

Common Playground Design Issues



Introduction

The following guidelines are general in nature and cover some of the key Standards issues that commonly present in custom playgrounds. These points do not cover all aspects of Standards requirements and individual designs/playgrounds should still be reviewed for compliance. Designers and manufacturers of play equipment need to be aware of the broader requirements covered in the Standards. These observations draw on the requirements of the current playground Standards:

- AS 4685 – 2014 (parts 1-6) – Playground equipment – General safety requirements and test methods + Additional specific requirements for swings; slides; runways; carousels; rocking equipment
- AS 4685 – 2012 (part 11) – Playground equipment – Additional specific safety requirements and test methods for spatial networks
- AS 4685.0:2017 – Playground equipment and surfacing – Development, installation, inspection, maintenance and operation
- AS 4422:2016 – Playground surfacing – Specifications, requirements and test method

Some interpretations in this document have been added by Andrew Reedy.

Avoiding common entrapment openings

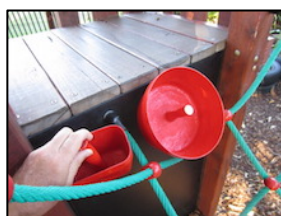
BOUND OPENINGS (potential head entrapment)

Bound openings, either vertical or horizontal, (e.g. in barriers, flexible nets, log climbing frames, etc.) need to meet the following size requirements. If the lower edge of the opening is greater than 600mm above ground level, any openings that allow the passage of the small torso probe (89mm x 157mm) or the small head probe (130mm diameter), but do not allow passage of the large head probe (230mm in diameter) are unacceptable. In brief, avoid any bound openings between 89mm and 230mm in any one direction.



Note: When specifying the opening between vertical members on a barrier or balustrade it should be made clear that 89mm is the maximum opening as it is common for contractors not to see this dimension as critical and to exceed it in places.

Examples of unacceptable bound openings



UNBOUND OPENINGS (potential head/neck entrapment)

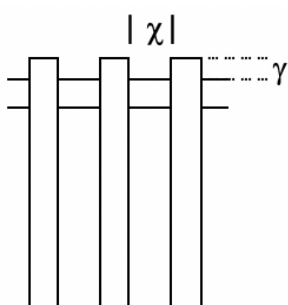
Unbound openings (e.g. gaps between the tops of adjacent vertical boards on barriers) that are more than 600mm above the ground and greater than 45mm in depth should comply with one of the following:

- the width of the opening should be less than 45mm (to prevent possible insertion of the neck), or
- the width of the opening should be greater than 155mm if the depth of the opening is less than 265mm on both sides, or
- the width of the opening should be greater than 230mm if the depth of the opening is greater than 265mm.



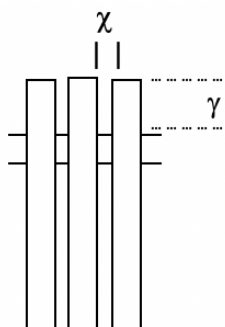
V-shaped openings that converge in a downward direction and are greater than 600mm above the ground should not be of an angle less than 60°, unless the depth of the opening is less than 45mm.

Acceptable ranges for unbound openings

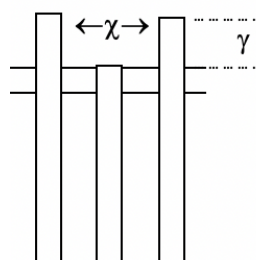


If γ is less than 45mm, then χ has no restriction.

Note: χ must be less than 89mm below the top rail to satisfy the requirements for bound openings.



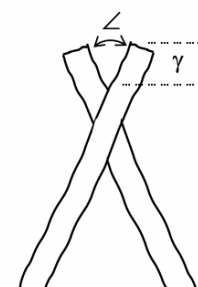
If γ is greater than 45mm, then χ must be less than 45mm.



If γ is greater than 45mm, and less than 265mm, then χ must be greater than 155mm.

or

If γ is greater than 265mm, then χ must be greater than 230mm.



\angle must be greater than 60°.

or

If \angle is less than 60°, then γ must be less than 45mm.

Examples of unacceptable unbound openings



HOLES (potential finger entrapment)

Any holes above 1000mm in height or immediately around items involving motion (e.g. slides), should not be between 8mm and 25mm in diameter to prevent finger entrapment hazards.

Chains should have a maximum opening of 8.6mm in any one direction, except where connections are made, where the maximum opening must be less than 8.6mm or greater than 12mm.

GAPS & OPENINGS AROUND SLIDES (potential clothing entrapment)

Openings or gaps immediately around slides or other items involving forced movement (e.g. sliding swinging or rocking) that allow access to a cord of 3.5mm thickness but do not allow passage of a 25mm diameter toggle on the end of the cord have the potential to create clothing entrapment whilst a child is in motion. This commonly occurs between the starting section of the slide and the platform or between the top edge of the slide and the adjacent panel or upright.

Protection against falling

MAXIMUM HEIGHTS

The maximum accessible height from which a fall is possible (reasonably foreseeable access) is 3000mm. Any platforms, etc. above this height should be fully enclosed to prevent the possibility of a fall.

Steep play elements (see note 1 below) are not permitted at heights above 2000mm on equipment that is 'easily accessible' to younger children (see note 2 below).

Note 1: Access/egress play elements of a gradient greater than 45° from the horizontal are deemed as Steep Play Elements.

Note 2: Determination of whether equipment is deemed as easily accessible is defined in the Standard as follows. Equipment is 'easily accessible' if it requires only basic skills to access the equipment, allowing users to move freely and quickly onto and within the equipment.

Some examples of items providing easy access are:

- Ramps
- Stairs
- Ladders, unless the first rung is greater than 400mm above the ground surface.
- Tiered platforms with a height difference of less than 600mm.

BARRIERS

On equipment that is 'easily accessible' to younger children (see note 2 above), any platform or walk way (defined as a surface where users can stand without the need of hand support) above 600mm in height should have a barrier at least 700mm high to prevent falls. (While 700mm is the minimum according to the Standard, around 900mm is typical in practice.) A barrier must prevent the user from falling or passing beneath so must be more than a guardrail.

Slides greater than 1000mm in height require a rail above the starting section of the slide, positioned between 600mm and 900mm above the slide surface. (Towards the upper end of this limit is generally more functional.)

OPENINGS IN BARRIERS

Clear openings in the barriers at access/egress points should not be greater than 800mm in width unless a guardrail spans the top of the opening, in which case the opening may be wider (see below). Handgrips can be used to reduce the width of the openings.

- In the case of equipment deemed 'easily accessible' (see note 2 above), 'steep play elements' (see note 1 above), cannot have an opening exceeding 800mm in width even with a guardrail.
- For equipment deemed 'not easily accessible', the opening above 'steep play elements' can be a maximum of 1200mm provided a guardrail is placed above the opening.

Impact Area (formerly referred to as 'fall zone')

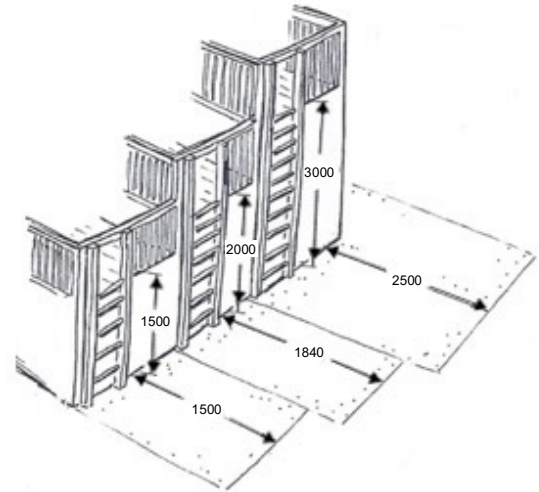
Equipment with a Free Height of Fall (FHOF) between 600mm and 1500mm should have a clear impact area of 1500mm around the equipment. The surface should have the appropriate impact attenuating properties for the respective FHOF. The impact area should be free of any objects that could be hazardous if fallen on. This does not necessarily preclude the use of items within the impact area that have a height differential of less than 600mm in height (e.g. stepping logs providing access to a higher point.)

Note: The FHOF is the vertical distance from the point of intended body support to the surface below, e.g. the platform height, or the hand-hold point for overhead items such as monkey bars.

GENERAL RULE

Equipment with a FHO of between 1500mm and 3000mm should have a clear impact area that increases incrementally from 1500mm to 2500mm. This can be worked out using the following formula – $[FHO \times 0.667 + 500\text{mm}]$.

Non-moving equipment with a FHO of less than 600mm is not required to have an impact attenuated surface in the impact area. (Where falls from such lower items are easily foreseeable it may still be prudent to include some form of soft surface such as grass, soil or mulch, even if this is not a tested impact-attenuating surface.)



ADJACENT PLATFORMS

The potential fall height between adjacent platforms cannot exceed 1000mm without the lower surface being impact attenuated.

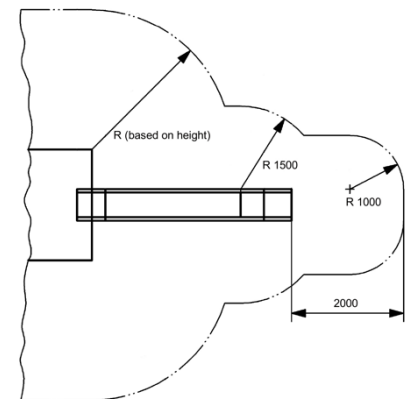
If internal elements, (e.g. vertical nets), are used as a means of access between platforms, means should be devised to eliminate the potential to climb above 1000mm and fall onto a hard surface.

SLIDES

Slides are required to have an impact area extending 2000mm from the end of the slide and 1000mm to the side of the outer edges of the run-out section. The impact area also extends at least 1500mm to the sides of the sliding section.

The surface around the run-out section should have impact attenuating properties for a Critical Fall Height of 1000mm.

Note: The requirement for impact-attenuating surfacing to the sides of a mound or embankment slide may be negated on the basis of a risk assessment. In such instances, additional protection against falling could be considered at the top of the slide/mound (e.g. a guardrail or barrier).



FREE STANDING ITEMS

Some free-standing items such as swings, carousels, spring equipment, etc. have their own impact areas which are generally provided by the supplier/manufacturer.

In the case of swings and carousels these impact areas should not overlap those of other items of playground equipment.

The impact attenuating surface requirement around items involving motion (e.g. swings, carousels, flying foxes) may be greater than the actual fall height based on forced movement. These details can also be provided by Play Check.

Protrusions

Edges and corners on elements that are in locations in which a person could come into contact should not be sharp. The Standard calls for a minimum 3mm radius on corners, edges and protruding parts, but bevelling, etc. to eliminate sharp edges/corners will often be satisfactory.

Protruding bolt threads should cut off flush with the end of the nut (ensuring that there are no sharp edges) or covered (e.g. dome nuts or security caps).

Footings

Footings should be laid in accordance with the one of the following requirements:

- Footings should be at least 400mm below the playing surface; or
- The tops of the footings must be at least 200mm below the surface if the top is rounded with a radius of 100mm and tapered; or
- the footings should be covered by the equipment or by rubber surfacing.

