

## 2 General Requirements

### 2.1 Space Allowances

The minimum clear floor or ground area required to accommodate a single, stationary wheelchair and occupant shall be 750 × 1200 mm.



*Figure 2.1 illustrates the minimum clear floor area for a person in a typical wheelchair. There are a variety of wheelchair sizes, some of which may require an area larger than that shown in this standard. Where possible, additional area should be provided to facilitate use by persons who rely on larger wheelchairs.*

*The minimum clear floor or ground area for wheelchairs may be oriented for forward or parallel approach to an object. Clear floor or ground area for wheelchairs may be part of the knee space where it is provided. Figure 2.2 shows the area required for a wheelchair to turn. Additional anthropometrics follow in Section 2.7.*

### 2.2 Controls and Operating Mechanisms

2.2.1 Controls for the operation of building services or safety devices, located in a barrier-free path of travel and intended to be operated by the occupant, including locks, manual pull stations, electrical switches, thermostats and intercom switches, shall be accessible to a person in a wheelchair and shall be mounted at not more than 1.2 m above the floor. (OBC 3.7.1.5). A clear, level floor area at least 750 × 1200 mm shall be provided at controls and operating mechanisms such as dispensers and receptacles.



2.2.2 The operable parts of controls and operating mechanisms, such as banking machines and receptacles, shall be located between 400 and 1200 mm from the floor. (Figure 2.3)



2.2.3 Controls and operating mechanisms shall be operable

- a) with one hand;
- b) without tight grasping, pinching, or twisting of the wrist; and
- c) with a force less than 22 N.
- d) The colour of controls and operating mechanisms should contrast with their background.

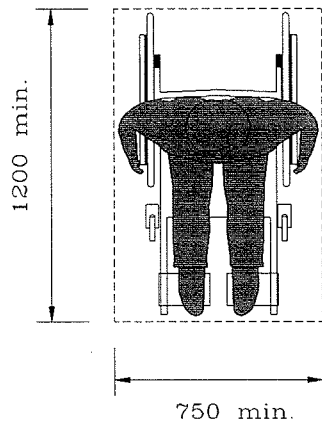
2.2.4 Controls and operating mechanisms shall be capable of being illuminated to at least a level of 100 lux and where reading is required, 200 lux.



### 2.3 Ground and Floor Surfaces

Ground and floor surfaces shall be stable, firm, and slip-resistant. (See Table 2.1 for slip-resistance of typical flooring surfaces.) Ground surfaces shall be well maintained free of holes and abrupt changes. In winter, ground surfaces should be maintained free of snow and slippery surfaces.

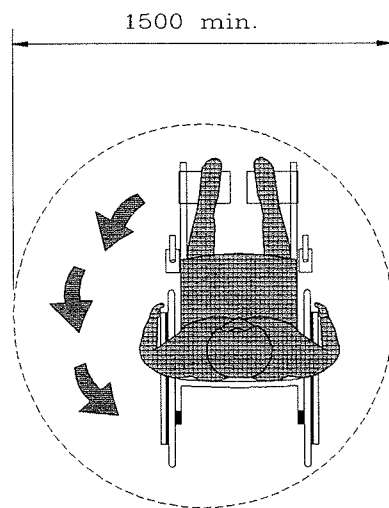




Minimum Clear Floor Area

FIGURE 2.1

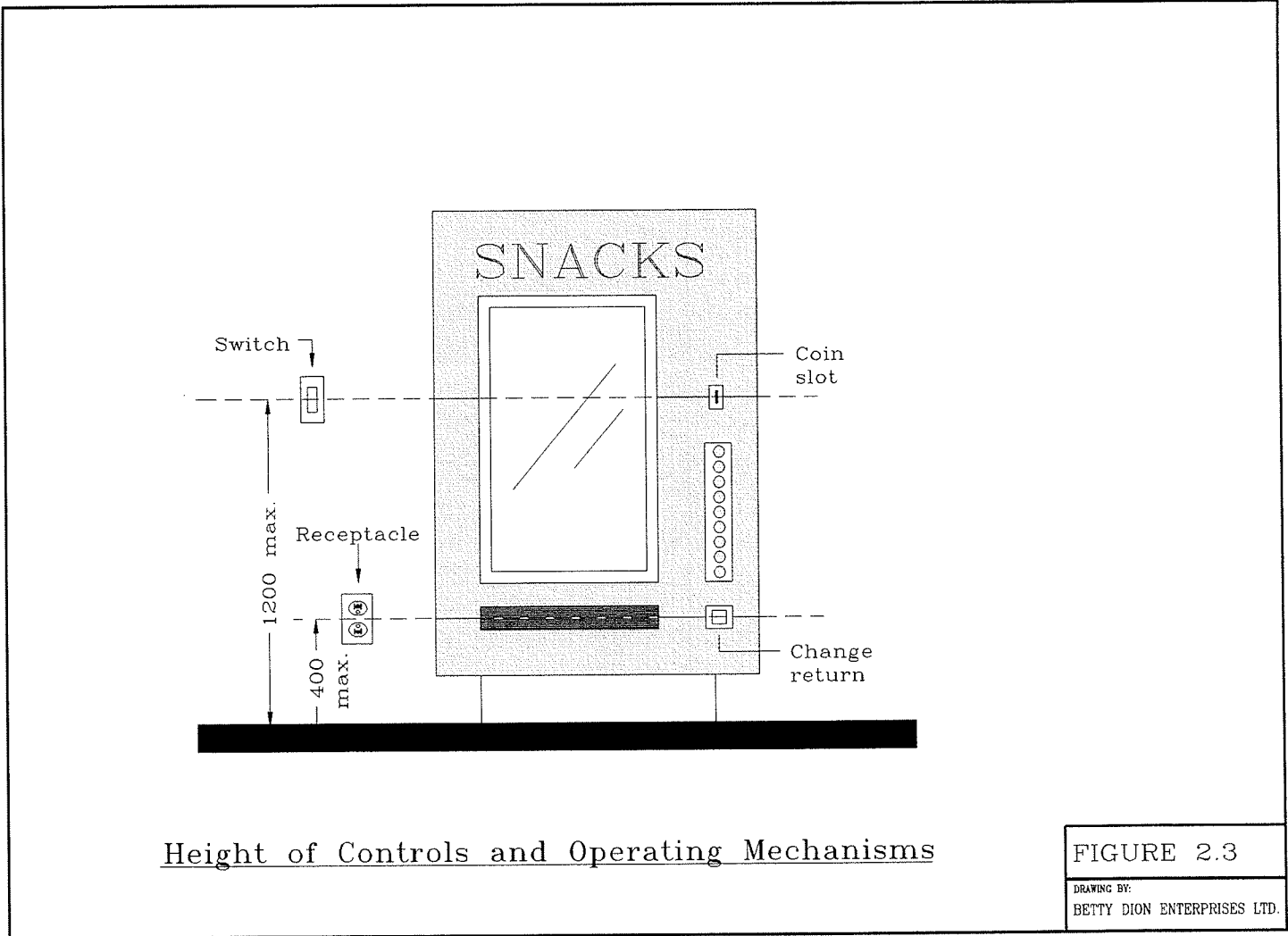
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Minimum Clear Turning Space  
at Toe Level for a Wheelchair  
to Pivot 180°

FIGURE 2.2

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**Source:** British Standard 5395 Part 1:1977, Code of Practice for the Design of Straight Stairs

**Table 2.1**  
**Slip-Resistance of Typical Flooring Surfaces**

<b>Material</b>	<b>Slip-resistance*</b>		<b>Remarks</b>
	<b>Dry and unpolished</b>	<b>Wet</b>	
Clay tiles (carborundum finish)	very good	very good	May be suitable for external stairs
Carpet	very good	good	
Clay tiles (textured)	very good	good	May be suitable for external stairs
Cork tiles	very good		
PVC with non slip granules	very good	good	
PVC	very good	poor to fair	Slip-resistance when wet may be improved if PVC is textured. Edges of sheet liable to cause tripping if not fixed firmly to base
Rubber (sheets or tiles)	very good	very poor	Not suitable near entrance doors
Mastic asphalt	good	good	
Vinyl asbestos tiles	good	fair	
Linoleum	good	poor to fair	Edges of sheets may cause tripping if not securely fixed to base

Concrete (abrasive grain finish)	very good	very good	Both these finishes should provide service levels equal to clay tiles with Carborundum or textured finishes.
Concrete	very good	good	A light broom finish is commonly used for slip resistance on municipal sidewalks where they have given many years of service.
Granolithic	good	poor to fair	Slip-resistance when wet may be improved to good by incorporating carborundum finish.
Cast iron	good	poor to fair	Slip-resistance may be acceptable when wet if open treads used
Clay tiles	good	poor to very poor	Slip-resistance when wet and polished.
Terrazzo	good	poor to fair	Nonslip nosing necessary on stairs. Slip-resistance when polished or if polish is transferred by shoes from adjacent surfaces very poor

*\*'Very good' means surface suitable for areas where special care is required, approximates to c.o.f. > 0.75.*

*'Good' means surface satisfactory for normal use, approximates to c.o.f. 0.4 < 0.75.*

*'Poor to fair' means surface below acceptable safety limits, approximates to c.o.f. 0.2 < 0.4.*

*'Very poor' means surface unsafe, approximates to c.o.f. < 0.2.*

Note: Care should be taken with polishes and cleaners so that the slip resistance is not reduced.

### 2.3.1 Changes in Level

Changes in level under 13 mm shall conform to Table 2.2. (See Section 10 Elevator for further requirements.)



**Table 2.2**  
**Changes in Level**

<b>Vertical rise, mm</b>	<b>Edge treatment</b>
0 to 6	may be vertical
6.1 to 13 mm	bevel, maximum slope 1:2
Over 13 mm	treat as ramp or curb ramp (See Sections 8 and 3)

### 2.3.2 Carpets or carpet tile shall

- be securely fixed;
- have a firm cushion, pad, or backing, where used;
- have a level loop, textured loop, level cut pile, or level cut/uncut pile texture with a maximum pad and pile height of 13 mm; and
- have exposed edges fastened to floor surfaces with trim conforming to Table 2.2.

*Highly patterned carpeting should be avoided as it distorts depth perception and can be disorienting.*



## 2.4 Walls

*Extremely uneven, rough or sharp surfaces should not be utilized for wall surfaces. These surfaces are unpleasant to the sense of touch and can interfere with trailing by persons who are visually impaired.*



*The use of lightly coloured walls can increase general illumination. Persons who are visually impaired will benefit in their wayfinding if the colour of the baseboards or walls contrasts with the colour of the floors. The use of sound absorbing wall surfaces is recommended as it can reduce the ambient noise levels which benefits everyone, especially those with hearing or visual impairments.*

*Windows should not be located where they will provide glare on the floor surface. Where this occurs, window blinds or anti-glare floor treatments should be considered.*

2.4.1 Mirrored walls are not recommended as they confuse everyone and may be a hazard for someone who is visually impaired. Glass panels and glass sidelights that can be mistaken as egress routes shall have a coloured decal placed at eye level to alert persons who are visually impaired.

## 2.5 Protruding Objects



*Consideration should be given to keeping one wall free of obstacles as this will assist people who are visually impaired who use walls for trailing. The requirement to have an area free from obstruction is primarily to aid persons with visual impairments (as shown in Figures 2.4, 2.5, and 2.6). Examples of such obstructions are directional signs, tree branches, guy wires, public telephone enclosures, drinking fountains, and the underside of escalators or stairways. Potentially hazardous objects are noticed only if they are within the detection range of canes. Persons with visual impairments walking toward an object can detect an overhang if its lowest surface is less than 680 mm from the floor, but when walking alongside projecting objects, they cannot detect overhangs. Because proper cane techniques and guide dogs keep persons away from the edges of a path or from walls, a slight overhang of not more than 100 mm is rarely hazardous.*

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Potentially hazardous objects are noticed only if they are within the detection range of canes. Persons with visual impairments, walking toward an object can detect an overhang if its lowest surface is less than 680 mm from the floor, but when walking alongside projecting objects, they cannot detect overhangs. Where a person is using a wall or an edge as a guide, a protrusion of not more than 100 mm is acceptable.

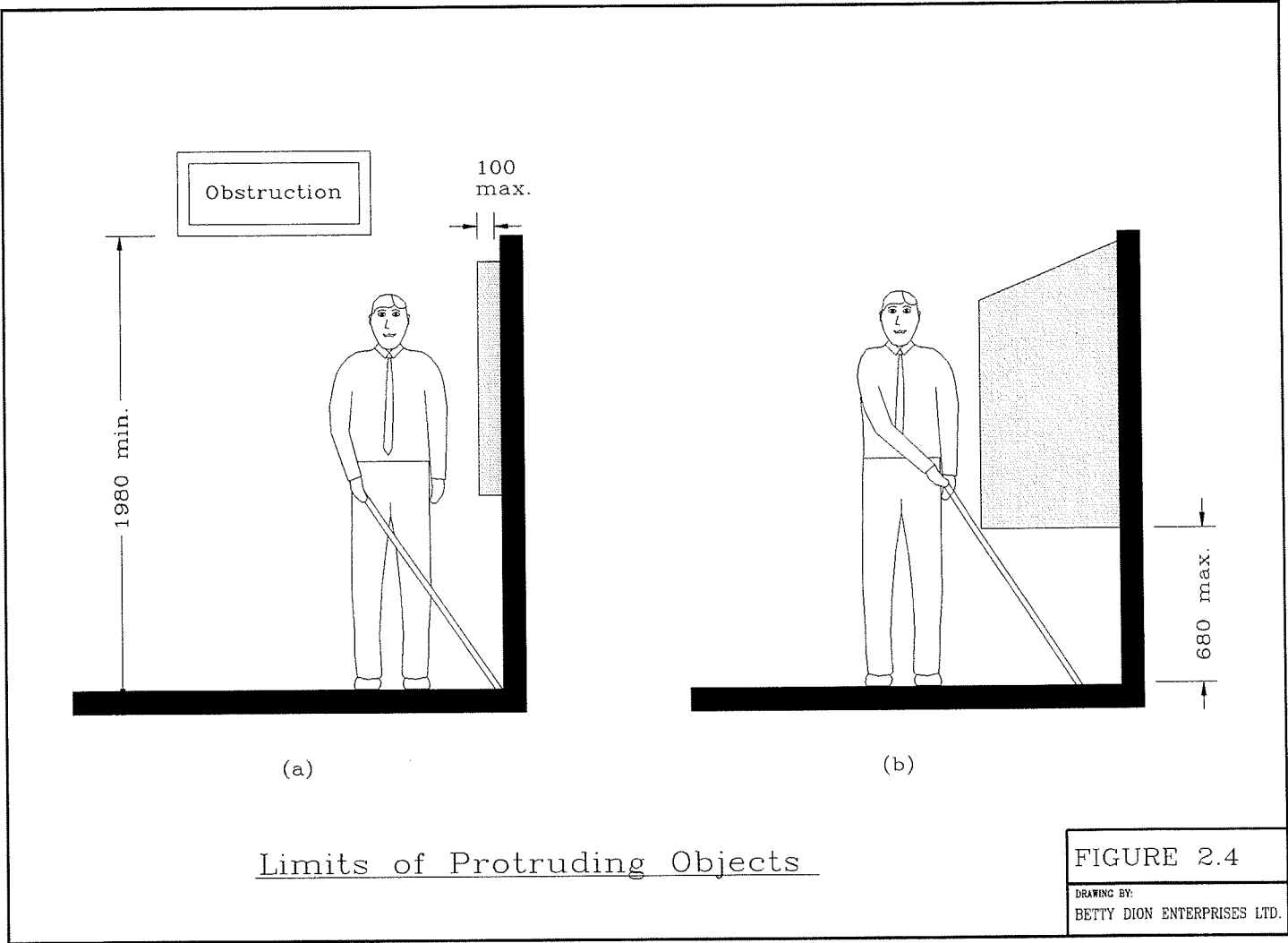
2.5.1 Objects with their leading edges below 680 mm from the floor may protrude any amount (Figure 2.5).

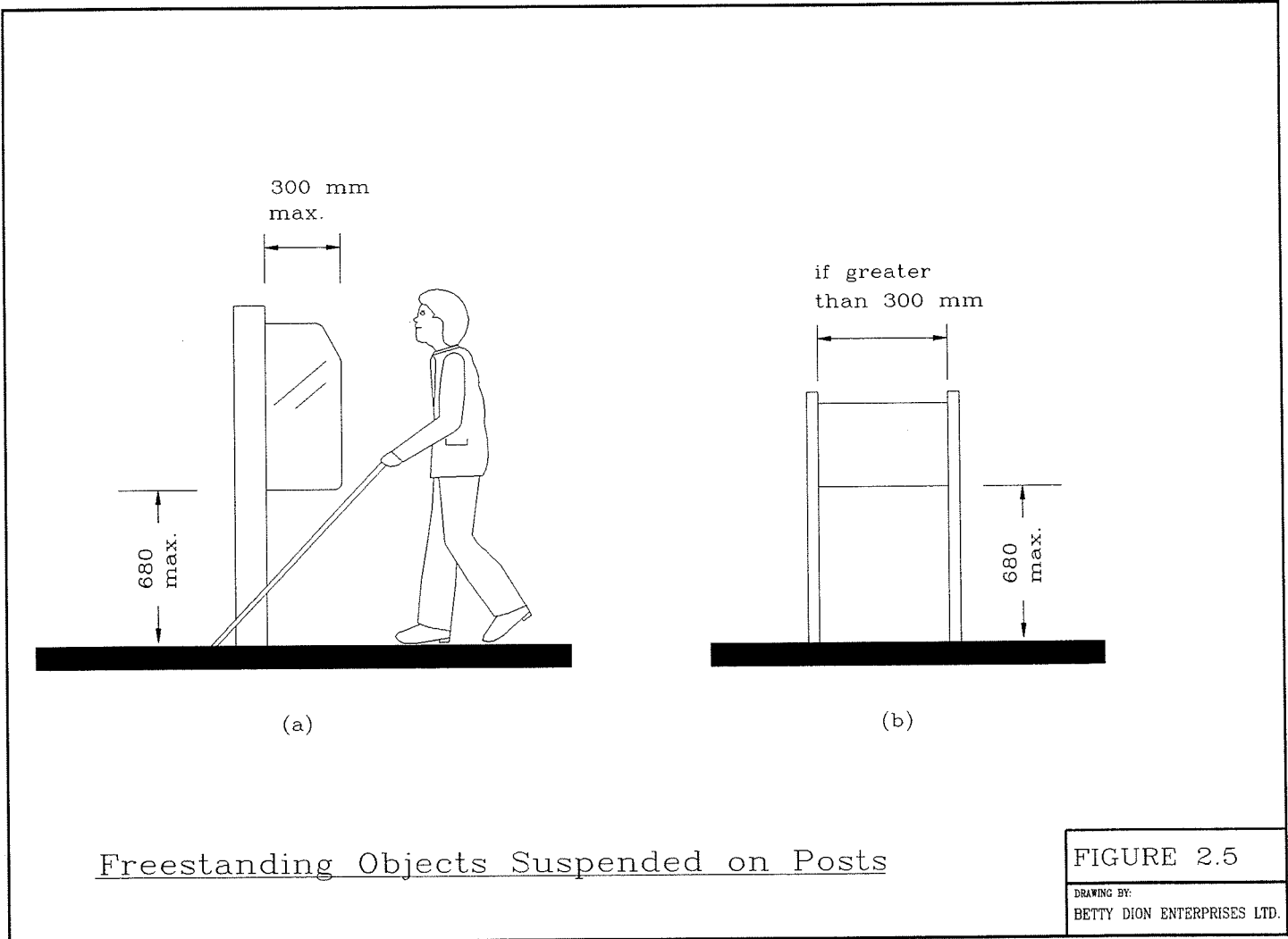
2.5.2 Freestanding objects shall not have an overhang of more than 300 mm between 680 and 1980 mm from the ground or floor. The maximum height of the bottom edge of freestanding objects with a space of more than 300 mm between supports shall be 680 mm from the ground or floor.

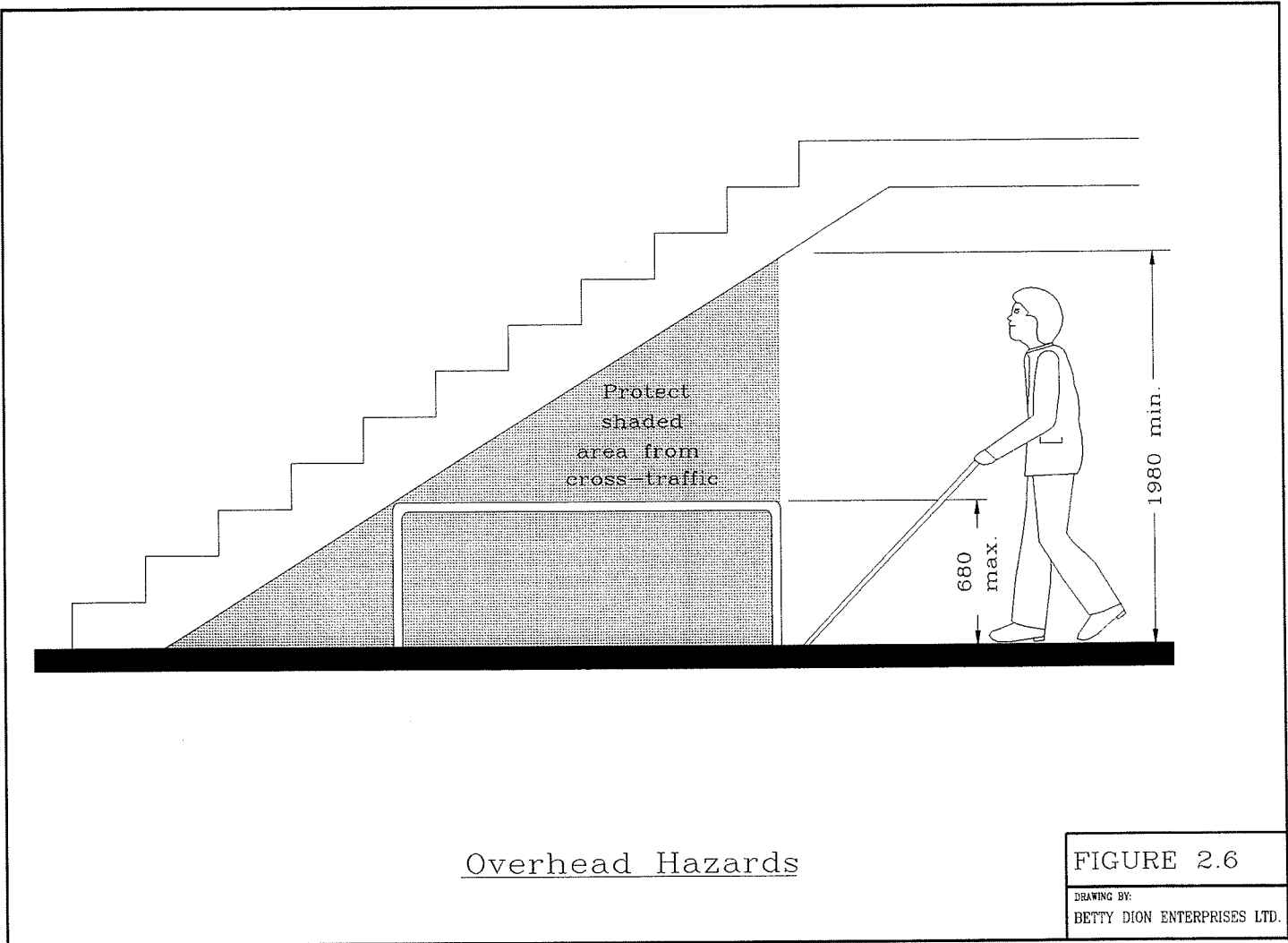
2.5.3 Protruding objects shall not reduce the clear width required for an accessible route or manoeuvring space.

### 2.5.4 Headroom

The minimum clear headroom in pedestrian areas such as walkways, halls, corridors, passageways, or aisles shall be 1980 mm. (Figure 2.6)







Overhead Hazards

FIGURE 2.6  
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A guardrail or other barrier having its leading edge at or below 680 mm from the floor shall be provided where the headroom of an area adjoining an accessible route is reduced to less than 1980 mm (Figure 2.6).

## 2.6 Detectable Warning Surfaces



Detectable warnings should be provided on walking surfaces prior to changes in grade. They shall be

- a) at least 900 mm long; and
- b) of a texture and colour (preferably yellow) that contrasts with the surrounding walking surfaces.

*The minimum length of the detectable warning is established to ensure that persons will detect it regardless of stride length. Suitable detectable warning surfaces include a textured rubberized surface on carpeted or smooth surfaces.*

## 2.7 Anthropometrics



### 2.7.1 Reach Ranges for Persons in a Wheelchair

#### Forward Reach

##### - Without Obstruction

The maximum forward reach is 1200 mm from the floor and the minimum forward reach is 380 mm from the floor (Figure 2.7.1).

##### - Over Obstruction

The maximum forward reach over an obstruction 600 mm deep for touch reach and 500 mm deep for grasp reach is 1100 mm from the floor (Figure 2.7.2).

#### Side Reach

##### - Without Obstruction

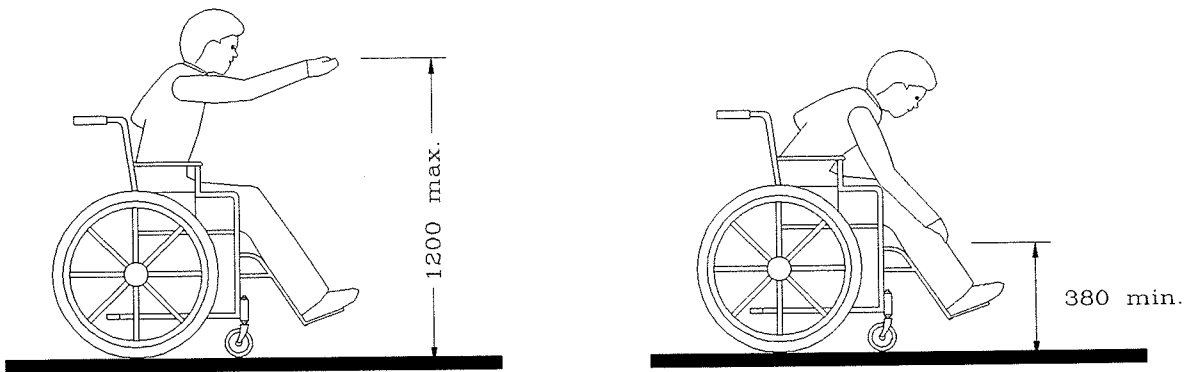
The maximum side reach is 1400 mm from the floor and the minimum side reach is 230 mm from the floor (Figure 2.7.3).

##### - Over Obstruction

The maximum side reach over an obstruction 860 mm high and 600 mm deep for touch reach and 500 mm deep for grasp reach is 1200 mm from the floor (Figure 2.7.4).

### 2.7.2 Wheelchair Dimensions

Figure 2.8 describes some typical dimensions. Power wheelchairs have larger dimensions, do not always have the same manoeuvrability or capability as manual wheelchairs, and are much heavier. Power wheelchairs cannot be folded.



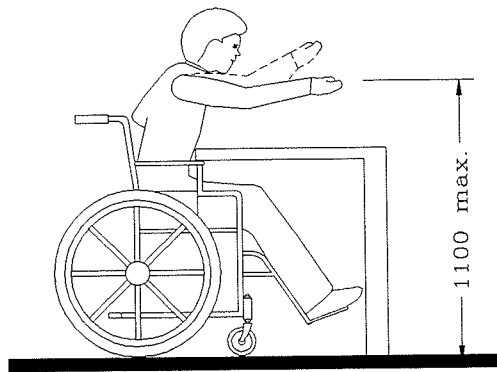
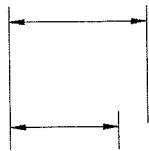
Forward Reach Without Obstruction

FIGURE 2.7.1

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600 max.  
touch reach

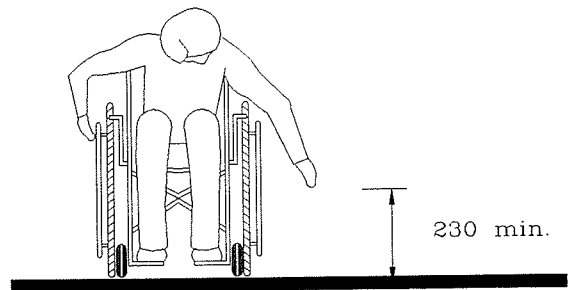
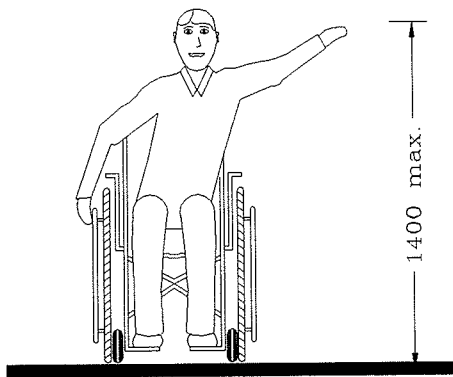
500 max.  
grasp reach



Forward Reach Over Obstruction

FIGURE 2.7.2

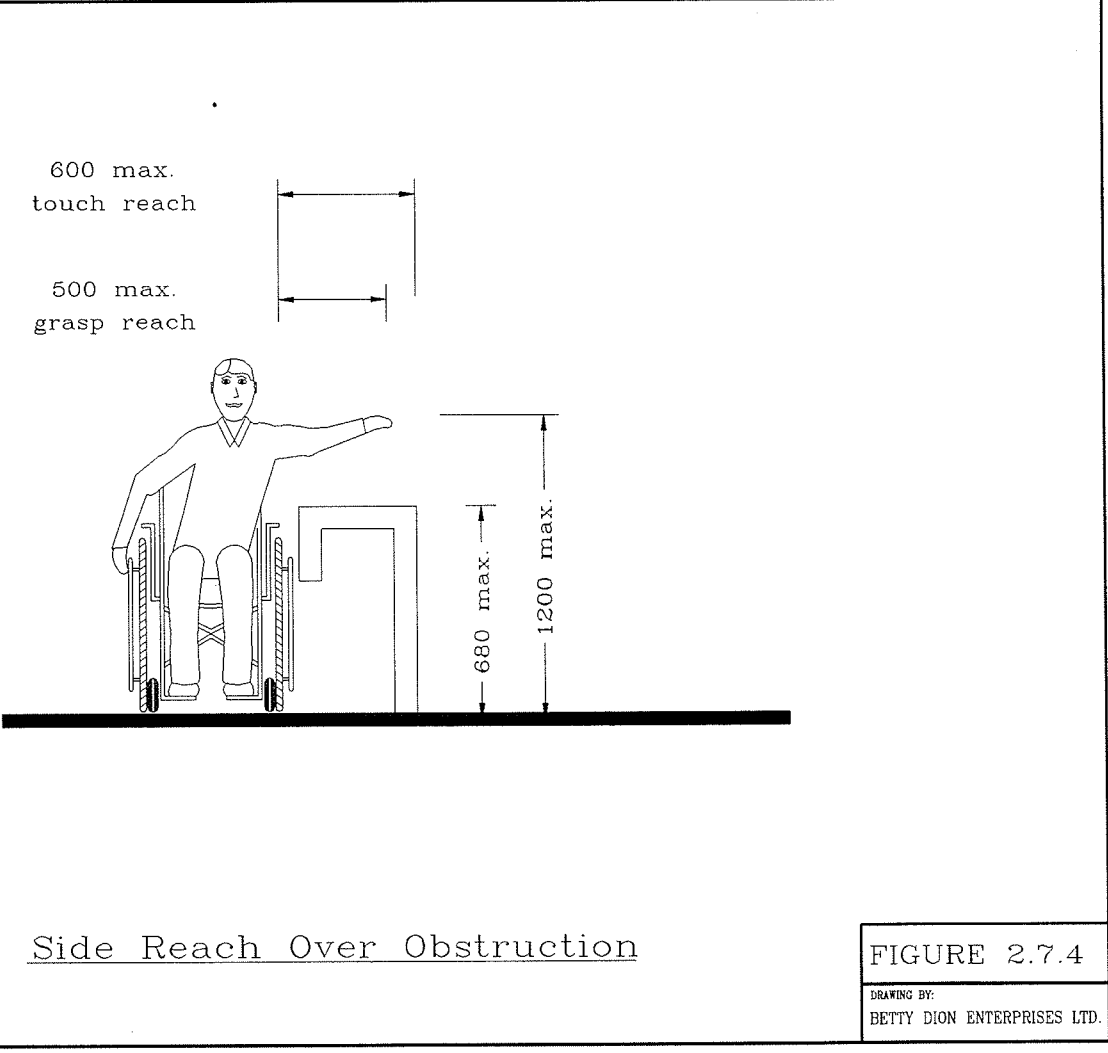
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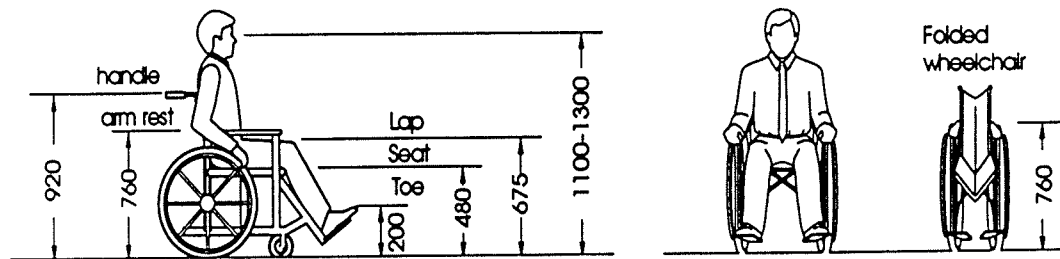


Side Reach Without Obstruction

FIGURE 2.7.3

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Wheelchair Dimensions

FIGURE 2.8

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For more information on wheelchairs see the following CSA Standards:

CAN/CSA Z323.4.2-M86, *Wheelchairs—Determination of Overall Dimensions, Mass and Turning Space*;

CAN/CSA Z323.4.3-M89, *Wheelchairs—Determination of Static Stability*;

CAN/CSA Z323.4.4-M89, *Wheelchairs—Determination of Brake Effectiveness*;

CAN/CSA Z323.4.6-M89, *Wheelchairs—Determination of Maximum Speed, Acceleration, and Retardation of Electric Wheelchairs*;

CAN/CSA Z323.4.7-M89, *Wheelchairs—Determination of Obstacle-Climbing Ability of Electric Wheelchairs*.

### 2.7.3 Seating Spaces - Seating at Tables and Counters



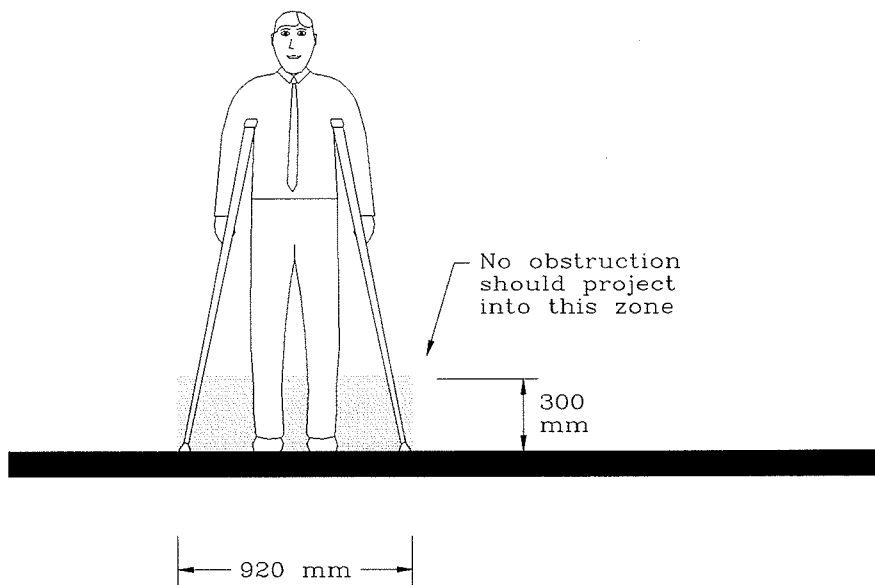
Seating spaces, such as that provided at counters, tables or work surfaces for persons in wheelchairs, shall have a clear floor space not less than 750 X 1200 mm.

Where a forward approach is used, a clear knee space at least 750 mm wide, 480 mm deep and 680 mm high shall be provided which may overlap the clear floor space by a maximum of 480 mm.

*Height and knee clearances at specialized work surfaces may require different requirements.*

### 2.7.4 Walkway Widths for Persons Using Crutches

Although people who use walking aids can manoeuvre through door openings of 810 mm clear width, they need wider passageways and walks for comfortable gaits (Figure 2.9). Crutch tips, often extending down at a wide angle, are a hazard in narrow passageways where they might not be seen by other pedestrians.



Comfortable Walking Width  
for Persons Using Crutches

FIGURE 2.9

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