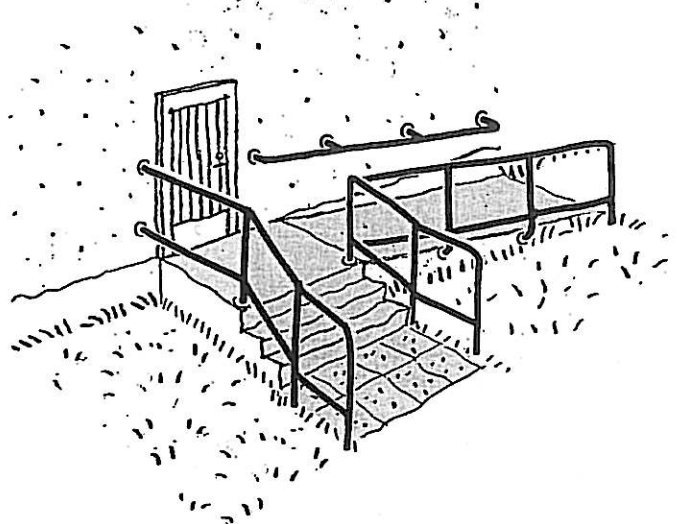
New buildings must be designed in such a way that they can be used by persons in wheel chairs and by persons with an impaired sense of locality. It is thus reasonable that the surface immediately outside the building, the entrance area, be designed so that a person can move to and from the building irrespective of whether the entrance area is set back from the road or in a public area.

DESIGN. There should be a flat space around the entrance so that a person in a wheel chair has room to manoeuvre and reach a door-handle, etc. An open area of 0.7 m in front of the door is sufficient to be able to stand close to the door and open it.

The ground around the entrance should be horizontal. A slight slope (1–2%) for drainage is acceptable. The slope can be reduced by raising the quality of the surface. If the entrance area is protected by a roof, it should be horizontal.

A level path between the entrance and the pedestrian area is almost a prerequisite of good accessibility. No doorstep is best since a single step may well prove to be insurmountable. A ramp is acceptable when a difference in levels cannot be eliminated in any other way.

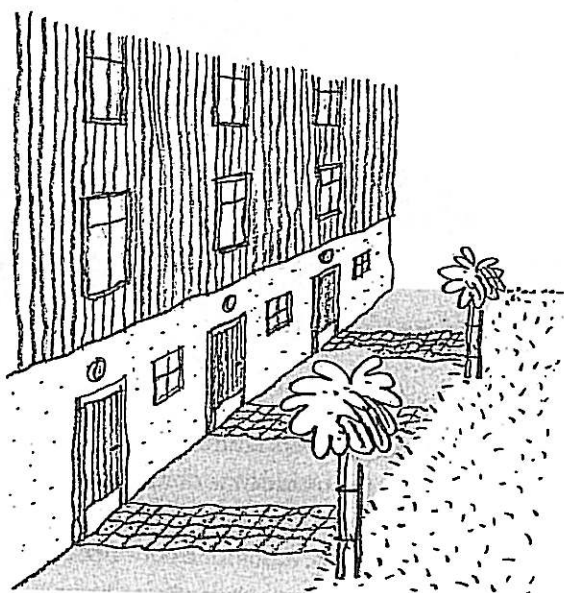
A seat or bench outside the door provides people with somewhere to rest. Rain protection over the entrance shelters to the person resting.



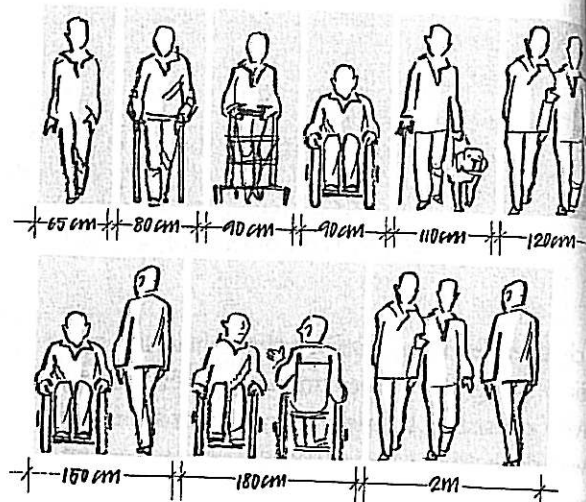
Mechanical door-openers require a control button, which is located outside the door and at a distance that enables a person in a wheel chair to stay next to the control button, even if the door opens outwards. If there is a section of wall beside the door,

the control button can be mounted 0.8 m from the door and at a height of 0.8 m. If there is a corner next to the door and the space between the frame and the door is less than 0.8 m, the control button should be mounted at a distance of 1.5 m in front of and to the side of the doorway.

MARKING. The entrance, the door, the façade around the door and the area immediately in front of it should look like an entrance. It is important that a person with impaired vision can correctly determine from a distance where the door is. Tactile and visual contrasts deliberately used together with a clearly defined appearance make it easier for the partially-sighted to find the right entrance.



3.2 PAVEMENTS AND FOOTPATHS



DESIGN. A footpath should have a width of at least 2.5 m. 1.8 m can be accepted in the case of temporary reductions in width over shorter distances. Often other factors such as snow-clearance machines, necessitate wider footpaths.

Free head room over a pavement should be at least 2.5 m. Occasional obstacles may limit the head room to 2.1 m; a lower head room constitutes a danger to the partially-sighted.

- A gradient of 1% is never an obstacle.
- A gradient of 2% can be managed by most people and also provides good drainage and thus less icy surfaces resulting from frost.
- A gradient of 2.5% can be managed by many people.
- Only a few people can manage steeper gradients than 2.5%. People sitting in manual wheel chairs usually find it impossible to manage this gradient alone.
- When the gradient is 5%, the footpath should have handrails on either side.

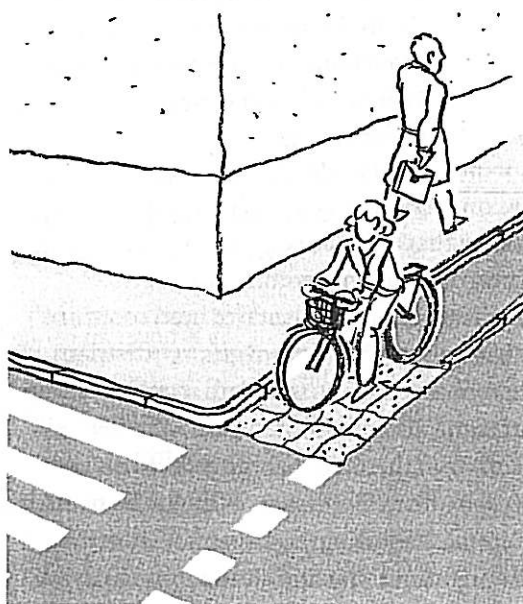
Gutters for rainwater runoff from roofs, etc. should be avoided. Where this is unavoidable, gutters should be shallow or take the form of grooves in the surface.

The footpath should not have any steps or edges. If there are steps, a ramp should provide an alternative route. Posts should be placed outside the pedestrian area; they can also be placed against a wall or in a row of trees. Posts in traffic islands should be placed outside the pedestrian area.

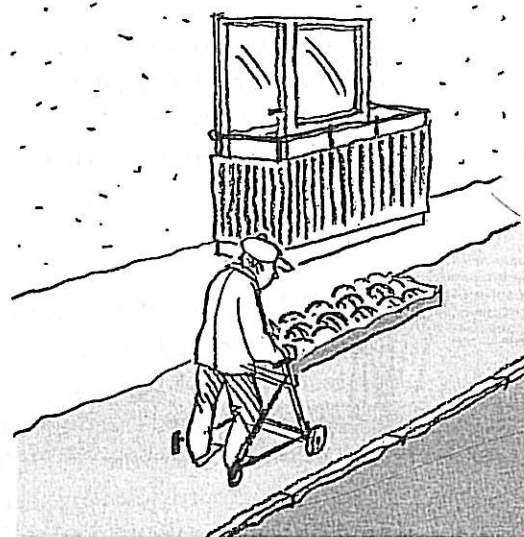
When a combined footpath and cycleway joins a road, different contrasting surface materials should be used to mark where the footpath/cycleway ends and the road begins.

Pedestrians and cyclists should be separated from each other either by a short distance between the footpath and the cycleway or a clearly visible and raised strip. When this is not possible, the footpath and the cycleway should have contrasting surface materials. Where there are few pedestrians and cyclists, a combined footpath/cycleway for both groups is acceptable.

A distance of 10 m between transport and entrance is acceptable. A distance of 100 m to bus stops, neighbourhood services and recreation is often acceptable to most people.



MARKING. A pedestrian area is marked off from surrounding areas mainly by kerbstones. At points where pedestrians cross kerbs, the height of the kerbstones should be reduced or a contrasting surface material used to mark the crossing point. Another solution is to use a surface material that provides both a distinct visual and tactile contrast to the pedestrian area. Kerbstones of a different colour, shade or texture can be used between a pedestrian area and some other area. Parts of buildings that protrude over the pedestrian area below a height of 2.1 m should be clearly marked by some form of permanent sign at ground level.



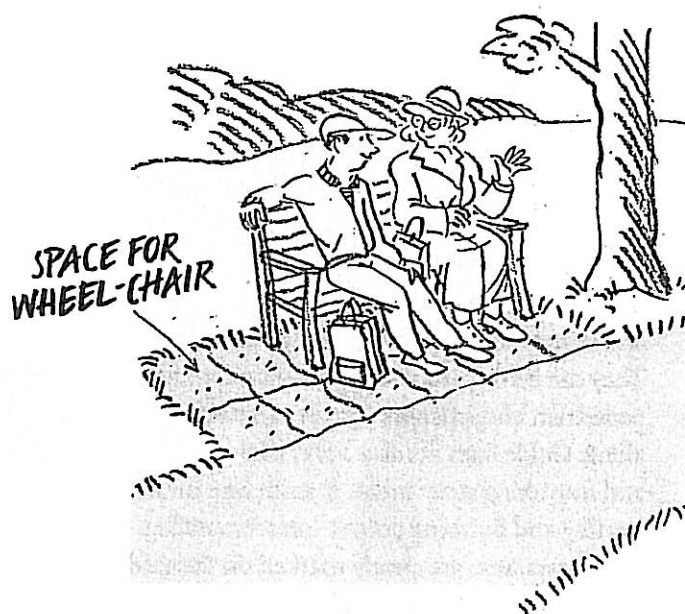
CHOICE OF SURFACE MATERIAL.

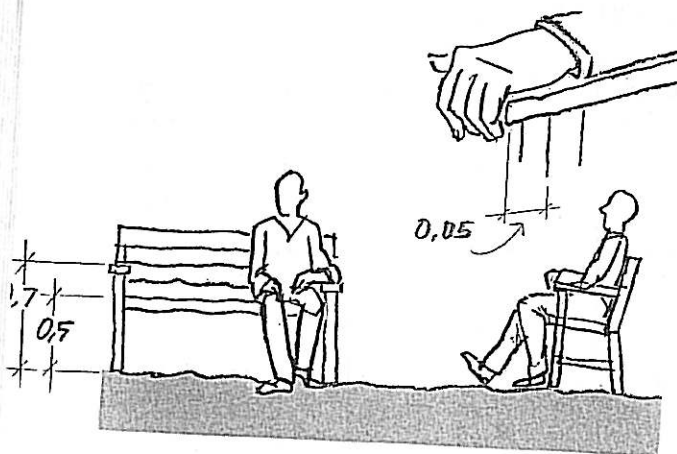
Suitable surface materials: Asphalt (drainage asphalt on pavements provides effective drainage and has good frost resistance). Prefabricated concrete products such as paving slabs and paving blocks, hewn stone in large blocks such as slabs and steps are also suitable.

Doubtful surface material: Compacted gravel.

Unsuitable surface materials: Hewn stone with many gaps, e.g. "knotts".

SEATS, BENCHES. A good sitting height for most people is 0.5 m. Sitting height can be varied so that short people can also sit comfortably. Arm-rests at a height of 0.7 m give support for sitting down or getting up.





Arm-rests that protrude slightly (see illustration) are good. Benches should be located every 100 m along interconnecting pedestrian areas. A distance of 25 m is suitable along primary interconnecting pedestrian areas leading to shopping centres and bus stops, for example. Benches should be placed at the side of the pedestrian area, preferably in a sunny position. Beside the benches, there should be space for a wheel chair. The benches should be painted in a colour that contrasts with the surrounding surfaces. If there is insufficient space for a bench, a horizontal plank to rest against can be positioned at a height of 0.8–0.9 m.



GUIDE LINES. Guide lines should provide guidance and orientation and give warning when necessary. They can be defined as safe and obstacle-free pedestrian areas that are simple to detect and move along. Guide lines are also a way of arranging, limiting and furnishing street areas. A guide line connects starting and finishing points. Interconnecting pedestrian areas are clearly marked on the guide line. All dangers along the guide line must be clearly marked. Contrasting surfaces have a different colour

and texture than the surrounding areas. The border between the contrasting area and the pedestrian area forms a contrast that can be followed. This can be achieved with the standard street construction materials if they are used with this in mind. A contrast can be created by varying the texture of the different surfaces, or by varying the distance between gaps.

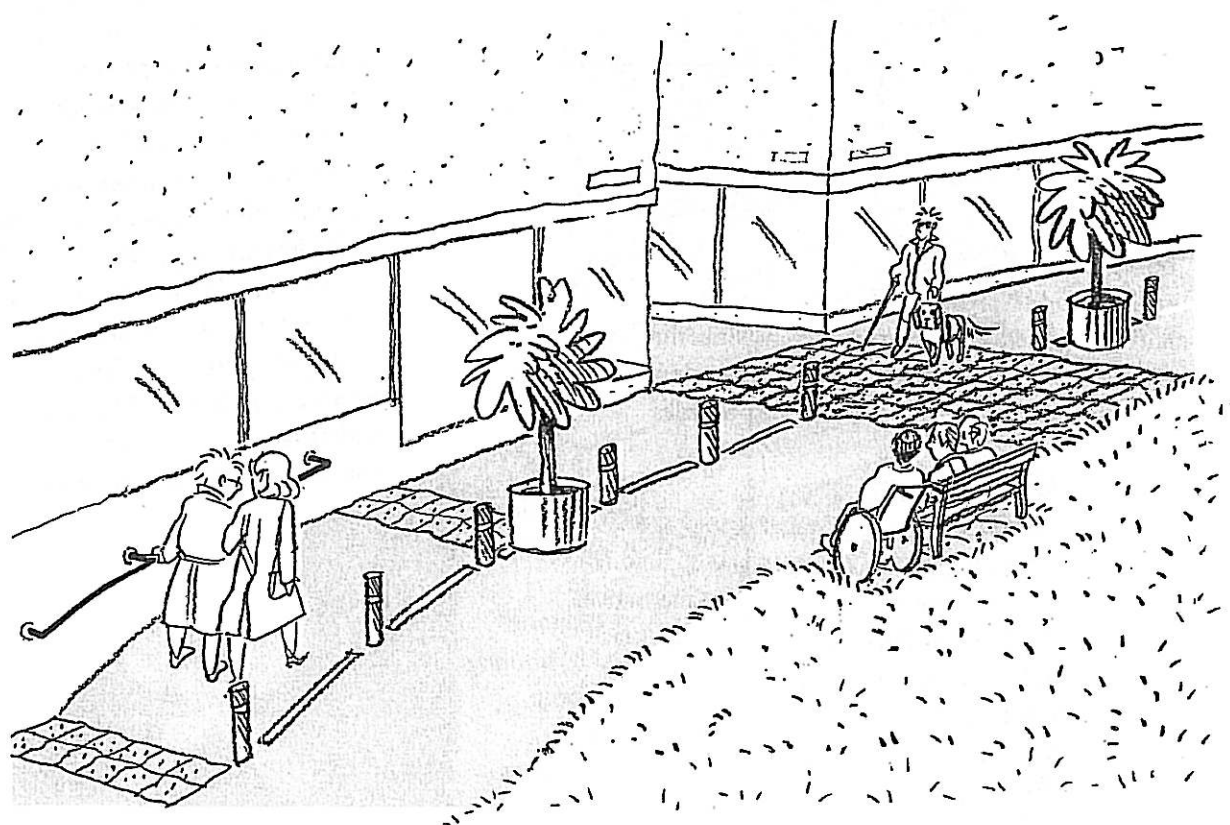
In order to achieve a continuous guide line, a wall, edge, railing or two surfaces with contrasting surface materials must form a continuous and unbroken chain from start to finish. A railing, with the bottom section placed horizontally 10–20 cm above the ground, can easily be followed by a partially-sighted person using his cane.

In addition to the above-mentioned surface materials, there are special products that can be built into the guide line. Paving stones with a ribbed pattern (sinus tiles) are a standard product and have a wave-shaped surface that contrasts very clearly with most other surfaces.

The guide line must be consistent, and it must have a basic standard that satisfies the functional demands of the people who use it. Crossing points, where two guide lines intersect, or other places where a choice of direction must be made can be marked by including contrasting surface materials. This informs the pedestrian that a choice has to be made. A combination of sufficient width, ramps as complements to steps, sufficient free head room and dangers that are marked out provides a pedestrian area with a consistent basic standard. A guide line can be located some distance from sources of noise, or screened off from them, so that the pedestrians can talk with each other. The design of the guide line itself must be simple, logical and consistent. A street area with meaningful and functional variations is easy to find one's bearings in. Changes must be made with great care. At intersections where vehicles cross a pedestrian area, the drivers must be forced to show consideration for the pedestrians.

**SURFACES ADJACENT
TO PEDESTRIAN AREA**
– dividing strip, cycleway, etc.
X = good colour and tactile contrast
*(X) = not as good, but acceptable colour
and tactile contrast.*

Pedestrian area:	Adjacent to pedestrian area						
	Asphalt	"Knott"	Concrete blocks	Concrete slabs	Paving slabs with surface of exposed aggregates	Gravel	Grass
Asphalt	–	X	X	(X)	X	X	X
Concrete blocks	X	X	–	X	X	X	X
Concrete slabs	(X)	X	X	–	X	X	X
Paving slabs with surface of exposed aggregates	X	X	X	X	–	X	X
Gravel	X	X	X	X	X	–	X



ROAD SIGNS. Avoid obstacles in pedestrian areas. Place road signs on walls of buildings. This is also an advantage from the point of view of maintenance. At present, there are no regulations giving a street and highway department the right to attach anything to the walls of private buildings. This may only be done after an agreement has been arrived at in each individual case. Posts placed in pedestrian areas are marked with a contrasting colour or pattern. Light and dark horizontal strips with a width of 0.1 m are easily visible. A good contrast is provided by two light and three dark strips, and several contrasting strips on a post is even better.



BICYCLE PARKING. Bicycles parking areas should be separated from pedestrians by, for example by railings, and be placed outside pedestrian areas. Large and well-placed parking areas, with facilities for fastening a shackle or cable lock to the bicycle frame, will result in most cyclists parking their bicycles correctly.

DRAINS AND COVERS. Drains should not be placed in pedestrian areas. Take great care in their design and placement when there is no other alternative. Gullies should not encroach on the pedestrian area if they are at the same level as the road surface, since pedestrians can easily twist an ankle when treading on them.

Drain covers in the pedestrian area should not have any openings larger than 10 x 20 mm, which means that wheel-chair wheels can roll over them.

NICKEL. Nickel can be found in handles and knobs but is an unsuitable material since it often causes reactions in allergy sufferers. Remember that nickel may be included in alloys used to coat metal.

SYMBOLS. Symbols in the pedestrian area should be the same as the standardized symbols used in terminals, arenas and other public buildings and facilities. For good readability at ground level, symbols should have a square background measuring between 0.3 x 0.3 m. and 0.6 x 0.6 m. Symbols on the ground should be made of contrasting materials.



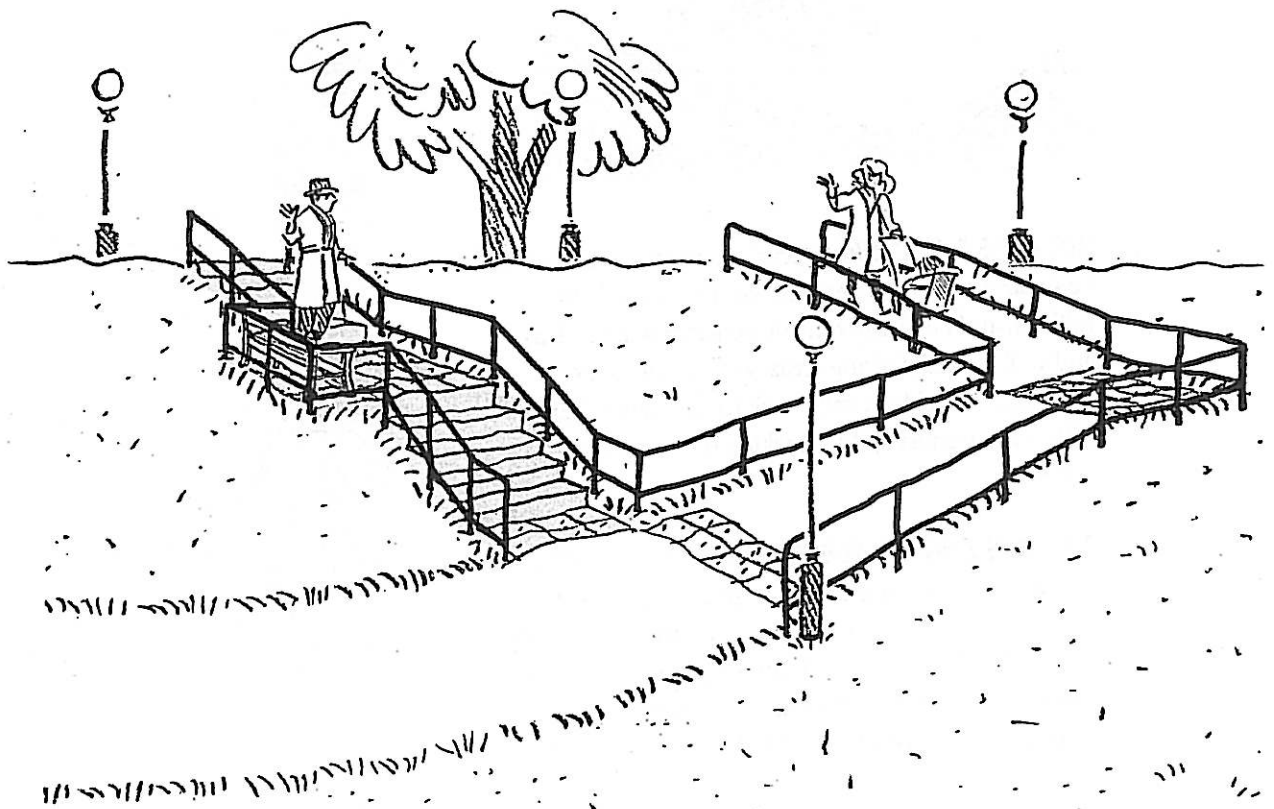
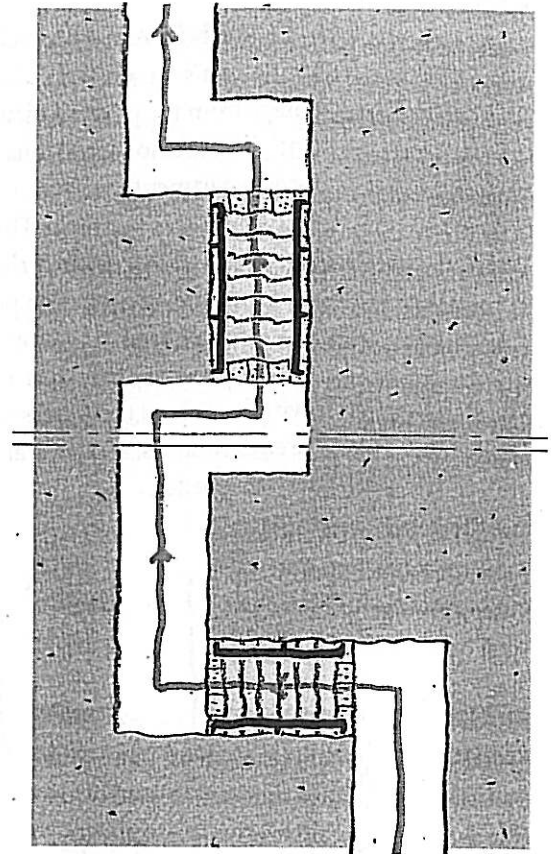
3.3 STEPS

DESIGN. The length of the rest area should be at least 1.2 m. There should be no more than two flights of steps. Where there are large differences in the levels connected by the steps, the rest area could have a bench to rest on. The free width should be at least 1.2 m. The width should be sufficient to allow a person together with a guide to use the steps.

There should be a handrail on both sides of the steps. The handrails should be extended and end 0.3 m before and after the steps respectively while ensuring that clothes, etc. cannot get caught on them. The handrails should also continue past the resting area in order to provide support and guidance. A suitable material is 40 mm piping which is easy to hold on to.

The steps should be placed at an angle to the footpath, in order to reduce the risk of the partially-sighted failing to detect them.

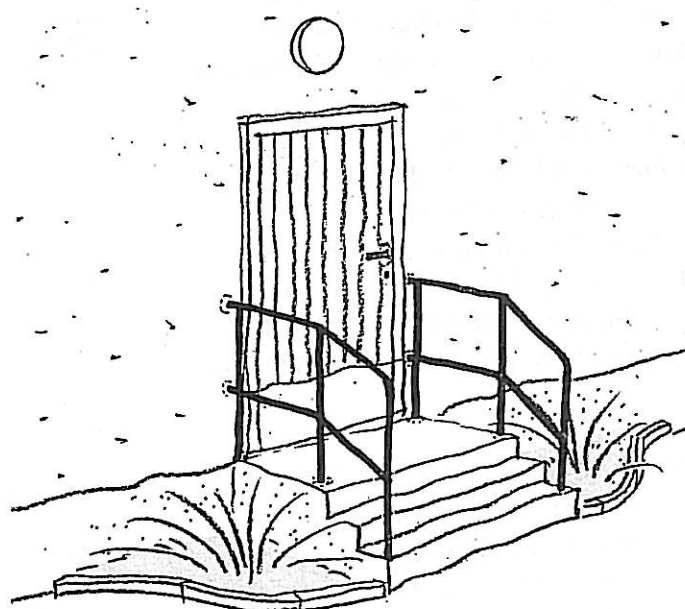
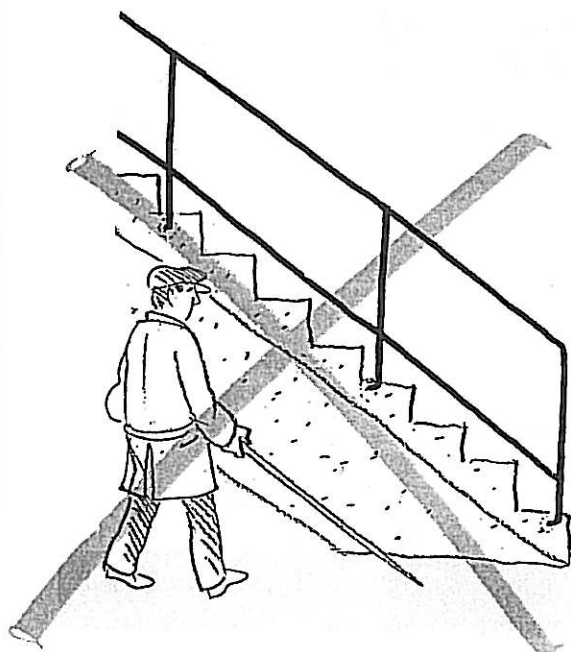
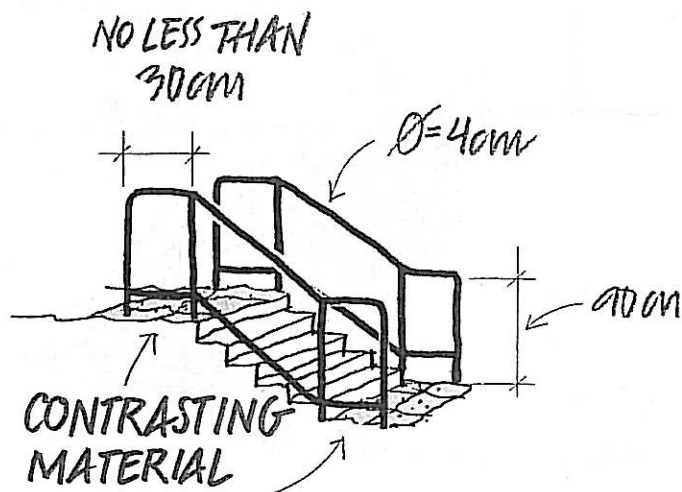
In the case of pram ramps, the best solution is to include them when building steps. If a pram ramp is added to the steps after they have been built, it can restrict the space available to pedestrians. A pram ramp can never help people with functional impairments, but, designed correctly, it need not be an obstacle.



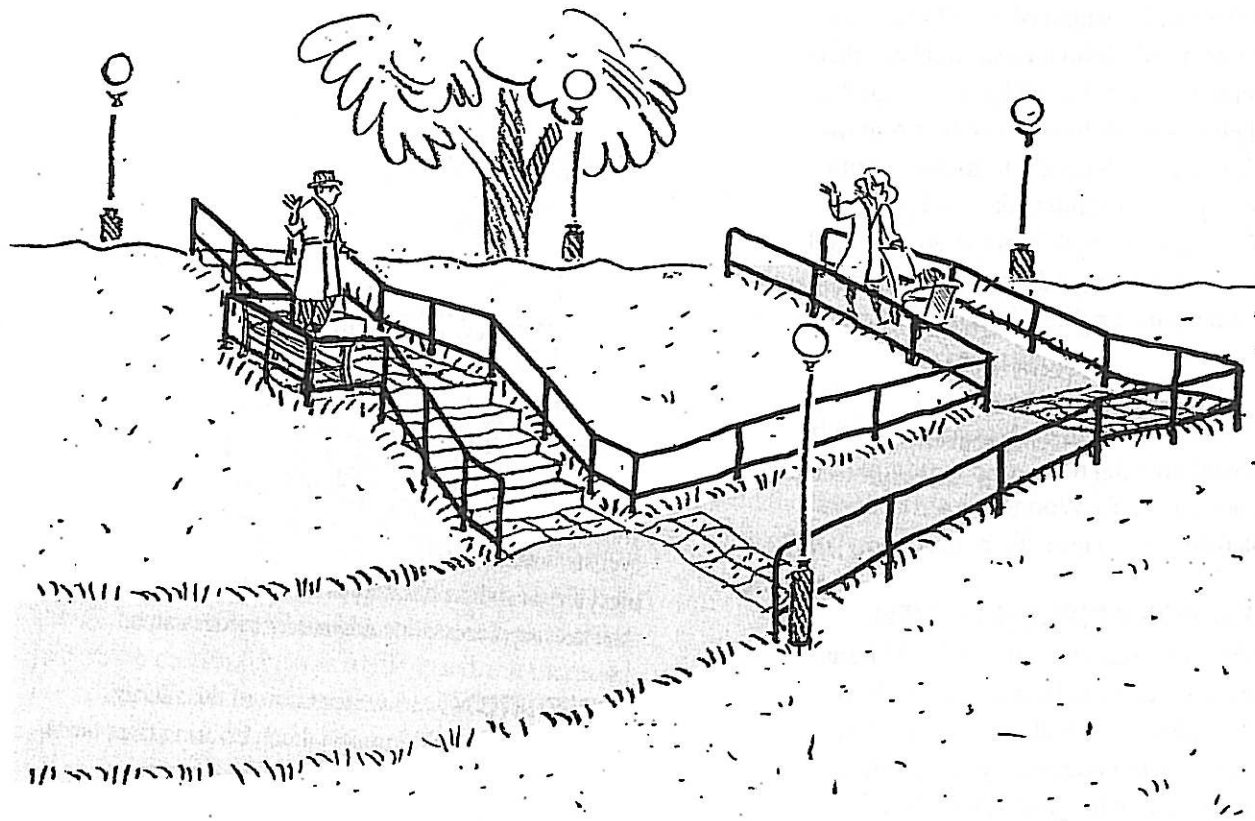
MARKING. There should be both a tactile and visual indication before the first step of a flight of steps, both at the top and the bottom, such as a contrasting surface with a length of 40–80 cm. Steps that protrude into a pedestrian area should have their underside built in or marked out. Flights of steps that do not have their underside built in can be a trap that a partially-sighted person is unable to detect until his head hits the steps. The underside of a flight of steps should be built in or marked out at ground level where it otherwise risks being a danger to pedestrians. Handrails should be distinguished by a contrasting colour.

CHOICE OF MATERIALS. Outdoor steps must be made of stable and non-slip materials. Stone and concrete are good materials. Wooden steps outdoors must be supplemented by a non-slip material.

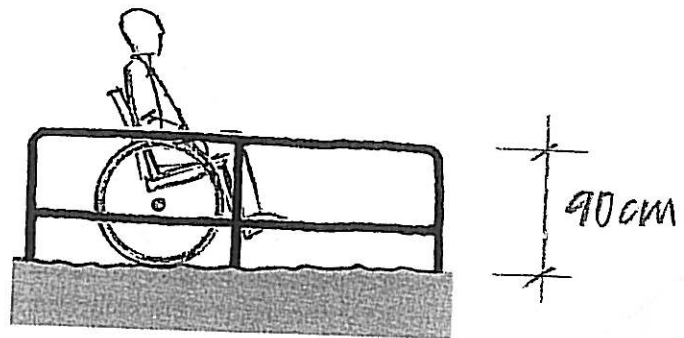
ALTERNATIVE FOR PEOPLE IN WHEEL CHAIRS. Where there are steps, there should be an equivalent alternative that can be used by people in wheel chairs. This alternative is also a help to others who cannot use the steps because they are leading a bicycle or pushing a shopping trolley, for example.



3.4 RAMPS

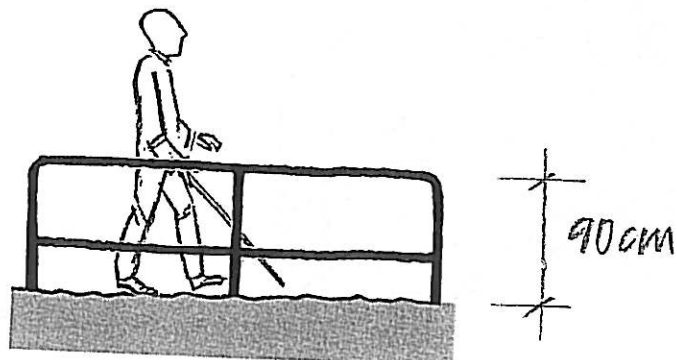


DESIGN. A ramp should have a minimum width of 1.3 m and a maximum gradient of 5%. A difference of up to 1.0 m can be managed by many people if this difference is divided between two ramps connected by a rest area. The length between rest areas should be no more than 10 m. Rest areas should have a length of at least 2.0 m and a maximum gradient of 2% and can be equipped with a bench. The handrails should be, 0.9 m high, on both sides of the ramp. The addition of a 0.7 m handrail is an advantage.



If the handrails are intended to also function as guard rails, they should have a height of 1.1 m (the same height as a railing on a balcony).

The whole length of the ramp should be fitted with a protective railing. This protection can take the form of an edge or a length of piping similar to the piping used in the railing at between 30 cm and 50 cm above the ground.



MARKING. The ground in front of the beginning of the ramp should be marked out in both directions with a contrasting surface material, a suitable length is 4–0.8 m. The surface material should extend over the whole width of the ramp.

3.5 BUS STOPS

DESIGN. Bus stops should be designed in such a way that they cannot be mistaken for anything else. In addition, the choice of materials and design is guided by the primary function of the bus stop.

In order to offer travellers good service, the bus stop should be equipped with effective weather protection. A clearly visible sign with the name of the bus stop, a timetable at a height of 1.5–1.7 m and a map of the area, correctly presented, make the bus stop suitable for more people. Timetables and other information should be placed inside the weather protection, illuminated by the existing light, so that people can stand close to them and be protected from the weather.

The bus stop area should be separated from surrounding areas by kerbstones or by a contrasting surface material. In order to increase safety and security, cycle traffic on combined footpaths and cycleways should be separated from the bus stop, perhaps by being routed *behind* the weather protection.

One security factor at a bus stop is visibility. Make sure that vegetation, bus-stop fittings, etc. are positioned and chosen so that they do not block the view.

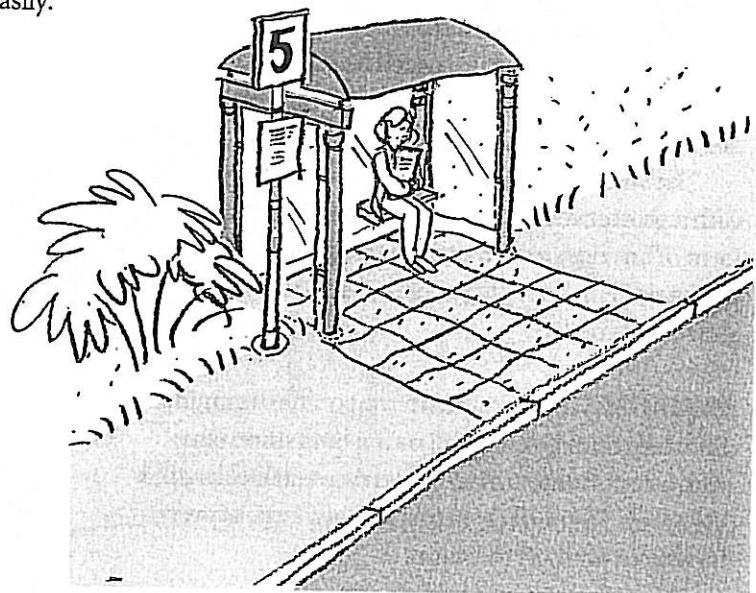
At the bus stop, a seat consisting of a plank 0.9 m above the ground can be used to rest on. A solidly built seat inside the weather protection also provides travellers with somewhere to rest. The seat can be painted in a contrasting colour. When the bus stop is separated from the traffic noise, which can be done by moving the bus stop a short distance away from the traffic or separating the waiting area physically, people with impaired hearing can communicate more easily.

TERMINALS. Where there are terminals or places with several bus stops next to each other, the street area should be designed for simple traffic situations. The ability to understand and cope depends on the number and complexity of events taking place at the same time. A good bus stop has an environment that is easy to understand and cope with.

MARKING. The place where the bus is boarded should be marked out so that it is easy to find. Some marking examples are contrasting surface materials with both tactile and visual contrast, handrails, a door leading to the boarding area or an acoustic signal.

BICYCLE PARKING. A parking area for bicycles should be arranged close to the bus stop. A parking area for bicycles, where they can be locked, provides cyclists with a convenient and safe place for their bicycles, as well as helping to make the area around the bus stop accessible and safe for pedestrians.

VEGETATION. It is important to take allergy sufferers into consideration when choosing the plants, bushes and trees to be planted around bus stops. Suitable choices are conifers, apple-, pear- and cherry trees, currant bushes and gooseberry bushes, dog-rose, raspberry bushes, roses, clematis, most plants of the buttercup family and rock plants.



3.6 PEDESTRIAN CROSSINGS

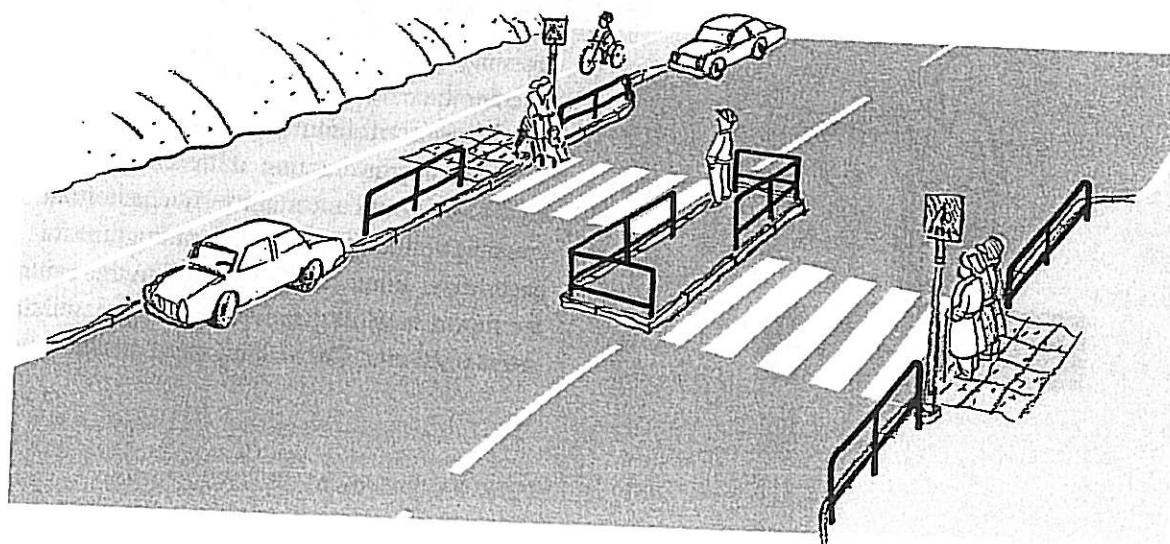
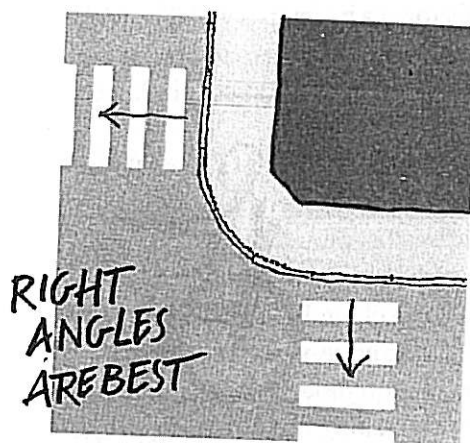
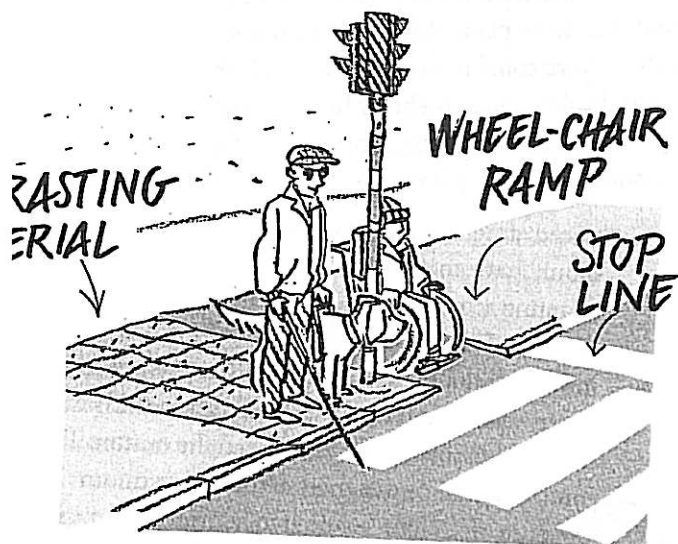
Where vehicles cross pedestrian areas, a pedestrian crossing should be built which is safer and more accessible than any other part of the street. The pedestrian crossing is a complicated place and has to satisfy many different needs. The Swedish Institute for Disabled Persons has coordinated several of these needs. Its proposal is currently being tested and adapted by several street and highway departments; all the components in the proposal are generally applicable. Below is a description of some of the improvements that can be made to pedestrian crossings.

DESIGN. The kerb between the pedestrian area and the roadway is used by the blind to determine direction. Consequently, the pedestrian crossing should be placed at right angles to the kerb. A raised pedestrian crossing reduces traffic speed and increases the opportunities for interaction between drivers and pedestrians.

Noise makes it difficult for the blind to hear where a vehicle is coming from, which means that traffic lights or some other form of separation are necessary.

A traffic island divides the traffic flow and means that a pedestrian crossing can be crossed in two stages. This makes it simple to both see and understand the traffic situation clearly. The traffic approaches from one direction at a time and each part of the pedestrian crossing is less than half the width of the street. The traffic island should have a low edge or have a contrasting surface material. It should have a width (depth) of at least 2.0 m. A short crossing reduces the time pedestrians are exposed to the vehicles.

A pedestrian crossing should preferably be designed so that the pedestrians can have eye contact with the drivers. They should, at least, be able to see each other.

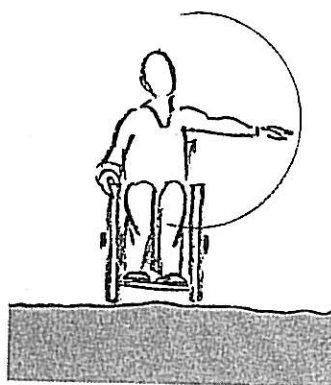
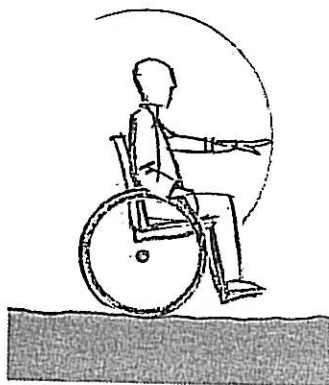


DIFFERENCE IN LEVELS OF ROADWAYS AND PAVEMENTS.

A *ramp* which bridges the difference in level of the roadway and the pavement provides the best accessibility for the disabled. If the ramp or the surface around the ramp is made of a contrasting material, the partially-sighted will have a greater chance of detecting the pedestrian crossing.

A *low kerb* and pedestrian areas made of smooth materials with a shallow gradient provides acceptable accessibility. The blind are able to determine the direction from the kerb. The kerb should have a height of 40 mm and have a rectangular profile. Its height should be reduced over the whole width of the pedestrian crossing.

MARKING. A kerb with a contrasting surface at a pedestrian crossing clearly indicates the border between the pedestrian area and the roadway.



CHOICE OF MATERIALS. Traffic markings and the surface of a pedestrian crossing should have the same friction as the pavement.

GULLIES. Gullies in the roadway should be placed outside the pedestrian crossing.

HANDLES. Posts or railings at either end of the pedestrian crossing should be fitted with some form of support such as a handle that can be held on to when crossing the kerb. A handle is also a convenient support when waiting at a bus stop or some other place.

TRAFFIC LIGHTS. Cross Now lights should be fitted with an acoustic signal. An acoustic signal has three basic functions: to indicate the presence of a pedestrian crossing, to indicate when the Cross Now signal is shown and to guide pedestrians across the street. The acoustic signal should always be placed either to the left or to the right of the direction of walking, not alternate between left and right, so that every pedestrian crossing has a predictable pattern.

Acoustic signals may disturb the sleep of people living in the vicinity. This can be avoided by regulating the strength of the signal so that it increases when the noise in the street area is louder. Turning the signal off at night is a simple but less suitable method.

The box containing the push button should be placed at right angles to the direction of walking and should have an arrow indicating the direction. A vibrating acoustic signal can be detected by touching the box. The area around the post on which the box is mounted should be designed so that a wheel chair or other walking aids can be placed next to the box, thus enabling disabled persons to reach the button. The button should be designed so that a maximum pressure of 2.5 N is required to activate it. A push-button box with a tactile map is an advantage. This map gives detailed information about the pedestrian crossing, what type of road will be crossed and whether there is a traffic island. The push button should be placed about 0.8 m above the ground.

Reducing the duration of the Cross Now signal leads to stress and uncertainty. At a pedestrian crossing with traffic lights, the waiting time for pedestrians should not be longer than the waiting time for motorists. Most people can manage a walking speed of 0.8 m/s. The walking speed of elderly people

moving at a normal walking pace is estimated to be the following:

70-year old men:	1.1 m/s, ± 0.3 m/s
70-year old women:	1.0 m/s, ± 0.3 m/s
79-year old men:	1.0 m/s, ± 0.3 m/s
79-year old women:	0.8 m/s, ± 0.3 m/s

Stop lines should be placed 2 m before a pedestrian crossing. Vehicles that slow down and stop a short distance from the pedestrian crossing give pedestrians a clear signal without any stress that they may now cross.

UNGUARDED PEDESTRIAN CROSSINGS.

A pedestrian crossing without traffic lights has a pedestrian crossing sign and zebra markings (white lines). A pedestrian crossing can be made easier for the partially-sighted to detect by using a square post for the pedestrian-crossing sign, which distinguishes it from the normal round post used for road signs.

UNMARKED PLACES WHERE

PEDESTRIANS CROSS THE STREET. At street intersections, there are usually unmarked crossings. In order to make such crossings easier for the disabled, people in wheel chairs, etc., kerb height should be reduced to 40 mm and the surface just before and after the kerb should have a maximum gradient of 1%. This reduces the effort needed to negotiate the difference in level between the pavement and the road, while still providing the partially-sighted with relatively good guidance.

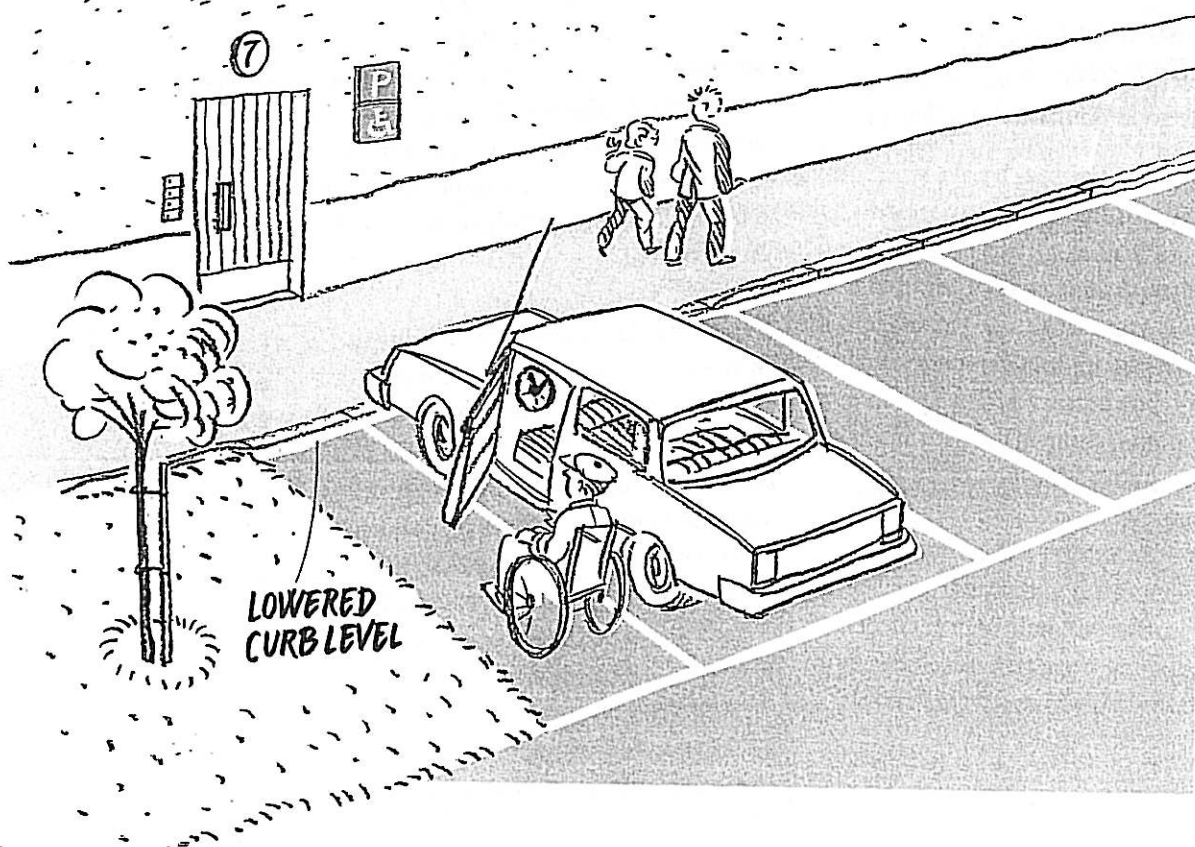
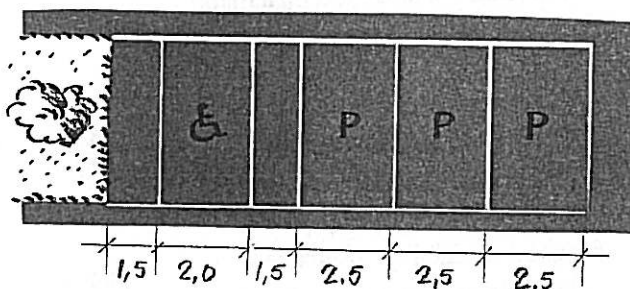
3.7 PARKING AND WAITING ZONES

DESIGN. Longitudinal parking spaces are usually 6.0 m long. They are often made a metre longer for "Invalid cars with special permits", since the extra space makes it easier to manoeuvre. The dimensions of parking spaces for the disabled, which are placed at right angles to the street, should be 2.0 x 5.0 m; this means that there is a space of 1.3 m on each side of the parked car. It is an advantage to adjust these measurements so that they are natural multiples of existing measurements of parking spaces, e.g. Parking: 2.5 m, gap: 1.5 m, parking: 2.0 m, gap: 1.5 m, parking: 2.5 m, and so on. Temporary parking space for taxis and mobility service vehicles and parking space for "Invalid cars with special permits" should be located close to entrances, preferably within 10 m. A line between the temporary parking space and the entrance provides guidance. The area between the entrance and the parking space should normally have a gradient of not more than 2% and, where there is a ramp, not more than 5%. Support in the form of a railing could be placed between the parking area or the temporary parking space for "Invalid cars with

special permits" and the entrance so that disabled persons can more easily move between the vehicle and the entrance. The section of the roadway closest to the entrance should be modified to give priority to temporary parking.

Kerbstone height between the parking space for "Invalid cars with special permits" and the pedestrian area can usually be reduced to zero. Make sure that this does not cause problems for the partially-sighted. The difference in level between the road surface and the pedestrian area can also be compensated for by raising the whole parking area and the space around it, or only the space around it.

MARKING. Parking spaces for "Invalid cars with special permits" should be marked with an invalid symbol on the parking space and by a sign.

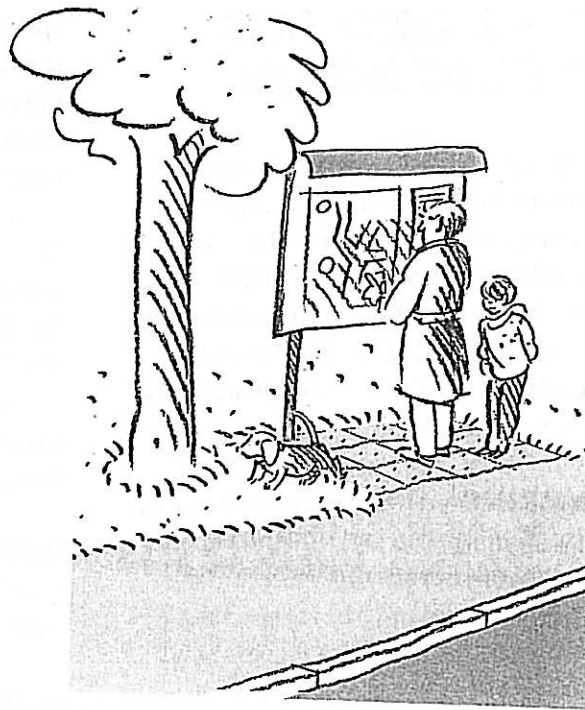


3.8 TRAFFIC SIGNS

READABILITY. For the partially-sighted, the readability of a text may be relatively good if a so-called grotesque type – a type with lines of a uniform thickness and no flourishes – is used. A grotesque type is "cleaner" and is easier to read than most other text types. Underlinings should be avoided since they confuse the eye. A text printed solely in capital letters has a "fence effect" and reduces readability. It should thus be avoided. A text in italics is usually more difficult to read than plain text. Variation and different levels of importance can be shown with the help of size and different bold types. The distance between each word should be constant, varying distance results in spaces that confuse the reader. In the case of large text, e.g. street names, white text on a dark background is easiest to read. For small text on a map, black text on a white background is best.

STREET SIGNS. A text size of 100/70 mm is easy for pedestrians to read at a distance of 1–3 m. A large contrast between letters and their background, black/white or dark background and light, light-yellow or white text, makes for good readability. A suitable height is 1.8–2.0 m above street level. Signs must not protrude into the pedestrian area. Street names in raille can also be used to provide more information.

INFORMATION MAPS IN URBAN DISTRICTS, ALSO IN RELIEF. A map of this type can consist of symbols and text for tactile reading or, alternatively, two separate maps can be used. The design of the map should make it simple to understand. This means omitting details and using simple and distinct symbols and texts. It is assumed that the information board is well-illuminated; 500 lux, no dazzling. The board should be placed 1–2 m above the ground and in such a way that the partially-sighted can stand close to it. It should have a maximum size of about 1 x 2 m. Audio information is an effective complement to a map as well as enabling information to be changed when necessary.



3.9 ARTIFICIAL LIGHTING AND DAYLIGHT

Lighting must satisfy certain basic requirements; it must provide sufficient illumination, it must not dazzle, the distribution of light must be well-balanced and the contrast must be good.

Good lighting increases safety in different situations and reduces the risk of accidents. Daylight can have troublesome dazzling effects and cause accidents for instance on steps and where there are differences in levels. It is important to take the risk of dazzling into account when planning the traffic environment.

DESIGN. An even level of lighting can be achieved by means of a well-balanced combination of lamp-post height, the distance between lamp-posts and type of lighting fitting. A minimum of 3–5 lux in pedestrian areas is appropriate. Signs, markings and important areas need a minimum of 5–10 lux. Yellow low-pressure sodium vapour lamps should not be used on footpaths. Omnidirectional lighting fittings should be avoided. Directional, shielded lighting that does not dazzle is good.

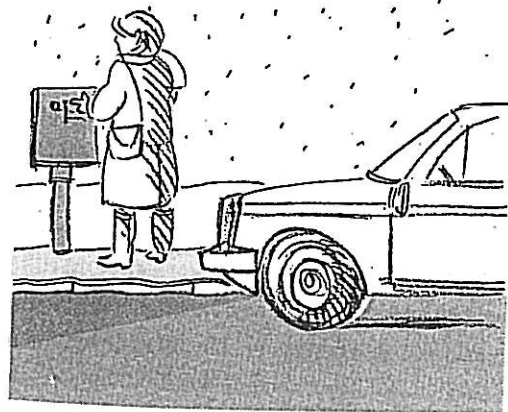
A gradual increase or decrease in the amount of light is an advantage when there is a transition from a street environment to other environments such as terminals, etc.

IMPORTANT PLACES.

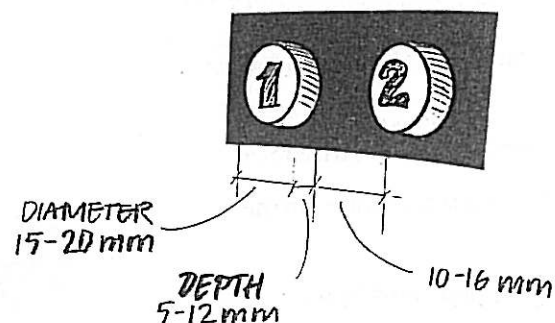
- Places where there is the risk of accidents, e.g. at the top and bottom of a flight of steps.
- Information sites, e.g. timetables, maps and direction boards.
- Places where pedestrians must be able to see and be seen, e.g. bus stops and pedestrian crossings.
- Places where people with impaired hearing need to be able to read lips in order to be able to communicate.

DAZZLING. When designing terminals and bus stops illuminated in part by daylight, it is important that the risk of dazzling is taken into account.

3.10 APPARATUS AND CONTROL



The apparatus we place in the street area should be designed so that it functions for everybody. This means that the users must find it easy to understand and use. One example is the parking-meter.



DESIGN. Knobs and handles used to get tickets, etc. should be designed to be easy to find, identify and use. Buttons or handles must be easy to depress or turn for people with stiff and weak hands. Wing knobs are easier to turn than round knobs. The torque required to turn a knob or handle should not exceed 5 Ncm for round knobs and 10 Ncm for winged knobs. In the case of buttons, the pressure required should not exceed 5 N. It should also be possible to use apparatus at night. It must be possible to read instructions, etc. Have the apparatus tested by members of the user group who will use it when it has been installed.

PLACEMENT. Buttons and similar controls should be placed at a height of about 0.8 m above the pedestrian area without any obstacles obstructing them.

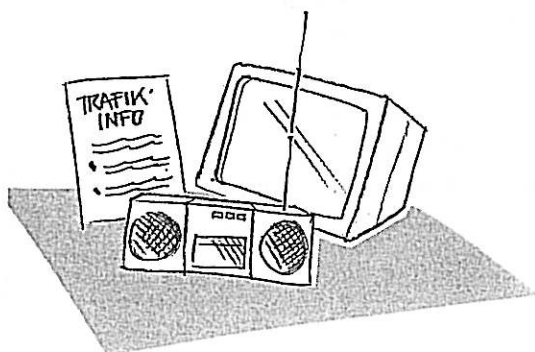
4. OPERATION AND MAINTENANCE

It is of the greatest importance that the facilities built are maintained so that they do not lose their original standard; preferably, they should be improved as technology and know-how progresses. For pedestrians, accessibility and safety are the two most important requirements. These are satisfied and maintained by the street and highway department paying special attention to the problems in its planning of operation and maintenance. In both operation and maintenance, an improvement is based on:

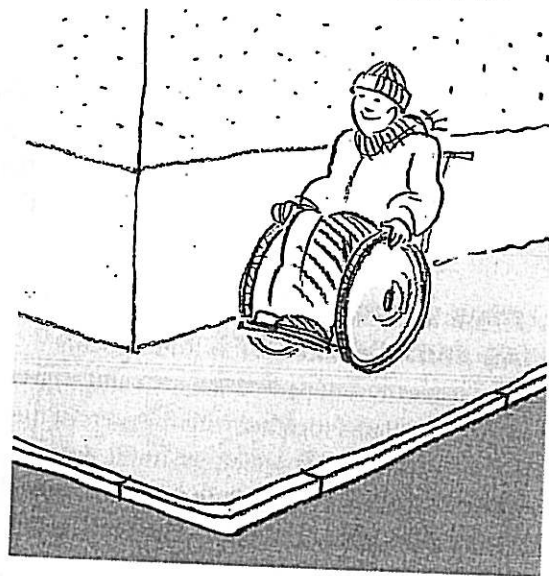
- Changed attitudes, unprotected pedestrians' street space is important
- Offensive routine inspection of pedestrian areas
- An action programme that concentrates on the pedestrian areas
- Utilizing new technology and know-how.

4.1 TRAFFIC INFORMATION

Routines for information on work in progress in pedestrian areas should be carefully planned. When street repairs encroach on these areas, information could be improved so that pedestrians get a good picture of where they should go as well as information about the reason for the work and how long it will take. These routines should also cover regulations concerning when information should be given and how it should be given.



4.2 MAINTENANCE OF PEDESTRIAN AREAS



There must be no depressions in the surface which could result in a twisted ankle or a person stumbling. The demands made on indoor surfaces can be used as a comparison. If a property owner fails to maintain the floors in his building in such condition that people do not stumble or trip, he risks having to pay compensation for injuries that occur as a result of his neglect. In public places, the street and highway department has so far not been subjected to very many claims for damages. There is, however, reason to assume that the willingness to claim damages from the street and highway department will increase as the number of elderly people increases and more elderly people are used to making demands. Consequently, there is reason to raise the quality of the maintenance of pedestrian areas, both for health reasons and economic reasons. The maintenance level must be such that people can use pedestrian areas freely and without risk.

CHANGED ATTITUDES, DEMANDS ON PEDESTRIAN AREAS. In order to clearly indicate the importance of good pedestrian areas, standard requirements should be specified. Resetting of loose stones or paving slabs should be carried out within 1–3 days.

■ Subsidence of no more than 5 m² and a depth of at least 25 mm should be repaired in 1–3 days.

■ Differences in level between paving stones, stones, kerbstones and drain covers may be a maximum of 15 mm in pedestrian areas. Repairs should be made in 1–3 days.

■ Drain covers, missing stones, pot-holes or any other holes that suddenly appear should be replaced or repaired immediately.

■ Open gaps between stones, or loose stones, in steps should be repaired immediately.

■ Pools of water in pedestrian areas are not acceptable.

■ Gaps larger than 10 mm should be repaired in 1–3 days.

ROUTINE INSPECTION OF PEDESTRIAN AREAS AND CYCLEWAYS. Routines for offensive inspections of pedestrian areas and cycleways should be formulated together with the users of these areas. Home-help service personnel, traffic wardens, people with functional limitations or other regular users can participate in this work. This work could begin with an inspection of one part of the town/city or neighbourhood.

INSPECTION OF UTILIZATION OF PUBLIC AREAS. Inspections of on-going work that affects pedestrian areas should be improved. When an area is closed off for repairs, etc., the normal users of the area must be given a simple and clear alternative.

MEASURES.

Re-paving footpaths and cycleways. Re-paving pedestrian areas and cycleways should be carried out at certain, specific intervals. This can be monitored by means of a special maintenance plan for footpaths and cycleways.

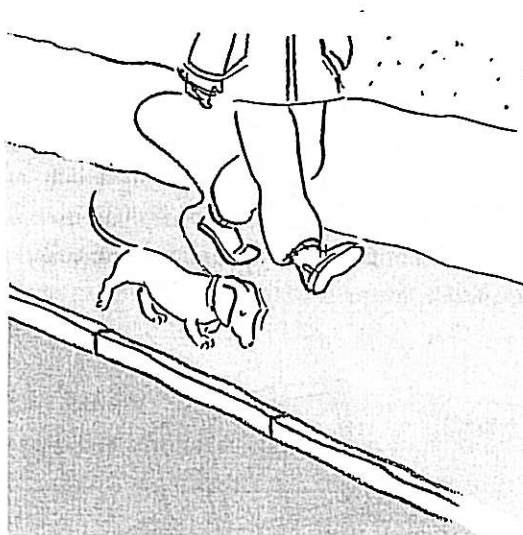
Re-paving roadways. When roads in housing areas are re-paved, it is a good idea to also re-pave adjacent pedestrian areas. Today, many pedestrian areas are in such poor condition that they need to be re-paved now, or they will need re-paving in a few years time. By re-paving the roadway and the pavement at the same time, both areas will have the same standard.

Excavation work in pedestrian areas. Excavation work ruins pavements, even if such work affects less than 50% of the width. Pavements in poor condition could be re-paved in conjunction with excavation work. If every time excavation work is planned repaving is considered, taking into account the cost of future maintenance in relation to the whole paving cost, there would be several gains: Excavation work would result in a general increase in the quality of pedestrian areas instead of the opposite; and, economically, the whole procedure would be simplified since the money would be channelled directly to more comprehensive measures. In this way, work in a pedestrian area could be completed in a way that would meet with the approval of the general public.

Inspection of utilization of public areas. Scaffolding supports, machines, materials and huts damage pedestrian areas. When an area is restored and handed over to the street and highway department the same procedure as the one suggested in the case of excavation work could be applied. This means that the money paid for the utilization of public areas could be used to improve the area for the general public.

4.3 STREET-CLEANING

There are varying levels of ambition when it comes to keeping pedestrian areas clean. Dirt consists of dust, rubber and asphalt residue from the streets, broken glass, paper, sand and stone chips used to prevent and remove icy surfaces, etc. The best method for cleaner pavements is, of course, ensuring that dirt is kept away. This is possible to a certain extent, but the only real solution is regular and frequent street-cleaning.



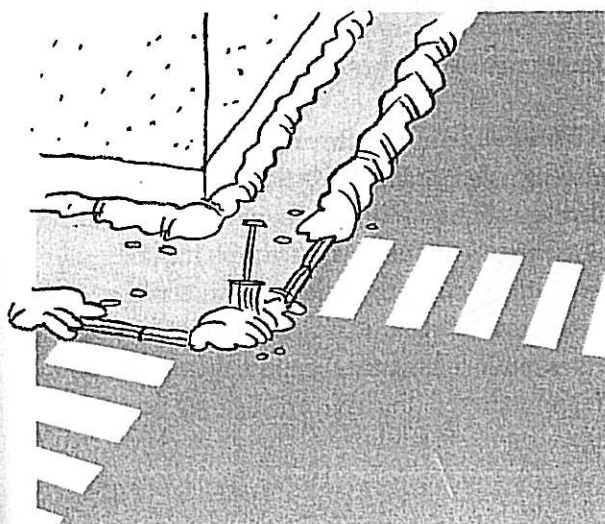
MEASURES.

- The obligation of dog-owners to pick up their dog's mess should apply to public places in built-up areas.
- Regular and frequent cleaning of bus stops and other places where there are many pedestrians.

4.4 TREATING ICY SURFACES AND SNOW CLEARANCE

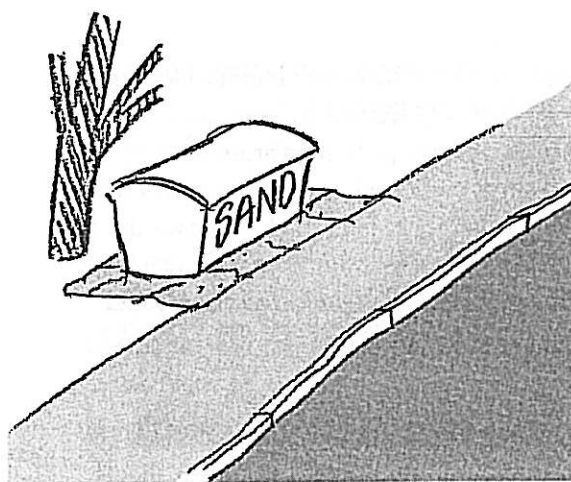
There may be several authorities, persons, etc. responsible for the operation and maintenance, in the form of treating icy surfaces and snow clearance, of the route between one's house or flat and the bus stop. On private land, it is the property owner who is responsible, and this responsibility also covers to a large extent the pavement outside the private land. The municipality has often laid the responsibility for ensuring that pavements are kept free of ice and snow on the property owner. For pedestrians, this means that the standard along a given stretch can vary considerably. The division into different areas of responsibility means that measures are taken at different times and with varying levels of ambition.

Snow and icy surfaces reduce accessibility. A covering of snow cannot be accepted as a surface for pedestrians and cyclists in built-up areas. People who have difficulties in walking, and particularly those who use some form of aid, find it very difficult to walk on loose snow. Snow banks are another obstacle to accessibility. Pedestrians can only use pedestrian areas if they have been cleared of loose snow and, in addition, made accessible by opening up the snow banks at pedestrian crossings, temporary taxi stands and parking spaces.



INSPECTION. The treatment of icy surfaces and snow clearance have a common and specified standard which applies from door to door within a municipality. This standard can be specified by requirements involving such measures as removing snow banks from pedestrian crossings and other passages so that they do not reduce accessibility. Today, the main shortcoming is inspection. The police authorities are the supervisory authority. What is needed to improve the situation is partly a clearer description of the standard and partly inspection that leads to a higher standard of road maintenance during the winter season.

NEW TECHNIQUES. Methods are needed for treating pedestrian areas that are not salted. Many municipalities have banned salt from pedestrian areas.

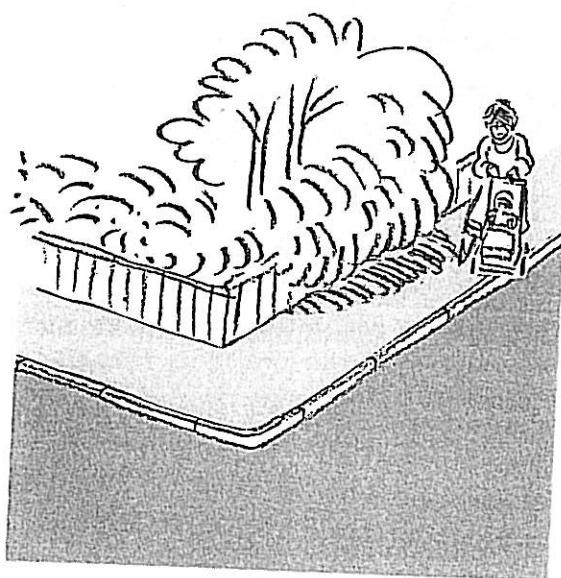


4.5 VEGETATION

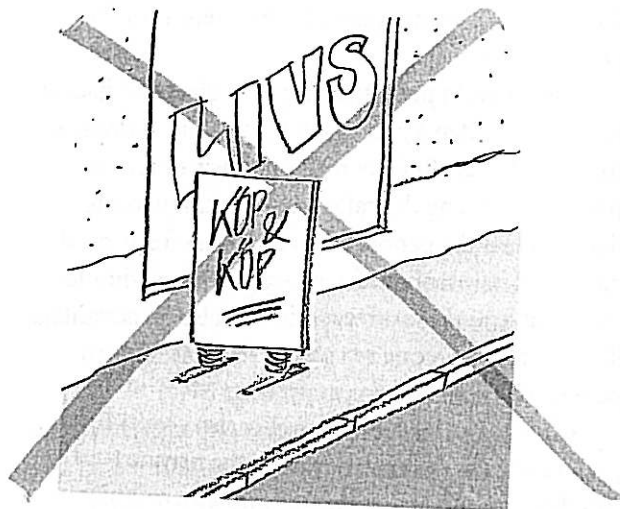
Bushes and trees planted close to pedestrian areas tend to grow over onto these areas, thus limiting the amount of open space and making it difficult to see. Branches that pedestrians can bump into with their heads are dangerous. Here, there is support in the Code of Land Laws for taking the necessary measures.

CHANGED ATTITUDES, DESCRIPTION OF STANDARD. Specify the requirements applying to vegetation next to pedestrian areas. Arrange supervision so that measures are taken to remove vegetation encroaching on pedestrian areas and obstructing visibility. Make sure that "free head room" and "free width" are always maintained.

INSPECTION OF VEGETATION. Routines for offensive inspections of pedestrian areas should be worked out together with the users of these areas. Members of the home-help service, traffic wardens or other regular users could participate in this work. Efforts should be concentrated to one part of the town or city at a time.



4.6 TEMPORARY OBSTACLES IN PEDESTRIAN AREAS



ILLEGAL SIGNS IN PEDESTRIAN AREAS.

Advertising signs are one of the most common obstacles in pedestrian areas. The signs used often have protruding supports and are one metre wide. They diminish the free width, thus reducing accessibility as well as constituting an accident risk. If pedestrians are to have an acceptable area to move in, a section of the pedestrian area must be free of signs and obstacles.

Outside built-up areas, the street and highway department has simple routines for removing advertising signs. In built-up areas, this is a more complicated matter. In order to have legal grounds for removing an advertising sign, the police must first have ordered the owner to remove it. This means that there is a profusion of illegal signs.

INSPECTION AND INFORMATION. Inform the shopkeepers about the consequences of putting out advertising signs that are in the way of pedestrians and cyclists. Present alternatives.

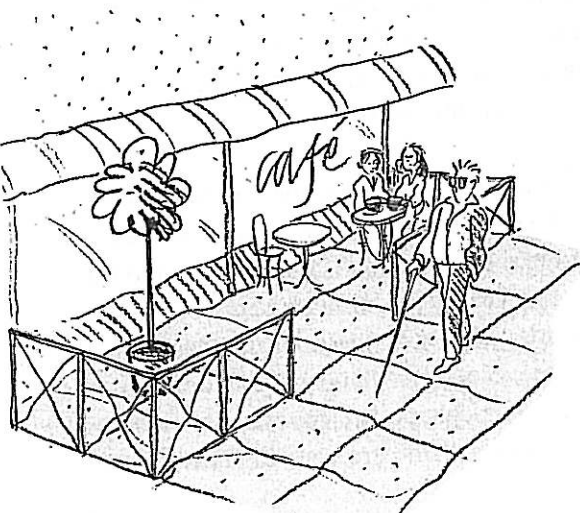
ROUTINES. Taking effective measures against illegal advertising in pedestrian and cycle areas requires simpler regulations for how a sign may be removed. Routines are needed for permits, the placing and incorporation of signs in public areas and for the simple removal of signs. Remove signs affixed to such objects as traffic-light posts, signposts, etc. which are the responsibility of the street and highway department.

SELLING GOODS IN PEDESTRIAN AREAS.

Shopkeepers are very interested in displaying their goods and selling them outside their shops. Their interest conflicts with, among other things, the justified demands of pedestrians for accessibility and safety. In order to reduce the inconvenience caused, the municipality must uphold the interests of the pedestrians.

Cafeterias in pedestrian areas or directly adjacent to them are often a great asset to street life. However, these cafeterias often encroach on the free area of pavement passing the cafeteria. It is reasonable to demand that the people who could pass freely on the pavement before the cafeteria existed there, should also be able to do so afterwards. It is also an advantage if the cafeteria is designed so as to be accessible to people with functional impairments.

Changed attitudes may necessitate a review of the present regulations concerning the conditions shopkeepers and businessmen must satisfy to be allowed to utilize pedestrian areas. Supplementary regulations are needed for the free space, displaying goods, carts and the design of stands. Local regulations and ordinances specify where and in what way goods may be displayed and sold. Good results would be achieved by reviewing these regulations and ordinances, informing those involved and carrying out offensive inspections.

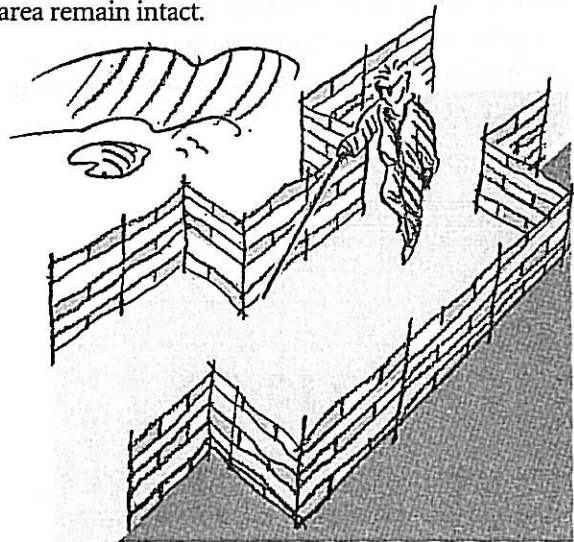


STREET REPAIRS IN PEDESTRIAN AREAS.

The width and surface of our pedestrian areas are, at times, temporarily reduced as a result of street repairs, excavation work, work on buildings and for other reasons. These activities both reduce accessibility and constitute a risk.

Every effort should be made to keep the pedestrian area thus affected open to pedestrians. If this is not possible, pedestrians should be provided with another, safe route. Closing off a pavement due to work on a building could be done in such a way that pedestrians can pass the site along the façade of the building and construction materials, machines, etc. are given access to the building via a protected pedestrian area. This makes it easier for partially-sighted and mentally retarded persons to understand how to pass the site.

Daily inspections should be arranged to ensure that the barriers between the site and the pedestrian area remain intact.



LOADING AND UNLOADING VEHICLES IN PEDESTRIAN AREAS.

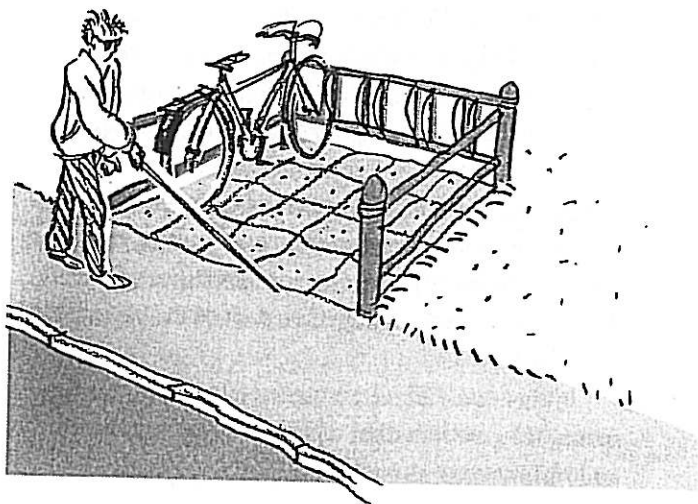
Vehicles being loaded and unloaded in pedestrian areas are an obstacle and a risk to pedestrians. In order to solve this problem, we must find out why the vehicle is parked in the pedestrian area. There can be several reasons. Lack of space for loading and unloading, long distance between the loading/unloading area and the loading bay, risks due to particularly valuable goods or ignorance of the consequences of blocking all or part of the pedestrian area.

If there are different interests competing for the space, then the situation will have to be assessed again and priority given to what is considered most necessary. People who park their vehicles incorrectly in pedestrian areas should be actively informed about the consequences as well as the alternatives.

BICYCLE PARKING IN PEDESTRIAN

AREAS. Bicycles are awkward obstacles that reduce the free width as well as constituting an accident risk. Bicycles are often parked indiscriminately, e.g. padlocked to posts, which means that pedestrians cannot anticipate where they are parked. The problem is often that there are no good parking areas where the bicycles can be padlocked. It ought to be possible to arrange parking areas for bicycles which are separated from the pedestrian area by virtue of position, level or some form of enclosure, while still being close to the cyclists' destinations.

The cyclists can also be informed about the inconvenience caused to pedestrians by badly parked bicycles. Move the offending bicycles to a better place in the vicinity and leave a note on them saying why they have been moved.



5. EXAMPLES

This chapter contains examples that illustrate good measures that can be taken from start to finish in our street space.

5.1 GOALS AND METHODS OF WORKING

Programmes for the handicapped. Several municipalities are in the process of drawing up programmes for the handicapped. The goal of these programmes is to improve the conditions for people with functional impairments. They could include the following:

Forms of co-operation, democracy, social planning and housing, child and family care, schools and education, work and employment, home-help service and rehabilitation, leisure and culture, traffic environment and communications.

Programmes for adapting the outdoor environment to the handicapped. The Stockholm City Council for Disabled Persons has drawn up a programme together with the City of Stockholm. The programme was adopted by the Stockholm City Council in 1987 and forms the basis of work on the design of the street environment.

Accessibility all the way. In the town of Karlskoga, the Swedish Planning and Building Act is applied, as regards accessibility, in the following way:

When refurbishing real estate, the accessibility requirements must be complied with in full if the real estate is in a neighbourhood where the topography lends itself naturally to accessibility. In urban districts, where the terrain is very hilly, the required level of compliance is lower.

Pedestrian areas for the handicapped. In the town of Eslöv, the local authorities have taken an inventory and proposed measures – some of these measures have been adopted – to make it easier for the disabled to move from one place to another along continuous stretches of pavements, etc, in the centre of Eslöv.

Funds for improving the street environment for the handicapped. Several municipalities set aside funds every year for measures aimed at improving the street environment for the handicapped. These funds are used for both general measures, such as fitting steps with handrails, and more individual measures such as adapting the pedestrian area used by a person to and from work.

5.2 DESIGN

Bus stops. At the Greater Stockholm Public Transport Company, work is being done on a project to adapt bus stops and terminals for people with functional impairments. Work is being done on several aspects so that the design as a whole will be adapted. These aspects include orientation surfaces, acoustic signals, signs, tactile surfaces, lighting and colour schemes.

Bicycle parking. The Municipality of Lidköping has carried out a comprehensive programme for bicycle parking. At every place where several bicycles are often left, the authorities have made available a convenient and easily accessible area for parking bicycles. Such areas are often difficult to use for any other purpose, often being within 10 m of a pedestrian crossing. When necessary, one or more parking spaces for cars have been utilized.

Drainage asphalt on pavements. Drainage asphalt is being tested on footpaths to and from bus stops in Gothenburg and several other towns. Drainage asphalt has larger cavities and is much more porous than conventional asphalt. This means that melting ice and snow can penetrate down through the surface. As a result, night frost cannot cause new ice to form on the surface.

Zone for "street furniture", etc. The Street and Highway Departments in Jönköping and other towns have arranged pedestrian areas and street furniture on wide pavements in such a way that the street furniture forms a special unbroken zone beside the pedestrian area. This zone has a different surface material and is placed next to entrances.

Ribbed tiles. Ribbed tiles are used in Holland and Japan to guide the partially-sighted in terminals and squares. These tiles look different and their ribbed surface means that they can be detected with the help of a cane. In the UK, they are used to mark the end of footpaths and cycleways. They are laid with their ribbed surface in the direction of the cycleway and across the the footpath. In Sweden, this type of tile has been used in two bus terminals, one in Uddevalla and one in Alingsås.

Shallow channels. In the UK, a shallow water channel, 15 mm deep and with 15 mm wide grooves, is laid across the pavement to drain off water. This solution does not cause the disabled any problems.

Benches. In London, wooden benches with a high back and three arm-rests are used. They have a sitting height of 50 cm.

Toilets. In Stockholm, there is a guide for public conveniences. The guide is an "admission ticket" for people suffering from incontinence, enabling them to move about the city.

Back supports. The Street and Highway Department in the town of Västerås has mounted back supports in the form of planks on the top of the hoops used to form fences around such places as parking areas for bicycles. The function of these planks is to provide a simple support for resting against.

In Vienna, simple seats have been mounted on the walls in the underground for passengers to rest on.

Raised platforms at bus stops. The town of Halmstad has had a system since 1980 where the bus stop area has been raised to form a platform. This means that the platform and the entrance to the bus are at the same level. The system will not be developed further and should be seen as an example of what can be done.

Bus stop signs in relief. The bus terminal in Bålsta is equipped with signs in braille providing information on what number the buses have and their routes.

Trams accessible to the disabled. Grenoble has raised tram stops so that the entrance to the tram is at the same level as the tram stop. These trams have lower floors than Swedish trams. The tram stops are built out of contrasting materials which makes it easier for the partially-sighted to determine where the edge of the platform is.

Acoustic signals. Several municipalities are currently testing a new type of electronic acoustic signal. The acoustic signal is noise-controlled so that it is louder when there is more traffic noise. The signal also includes a number of other functions; e.g. a tactile map on the side of the signal box showing what the pedestrian crossing looks like and an arrow on the top of the box showing the direction the acoustic signal is indicating. A vibrating signal will be introduced in the near future.

The authorities in Norrköping have equipped all the city's pedestrian crossings, which are combined with traffic lights, with an acoustic signal.

Dome tiles. Dome tiles are used in Japan and the UK to indicate a stopping area prior to a pedestrian crossing. In Japan, they are also used to indicate an orientation point or a point where the pedestrian has to make a choice.

Painted kerbstones. The Street and Highway Department in Jönköping has painted the kerb at pedestrian crossings white in order to make it easier for the partially-sighted to detect it.

Pedestrian crossings, a variation of the model proposed by the Swedish Institute for Disabled Persons. The Stockholm Street and Highway Department is working on the further development of the Institute's model of what a pedestrian crossing should look like. This work is being done in consultation with

several local handicap organizations. In 1991, several pedestrian crossings were built where each crossing was adapted to the local conditions but with the same basic design.

Pedestrian crossing with a guide line across the roadway. The Street and Highway Department in Lund has built a pedestrian crossing with a guide line in a contrasting material in the centre of the crossing. The guide line is 0.5 m wide and crosses the roadway. The pedestrian crossing also has ramps made of a contrasting material, signposts with contrasting markings, etc.

Pedestrian crossing in a curve. In Åstorp, on the road passing through the town which has been designed to be environment-friendly, the pedestrian crossing has a low kerb built at right angles to the direction of walking. The kerb can be used by the blind for orientation, even though it is in a curve.

5.3 OPERATION AND MAINTENANCE

Pedestrian information. When street repairs are carried out in the centre of Luleå, a talking magazine is used to give information on changes in the traffic environment.

Cut your hedge! The authorities in Gothenburg, Västerås and other towns have distributed a brochure to house-owners in which they are encouraged to "cut your hedge". The brochure contains examples of how this can be done and why, as well as a few lines on what the regulations say about their responsibility as regards hedges.

Road signs. The municipality of Avesta has produced a type drawing showing how advertising signs placed in or beside pedestrian areas should be designed. The drawing shows a 10 cm high base around the sign. Signs placed in or beside pedestrian areas require a permit.

Borlänge has issued directions for advertising signs, cafeterias and the display of goods in pedestrian areas. The directions specify the amount of space necessary for a wheel chair to pass and where signs may be placed so that they are not a danger to pedestrians.

In Malmö, stickers are stuck to illegal signs to show that they are illegal.

Malmö also has regulations for when advertising signs in or beside pedestrian areas are allowed. When a permit has been granted, a special sticker showing this is affixed to the sign.

The municipality of Söderhamn has decided allow advertising signs to be placed next to walls and up to a distance of 0.6 m from the wall. There are regulations for how the advertising signs should be placed so as not to cause injuries to passers-by.

The authorities in Oslo put tape across illegal advertising signs with the text "This is an illegal sign".

Street repairs. In Luleå, planks are often used instead of cord when closing off a pedestrian area. Planks form a firm and solid barrier which is easier for the partially-sighted to detect.

In Malmö's "Regulations for closing off areas for street repairs", it is emphasized that barriers must be designed in such a way that the blind can detect them with their canes.

In Stockholm, the Street and Highway Department, the Stockholm Road Safety Association and organizations for the handicapped have produced a small brochure, "Your work and the handicapped", which is aimed at everybody carrying out construction work, etc. in pedestrian areas.

Also in Stockholm, the Street and Highway Department, the Stockholm Road Safety Association and the police authorities have produced a small brochure called "A living street scene" which explains the regulations governing transportation, goods, temporary storage of materials, etc. on pavements.

Bicycle parking. Every summer, the local authorities in Skellefteå employ a number of young people whose job it is to remove bicycles blocking the way on pavements. The following message is then fastened to bicycles:

Dear cyclist, your bicycle has been moved from an unsuitable place to an area intended for parking bicycles. Think about the pedestrians who have to weave their way past the bicycles, and especially the partially-sighted who find it very difficult to make their way between the bicycles. Next time, when you park your bicycle, put it in a cycle stand.

Thank you.

The Street and Highway Department.

STREETS for EVERYBODY

When physically-disabled, mentally-retarded, visually- or hearing-impaired people, allergy sufferers, the elderly and children make their way along a street, it is important that the traffic system be adapted to their individual ability.

Streets for Everybody is intended as an aid for building, furnishing and maintaining street areas in such a way that "everybody" can use them. This book can be used both as a source of advice on how to solve technical problems, and as a joint platform for users and decision-makers. The Swedish original of Streets for Everybody is widely used by Swedish authorities as a source of information when drawing plans and making decisions concerning the public street environment.

This book can be ordered from the Swedish Association of Local Authorities (Svenska Kommunförbundet), S-118 82 Stockholm. Ph: +46 8 772 45 06, Fax: +46 8 642 66 54. ISBN 91-7099-307-6



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