

9 Stairs

9.1 General

Stairs that are poorly designed can cause trips or falls so should be well configured. Many ambulatory persons with mobility impairments prefer stairs rather than ramps and elevators.

Stairs and ramps should be well illuminated so that they can easily be seen. Strongly patterned carpets should not be used on stairs since they cause perceptual problems, and obscure the definition of the tread edges.

9.2 Treads and Risers

Stairs with open risers are hazardous to persons who need a solid riser to guide their foot up the riser to the next step or who place canes or crutches against the riser of the next step.



9.2.1 A flight of stairs shall have

- uniform riser heights and tread depths (OBC 3.4.6.7.(3));
- risers not more than 180 mm high; (**Although OBC 3.4.6.7.(2) states risers must be between 125 and 200 mm high, not more than 180 mm is preferred.**)
- treads not less than 280 mm deep, measured from riser to riser; (**Although OBC 3.4.6.7.(1) states treads must be between 230 and 355 mm deep, not less than 280 mm is preferred.**) and
- no open risers. (Figure 9.1a)



9.2.2 Treads and landings of interior and exterior stairs accessible to the public shall have a slip-resistant finish or be provided with slip-resistant strips which extend not more than 1 mm above the surface of the tread or landing. (OBC 3.4.6.1.(1))

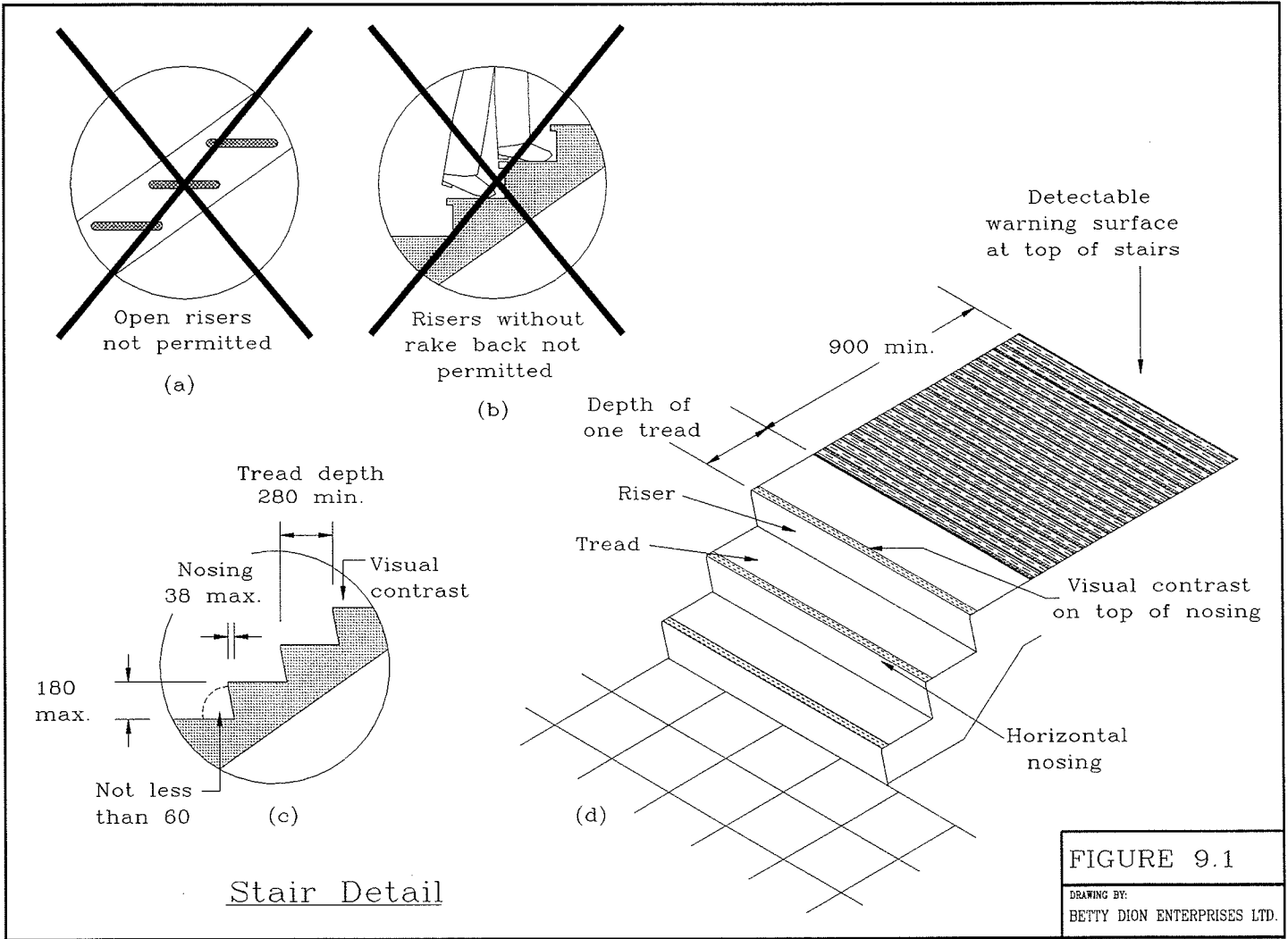
9.3 Nosings

Where projecting nosings are used, they must not have sharp or abrupt angles that prevent a foot from sliding up the riser.

Nosings shall



- project not more than 38 mm;
- have no abrupt undersides (Figure 9.1b);
- have a radius of curvature at the leading edge of the tread not more than 13 mm;
- where projecting, be sloped to the riser at an angle greater than 60° to the horizontal (Figure 9.1c);
- be illuminated to a level of at least 100 lux;
- be slip-resistant; and
- have the horizontal face in a colour contrasting with the tread. *The contrasting colour of*





the nosing is meant to ensure that the tread edge is clearly visible in descent. Yellow is the recommended colour with dark contrast. Care should be taken not to use paint that will create a slippery surface.

9.4 Detectable Warning Surfaces

Detectable warning surfaces should be used consistently throughout the campus to warn people, particularly those with visual impairments, of an upcoming change in grade. Materials such as a textured rubberized surface are acceptable for interior use and brushed concrete for exterior use.



Detectable warning surfaces shall



- a) be provided at the top of the stairs and at landings;
- b) extend the full width of the stair for a depth of at least 900 mm commencing one tread depth back from the stair (Figure 9.1d); and
- c) consist of flooring material that is
 - i) contrasting in colour (yellow preferred) with the surrounding flooring material; and
 - ii) of a different texture from the surrounding flooring material.

9.5 Stair Handrails

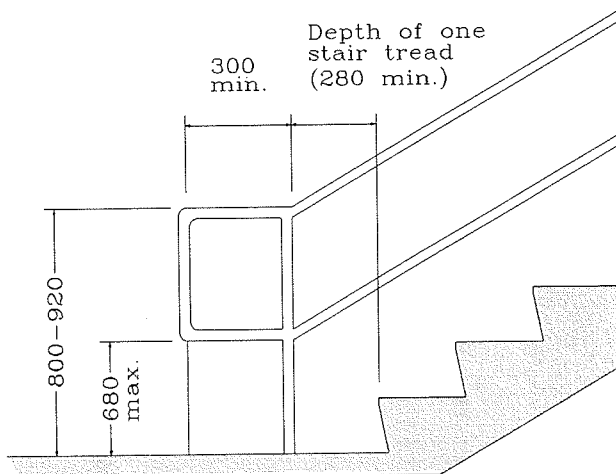
Many people who are elderly or have disabilities rely on handrails to maintain balance and prevent serious falls. Handrail extensions at the top and bottom of stairs provide tactile cues for persons with visual impairments, and a continuous handrail will assist them in negotiating stairs at changes in direction. The extended handrail is useful for persons with physical limitations to steady themselves before climbing or descending the stairs. The "one-tread depth" extension at the bottom is to ensure that the horizontal handrail extension is at the same height as the handrail on the stairs. (See Figure 9.2)



Handrail extensions should not project into another path of travel, and handrails should return to the wall, floor or post so as not to constitute a hazard.

Handrails for stairs shall

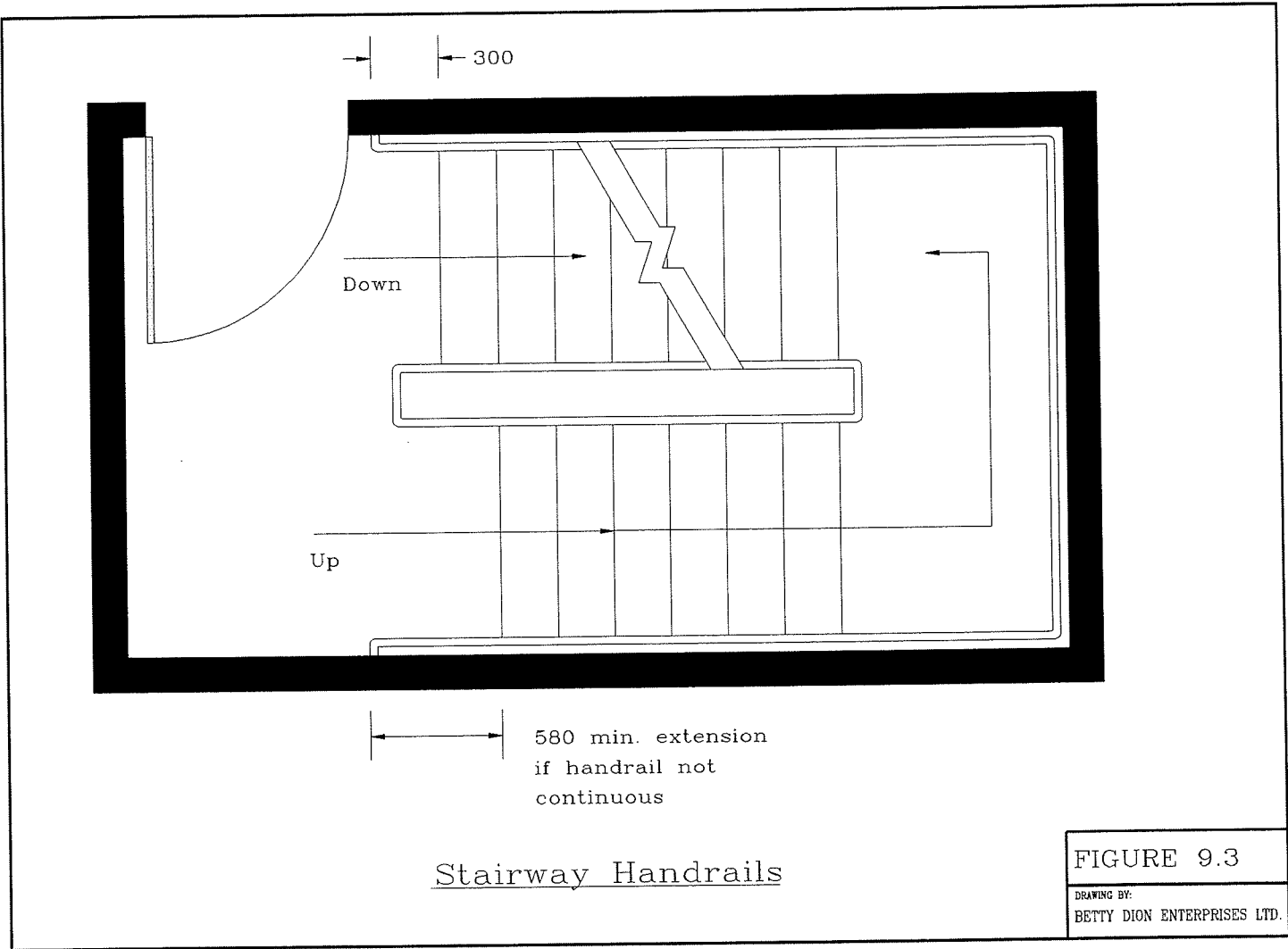
- a) comply with Clause 9.6;
- b) be installed on both sides (Figure 9.3);
- c) have their tops between 800 and 920 mm from the stair nosing (OBC 9.8.7.5), **and another handrail at a height of 450 mm above the surface;**
- d) be continuous wherever possible, but have at least one handrail continuous throughout the length of a stairway including landings except where the handrail is interrupted by doorways or newels at changes in direction (OBC 3.4.6.4.(5)). (See Figure 9.4.) **Handrails shall be continuous in all new construction;** and
- e) where not continuous:
 - i) extend at the top of the stairs parallel with the floor surface not less than 300 mm;
 - ii) continue at the bottom of the stairs to slope for a distance equal to the depth of

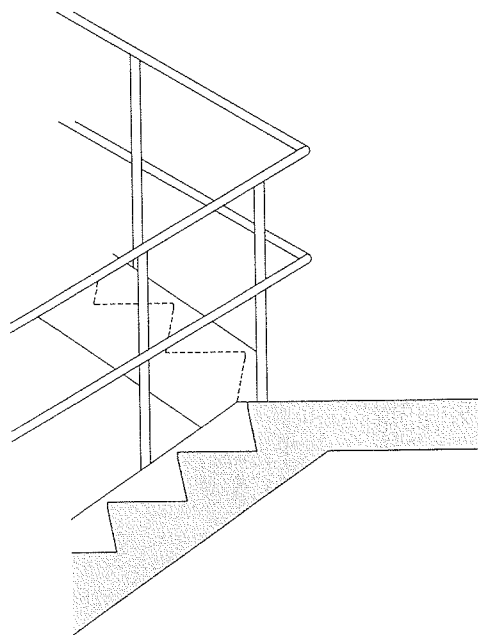


Handrail Extension at Bottom of Stair

FIGURE 9.2

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Continuous Handrail @
Centre of Stair

FIGURE 9.4

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one tread and then extend parallel to the floor surface not less than 300 mm; (OBC 3.4.6.4.(7)); and

iii) return to the wall, floor or post. (OBC A-3.4.6.4.(5)) (Figure 9.5)

f) have a distance between handrails of 920 to 1000 mm.

9.6 Handrails

Handrails are extremely important features and should be designed to be easy to grasp and to provide a firm and comfortable grip so the hand can slide along the rail without obstruction.

A circular section with a diameter not more than 40 mm is the preferred shape so that the thumb and fingers can lock around the handrail. Wide or deep handrails which allow only a pinched grip are undesirable unless a proper hand-size grasping area is provided (See Figure 9.6). Standard pipe sizes designated by the industry as 32 to 38 mm meet the requirements of clause 9.6a.

Handrails shall

a) have a circular section 30-40 mm in diameter or an alternative shape providing the same gripping surface;

b) be free of any sharp or abrasive elements;

c) have continuous gripping surfaces, without interruption by newel posts, other construction elements, or obstructions that can break a hand hold; and

d) have a clear space between the handrail and the wall of

i) 40 mm minimum (OBC 3.4.6.4.(8)); or

ii) at least 60 mm where the wall has a rough surface (Figure 9.6); and

e) have textured cuing on the underside of the handrail of exit floors. (To alert persons who are blind of exit levels).



Where a wall has the handrail that is recessed, the recess shall extend at least 450 mm above the top of the rail (Figure 9.6). The maximum clearance allowed is to provide for adequate gripping room and to prevent injuries from arms slipping through the openings.



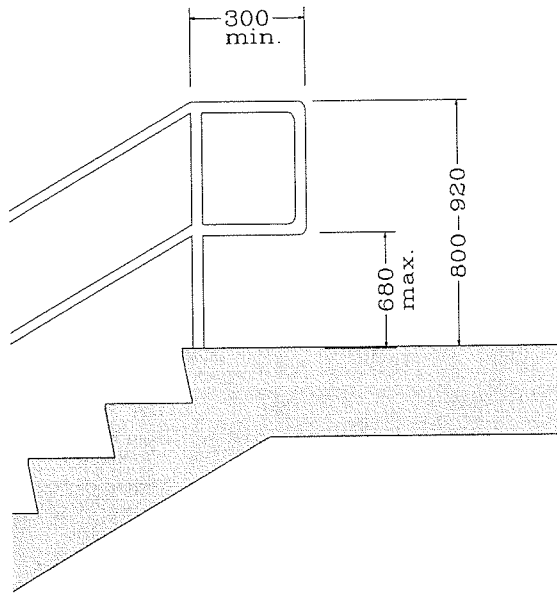
9.7 Guards (OBC 3.4.6.5)

Every exit such as a ramp, stairway or passageway shall have a wall or a well-secured guard on each side. (OBC 3.4.6.5.(1))

9.7.1 Height



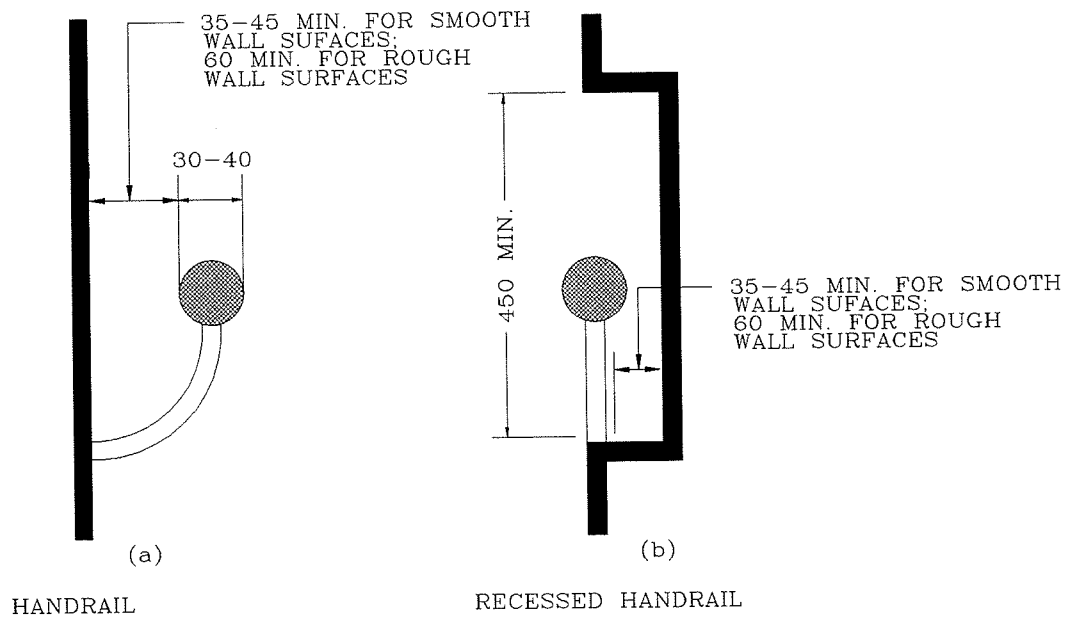
The height of guards on exit stairs shall be not less than 920 mm measured vertically to the top of the guard from a line drawn through the outside edges of the stair nosings and 1070 mm around the landings. Except where landings are more than 10 m above adjacent ground level, guards shall be not less than 1500 mm measured vertically to the top of the guard from a line drawn through the outside edges of the stair nosings. (OBC 3.4.6.5.(2))



Handrail Extension at Top of Stair

FIGURE 9.5

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Handrails/Handrails in Recess

FIGURE 9.6
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The height of guards on exit ramps and their landings shall be not less than 1070 mm measured vertically to the top of the guard from the ramp surface. (OBC 3.4.6.5.(3))

9.7.2 Size

The size of any opening through guards for exits shall be such as to prevent the passage of a spherical object having a diameter of 100 mm in buildings of residential occupancy and in day care centres, nurseries and other similar type occupancies, and 200 mm in buildings of other occupancy, except where the location and size of the openings that are more than this limit do not present a hazardous condition. (OBC 3.4.6.5.(5))

