

## Assessing required thicknesses and areas

This section summarises the requirements of the two relevant European Standards. EN 1176 : 1998 specifies safety requirements for different types of playground equipment, while EN 1177 : 1998 specifies safety requirements and test methods for impact-absorbing playground surfacing.

### Specifying the right thickness

Playground operators must choose a surface with a Critical Fall Height rating that matches or exceeds the maximum possible 'free height of fall' from their play equipment. EN 1177 : 1998 defines the Critical Fall Height test. An instrumented 'headform' representing a child's head is dropped from various heights onto the test specimen, and its deceleration is monitored. The greatest height of fall that keeps maximum deceleration below the permitted limit gives the rated Critical Fall Height for the product. Under low play equipment with free heights of fall under 0.6 m, the surface is only required to have 'some impact-attenuating properties'. We recommend 20 mm thickness here and for general run-about areas. But NOTE, because 20 mm requires a separate structural layer but 40 mm can be laid directly on a dynamic (crushed-stone) base, the 40 mm thickness may sometimes be cheaper. Please ask us for alternative quotations.

The Critical Fall Height ratings for our standard thicknesses are:

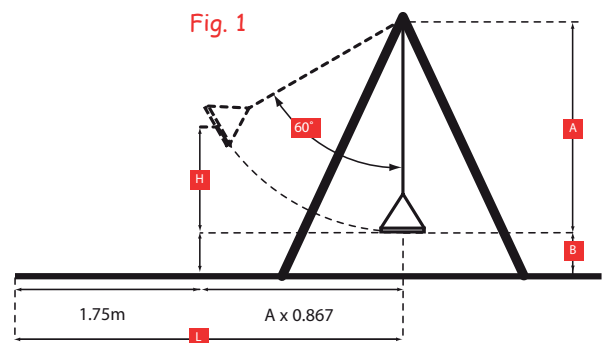
Thickness	20 mm	40 mm	50 mm	60 mm	80 mm	100 mm	140 mm
Critical Fall Height	0.6 m	1.3 m	1.4 m	1.6 m	2.0 m	2.5 m	3.0 m

### Assessing the fall height

The maximum free height of fall for a piece of play equipment is defined as follows:

- For equipment on which the child stands, it is the height of the foot platform above the ground, regardless of higher guard rails.
- For equipment from which the child hangs, it is the height of the hand support above the ground.
- For equipment on which the child sits, it is the height of the seat above the ground.

BUT if there is any possibility that a normally adventurous child can use guard rails, supports or seats to climb to higher parts of the structure, such as a roof, the height of the highest attainable point must be taken. For swings, the height (H) of the seat when 60° from the vertical is taken.  $H = B + \frac{1}{2} A$  (see Fig.1).

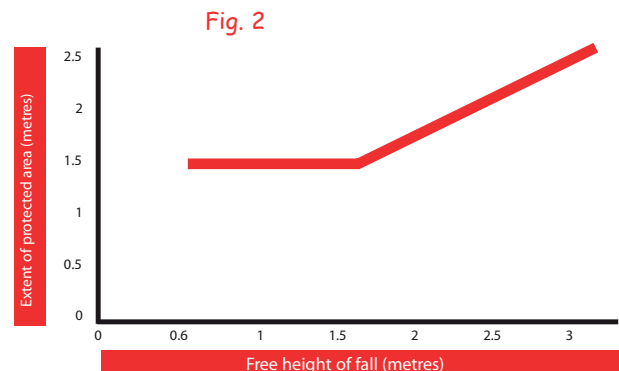


### Assessing the area to be protected

The higher a piece of play equipment is, the further away a child could fall. And special rules apply to swings, slides, runways and carousels whose use involves horizontal movement.

### Static and rocking equipment

For static equipment, rocking equipment and seesaws, the protected area should extend at least 1.5 metres round the equipment. This applies to fall heights from 0.6 metres up to 1.5 metres. The distance then rises linearly to 2.5 metres round the equipment at the maximum permitted fall height of 3 metres (see Fig.2).



## Swings

For conventional swings:

The width of the protected area should be 1.75 metres, centred on the seat. If the seat is wider than 500 mm, increase width by the amount it exceeds 500 mm.

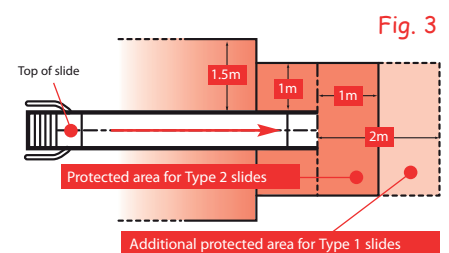
The length (L) of the protected area should extend 1.75 metres beyond the horizontal limits of the swing's movement. On each side,  
 $L = (A \times 0.867) + 1.75$  metres (see Fig.1).

For single-point swings:

The protected area should be circular, centred on the rest position, with a radius (R) given by the same formula as above, thus allowing for a 60° angle of swing in any direction.  $R = (A \times 0.867) + 1.75$  metres.

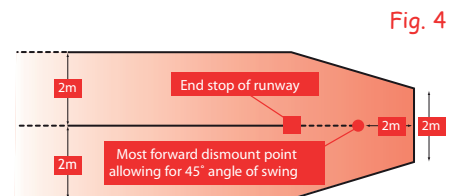
## Slides

For the ladder, starting section and upper part of the sliding section down to a height of 0.6 metres, the standard rules apply: the protected area round the slide should extend between 1.5 and 2.5 metres, depending on the free height of fall (see Fig.2). Below 0.6 metres, the protected area should extend at least 1 metre on each side, and this should continue into the run-out area beyond the slide end for a distance of either 1 metre (Type 2 slides) or 2 metres (Type 1 slides) (see Fig.3). We can tell you which Type you have. The whole protected run-out area is taken to have a fall height of 1 metre to compensate for speed of arrival, and thus requires 40 mm thickness.



## Runways

For cable runways down which children travel under gravity, either seated or hanging by their hands, the protected area should extend 2 metres on either side of the runway's centre line. At the arrival end, it should extend 2 metres beyond the most forward dismount position. A 45° forward swing beyond the end-stop is the standard allowance. The protected area should taper in width from 4 metres level with the end-stop down to 2 metres at the extreme position (see Fig.4).



## Carousels

The Standard applies to carousels over 500 mm in diameter. For most types, the protected area should extend 2 metres out from the outer edge of the carousel to allow for centrifugal force. For carousels of the 'giant revolving disk' type, the protected area should extend 3 metres out. Some safety inspectors may allow the protected area to be reduced round small and/or low carousels.

Where the free height of fall exceeds 0.6 metres, the normal Critical Fall Height rules apply. But most carousels are lower than this, and the only requirement is for 'some impact-attenuating properties'. We recommend 20 mm laid over existing hard surfaces, or 40 mm laid direct on loose stone in new construction. Surfacing under the carousel and surrounding it must be at the same level, but no inward extent of protective surfacing is specified. We recommend 300 mm in from the outer edge for most carousels, but for types with overhead grips from which children hang, surfacing should extend in to the central support.