



# Playground SAFETY Handbook



**A pictorial guide to the basics of  
international safety standards**

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# Managing

Managing Great Playgrounds

02



## Hazards

Sharp Edges, Protrusions and Impalement Hazards	12
Pinch, Crunch and Shear Hazards	14
Clothing Entrapments	15
Entrapment Hazards	16
Trip Hazards	19
Playground Design	20



## Heights + Fall

Preventing Falls: Soft Fall Material	24
Preventing Falls: Soft Fall Zones	25
Preventing Falls: Platform Heights and Guardrails	28
Review from Euro/AUS/NZ Playground safety assessor	37

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# Playground Ideas Safety Manual

A summary of the most common playground hazards.

The safety of children is everybody's responsibility and is something that needs to be considered carefully. From birth, a child's ability to move, play and learn is a miracle to watch and we all want to see our children have the best, most enriching experiences to help them grow and develop into healthy, happy adults.

Along this learning journey, a child's ability to perceive hazards takes time to mature and it is our job to fill this perception gap. Doing this well involves a tricky balance of helping children to avoid the 'big mistakes' that could have long-term negative effects for that child and; having the patience and confidence to stand back and let them learn for themselves with the many 'small mistakes' that come and go.

Finding this balance between intervening and letting go is a real challenge and is essentially what this manual is all about.

## Acknowledgments:

This book would not have been possible without the careful and diligent work of some fine individuals. I would specifically like to thank Saw Wa Do and all the amazing school principals, teachers and builders who helped in all the really hard work of actually building great places for children. Also, thanks to so many others who helped with research, copy writing, and advice. Paul Grover (Qualified Playground Safety Assessor and Engineer), Jon Racek, Mary Jeavons , Rani Kellock - Wordplay copywriting, Lejla Kebic for her beautiful images, Heath Gledhill, Dom Morgan - Swinburne Design Centre and Matt Green (for the design), and Liz Cummins from Bricolage Design for the 2017 re-edit. And to my wife, Willow who had the courage and compassion to lead us to work in Thailand in the first place.

Thank you.

"Unfortunately, the term 'risk-taking' is usually interpreted with negative connotations, with 'risk' and 'hazard' often being seen as synonymous (Lupton & Tulloch, 2002). Greenfield (2003), however, believes a distinction should be drawn between these two terms; hazard is something the child does not see, whereas risk relates to the child's uncertainty about being able to achieve the desired outcome, requiring a choice whether to take the risk or not. Adults can mostly see the hazards and endeavour to eliminate them. The way is then clear for children to face the challenge and accept the risk should they choose to do so. This also involves providing adequate supervision and support and being aware of those aspects of the child's behaviour that might contribute to serious injury, especially as a result of inappropriate use of playground equipment."

Helen Little and Shirley Wyver

Institute of Early Childhood, Macquarie University [http://www.earlychildhoodaustralia.org.au/australian\\_journal\\_of\\_early\\_childhood/ajec\\_index\\_abstracts/outdoor\\_play\\_does\\_avoiding\\_the\\_risks\\_reduce\\_the\\_benefits.html](http://www.earlychildhoodaustralia.org.au/australian_journal_of_early_childhood/ajec_index_abstracts/outdoor_play_does_avoiding_the_risks_reduce_the_benefits.html)



# Managing

### Your number one priority

There is no use creating a safe playground if it means the playground is so dull that children lose interest in it. That defeats the entire purpose! This manual offers a simple process to help guide you in your number one priority: to create a great playground. A great playground is much more than just safe. It is a stimulating, adventurous and challenging space that will fully support children's growing bodies and minds as well as being safe. Reserving your judgment on safety and focusing on a great design first is the best way to start. Often simple modifications can be made to elements to make them safe if we clearly think through how children might use them.

In our Playground Builders Handbook there is a lot of great information about completing a community consultation (Chapter 1: Listen) and designing playgrounds (Chapter 3: Design). This section of the safety handbook will help in you in guiding the design decisions you make after reading these sections.

### Creating a great playground

Starting from a place of wanting to create a great playground, we need to first have a clear understanding of what that means to us - so that we can communicate this to everyone. In our Playground Builders Handbook again there is lots of information and ideas about all types of play.

**We have created a poster for you at the end of this section to print out and stick somewhere visible** - so everyone will know why your playground is a great playground design for so much more than running and jumping. This poster represents the agreed principles of why your playground has been designed the way it has and what the children get out of using it.

#### Great playgrounds:

- get children outdoors
- allow children to test the boundaries of their abilities
- help children learn to make friends and collaborate
- encourage creativity and problem solving
- encourage imagination and pretend play
- give children healthy exercise
- are exciting and fun!

### Assessing how great your playground is

So how do you know whether your playground is great or not? Well it may sound a little funny, but one of the best ways to do this is to try and ask each of your individual playground elements some questions and from the answer, give them a score. 1 point for yes and 0 points for no. There will be certain elements that you will always include regardless of the score, but a playground that has elements that score a lot of points and a whole site design that includes points from every different question is a really good start.

**Use the Play Value Interview Questionnaire at the end of this section to ask your playground questions and score them. There is a practice example of how to do this included.**



## Managing great playgrounds

### Modifying your elements to make your playground even greater

So now that you have an idea of the value of each of your elements and the playground as a whole, what can you do to increase their value for play? Go back over your questionnaire again and look at the elements that had a low score. Ask the following 3 questions to see if you can improve the score.

1. Are there any design elements you haven't included that you should?
2. Are there other elements that provide the same activity (but score much higher) that you could add or substitute? *For example: a seesaw is a fun element, but the standard sit down seesaw gets boring fairly quickly for most children. On the other hand, our Balance Seesaw Hybrid (<http://www.playgroundideas.org/designs/balance-seesaw-hybrid/>) has the same kind of activity and costs a similar amount as a few standard seesaws but scores much higher on the playground element assessment .*
3. Can you change the location of the element so that it combines with other elements to improve the play value overall? *For example: Adding a play shopfront next to a sandpit where children can "sell" the cakes they "bake" in the sandpit increases the play value of both elements significantly.*

When you've worked over your questionnaire a few times and reached the end of this process you should have a clear idea of how to maximise the play value of your specific space. It is now time to begin considering safety for your particular playground.

### The context for safety in playgrounds

We all agree that we want our children to be safe and free from serious injury and so removing the obvious hazards mentioned in the latter part of this manual will make a big impact on safety. The issue is however, that in the process of removing these hazards, playground designers/ managers often also remove the most positive, stimulating and challenging aspects of the playground as well. Creating a great playground requires judgement, it requires you to weigh up the benefits of certain activities with the potential risks that that activity holds in your specific context. These decisions should be made based on your particular situation and will change throughout the world but below we have some helpful ideas to start you on the road.

### Risk and play

**'Children are more likely to develop responsible attitudes toward risk if they have experience dealing with risky situations. If adults deny children the opportunities for worthwhile, positive risks, they also prevent children from developing the decision-making skills necessary to make accurate risk judgement. Children need to learn to take calculated risks' - Barker 2004**

It is important to note that all of us are exposed to risks that we gladly choose to take, like riding a bike, because those risks have important benefits to our lives. Life is full of risky situations we cannot avoid and the consequences of poor judgement gets more serious as we reach adulthood. The last thing we want are teenagers who have not learned to manage small risks to be experimenting with big risks like learning to drive a car or dealing with drugs and alcohol... From learning to take small risks with small consequences as children we learn the skills to calculate bigger risks with bigger consequences later in life. The good news is that children are in-built with the perfect tool to develop these skills and this tool is called 'play'.



### What is risk competence?

Minute by minute, day by day, children forge forward in their development by practising skills and trying new experiences. Before each of these moments where they step into the unknown children are making judgements on whether they are ready or not for that next challenge. We call this process of children evaluating how confident and ready they feel in themselves to take on new experiences and challenges in their environment 'risk competence'. A great playground will provide opportunities for children to practise risk competence in their own time.

### Why providing risk in play is important

Risk in play is valuable because it allows children the freedom to develop the following human capacities:

- Curiosity
- Physical skill
- Leadership
- Self-confidence
- Resilience
- Creativity
- Innovation

Children who develop these human capacities tend to become more happy, well-rounded, successful adults.

### Dealing with our own fear

Everyone agrees that great play is an essential tool for children's development. We know that the only way anyone learns a new skill is to try it for the first time and then over and over. Childhood therefore involves millions of small attempts beyond a child's current competence. This pathway to mastery comes with all of the expected falls and clumsy mistakes you would expect from a developing human.

Even with this knowledge, the process of watching a child constantly teetering on the edge of their competence can make us nervous (which is a normal and natural reaction from our empathy towards a child's pain.) A conflict arises however, when our desire to remove the chance of any injury overrides the child's needs to take these important risks and this is why some balance and flexibility is required in our judgement in order for the child to grow.

To make the issue more complex, children grow, develop and change in their competence quickly (often quicker than we notice) which means that we may be holding them back without even realising it.

A risk benefit approach (discussed below) can be helpful to make more balanced decisions between our 'duty of care' to minimise the chance of children having a serious injury with our 'duty of care' to cater for children's need for the freedom to experience, explore and test their boundaries.

### What is a risk benefit approach?

First, let's clarify 2 key points:

- 1) We all take risks and use our judgement daily to decide which risks are ok and which to avoid. (taking a bus is a risk most people are more than willing to take).
- 2) No playground will ever be injury free, ever. In fact, it is guaranteed that children will be injured during childhood. Bumps and scratches are a natural part of the learning process as children grow up and most people would agree that if we created a world where a child could



## Managing great playgrounds

never fall over that this would create other, worse consequences for the child. Children need challenges to grow and develop and they will experience some consequences along the way. So, it is really important to differentiate between 'bad hazards' and 'good risks'.

'Bad hazards' are those risks that offer no value to children and could cause serious harm. All the most common hazards are covered in this manual and they can and should be eliminated without loss of play value to children. Please also refer to your local Safety Standards which are listed on the Global Safety Standards page on the Playground Ideas website (<http://www.playgroundideas.org/global-safety-standards/>). Use common sense and seek expert advice (if it is available) to assess and remove these hazards in your playspace.

*For example: A bad hazard would be an old piece of equipment with protruding nails, a rusted ladder with rungs missing and a rotten deck platform*

'Good risks' on the other hand are challenging activities that provide value to children's learning and development and are unlikely to cause serious harm. These risks should be included. These activities often involve tricky movement, agility and balance. Eliminating them can be counterproductive and therefore common sense must be introduced when evaluating these activities to manage and support them effectively.

*For example: A good risk might be including a series of rocks at different levels in an embankment for scrambling up and down.*

### Removing obvious hazards

Removing hazards (please read carefully through the latter chapters of this handbook at this stage) like sharp edges, shearing or entrapments is unlikely to lower the play value of your playground, but will significantly reduce the chance of a serious injury.

*Note: Injuries in the developing world are not the same as they are in wealthy countries. Healthcare can be a long distance away and may be of low quality. This increases the need to carefully remove any bad hazards.*

It is important to also be aware that a perfectly safe playground elements can become hazardous when placed in certain settings or next to other elements. *For example: Swings too close to the main pathway in and out of the classroom.*

When evaluating if your great playground has the right balance of risk and safety it is important to remember that every community has its own particular set of broader circumstances that are worth considering as well. Know the following about your particular playground's community:

- The ages and skills of the children using the playground
- The volumes of children using the playground regularly
- The amount of adult supervision in the playground
- The capacity for trained adults to work with children to teach them 'risk competence'
- How often the playground is maintained (this includes clean-up as well as part replacement or repair)
- Where elements sit in relation to paving, buildings, doorways, roads, trees and plants, water bodies (i.e. rivers) and other structures (i.e. poles)
- The type of ground surface and slope
- Where elements sit in relation to other elements. This might be related to Free Height of Fall (refer to the Hazards section of this manual) or just conflicts in activities as mentioned above (*For example: Swings to close to pathways or running children*).



## Managing great playgrounds

### Undertaking a risk benefit assessment

What we suggest you do after you have completed your Play Value Interview Questionnaire is undertake a risk / benefit assessment on your playground **using the checklist at the end of this section.**

To finalise your design you will need to rank each of your playground elements again according to play value and how severe the risk is. When evaluating it will be useful for you to have the latter sections of this handbook available to refer to.

A playground element that is LOW in play value but HIGH in risk will more than likely be worth removing.

A playground element that is HIGH in play value and LOW or MEDIUM in risk will more than likely be a valuable play activity and worth including.

A playground element may sometimes be both HIGH in value and risk. In this situation you will need to exercise some common sense judgment and refer back to the questions in the section above to take decisions on what to do.

A playground element may also sometimes be both LOW in value and risk. Retaining it will not be an issue of safety, but it might be worth looking at how the element may be further improved.

Refer to the example checklist provided and use the checklist template to complete your own assessment of your playground.

### What to do when things go wrong

Of course, when accidents do occur it is MOST important you are prepared. **At the end of this section is a poster titled 'When something goes wrong in our playground this is what we do' that you should print off, fill out the details required, and put it up somewhere close to a telephone or in a prominent location.** This will help with responding quickly and effectively to any situation that arises.

### And finally...

You now have the framework to address the safety aspects of your great playground design. Remember maximising children's opportunities to grow and develop should always be the end goal.

Taking a balanced approach to 'risk' ensures that whilst we are being mindful of children's wellbeing, we're also not compromising our great playspace on valuable opportunities for play.

**'As safe as necessary, not as safe as possible' - Ball, Gill & Spiegal 2007**

If you have any further questions about managing risk please get in touch at [info@playgroundideas.org](mailto:info@playgroundideas.org)

# PLAY VALUE INTERVIEW QUESTIONNAIRE:

1. Write the particular element or activity along the top of the table and ask your playground the questions down the left-hand side by putting a score in the middle column. At the end total the score for both element / activity and play ground overall at the bottom. The higher your possible score the BETTER!
  2. Review again, this time looking at all the elements / activities that received low scores and see how those scores can be further improved.

## RISK BENEFIT ASSESSMENT CHECKLIST:

1. Put the elements from your playground down the left-hand side of the checklist.
  2. Rate the element in terms of good risk as H = High, M = Medium and L = Low
  3. Rate the likelihood of bad hazards occurring as H = High, M = Medium and L = Low
  4. Review and write your assessment in the far right-hand column

# **THE PLAYGROUND AT**

.....

## **IS A "GREAT" PLAYGROUND BECAUSE**

It takes us outdoors

It can change

It challenges us to grow

It helps us learn to make friends

It gives us healthy exercise

It takes us outdoors

It's exciting and fun!

.....  
(add your own description here)

# **WHEN SOMETHING GOES WRONG IN OUR PLAYGROUND THIS IS WHAT WE DO:**

1. Make sure that we remove the children, staff and ourselves from danger first
2. If safe to do so, remove any hazards
3. Assess how serious the injury is and what treatment might be needed
4. If the injury requires minor first aid send a responsible adult or older child to bring the first aid kit and treat injured child
5. If the injury is more serious contact the following numbers:

**AMBULANCE: .....**

**MEDICAL  
CENTRE: .....**

**DOCTOR: .....**

6. Rope or tape off the playground area until it has been assessed
7. Contact the child's parents or carer
8. Write down all details of the incident, what treatment or actions were followed and what the outcome was
9. Assess the playground and make changes if necessary



## Hazards

# Hazards

The following Hazards section contains information about all of the most common hazards in a playground. Some of these hazards are obvious and some are not. Please read carefully and if there is any confusion or more information required. Refer to [www.playgroundideas.org](http://www.playgroundideas.org) where further resources are available.

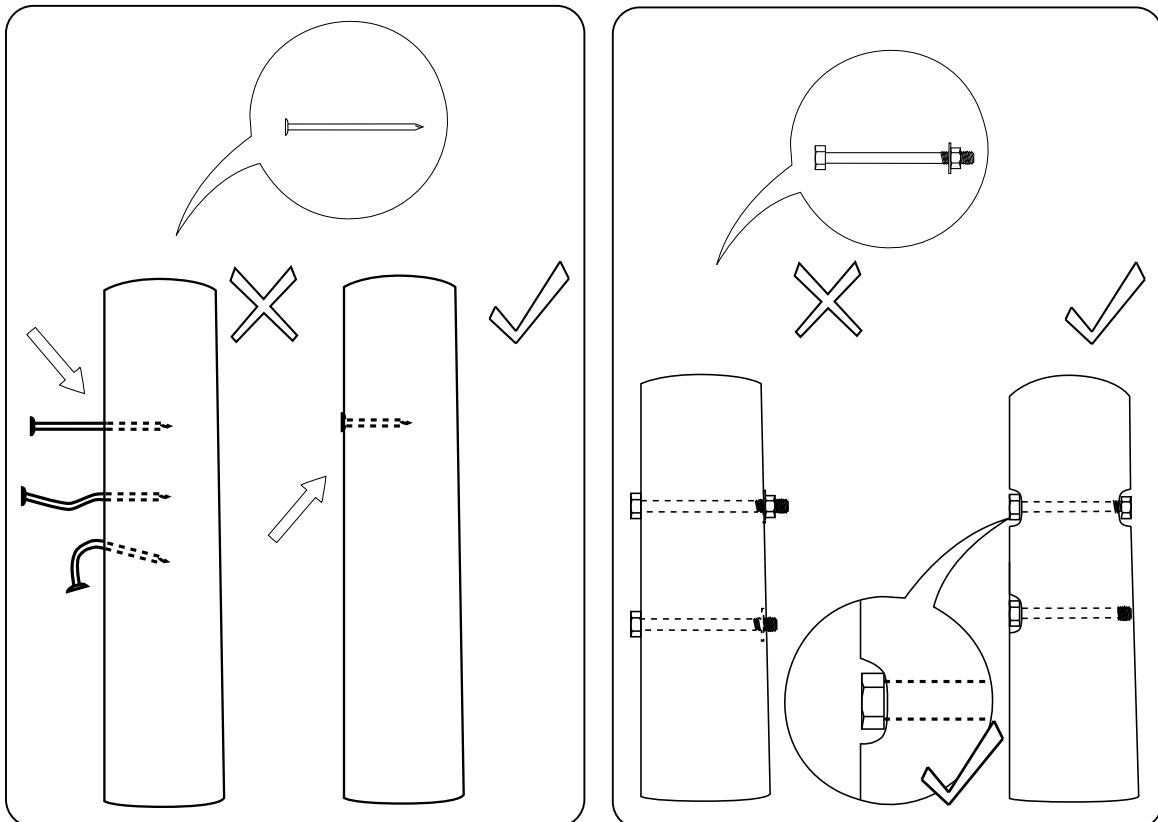
Sharp Edges, Protrusions and Impalement Hazards	12
Pinch, Crunch and Shear Hazards	14
Clothing Entrapments	15
Entrapment Hazards	16
Trip Hazards	19
Playground Design	20
Notes on Materials	21



## Hazards

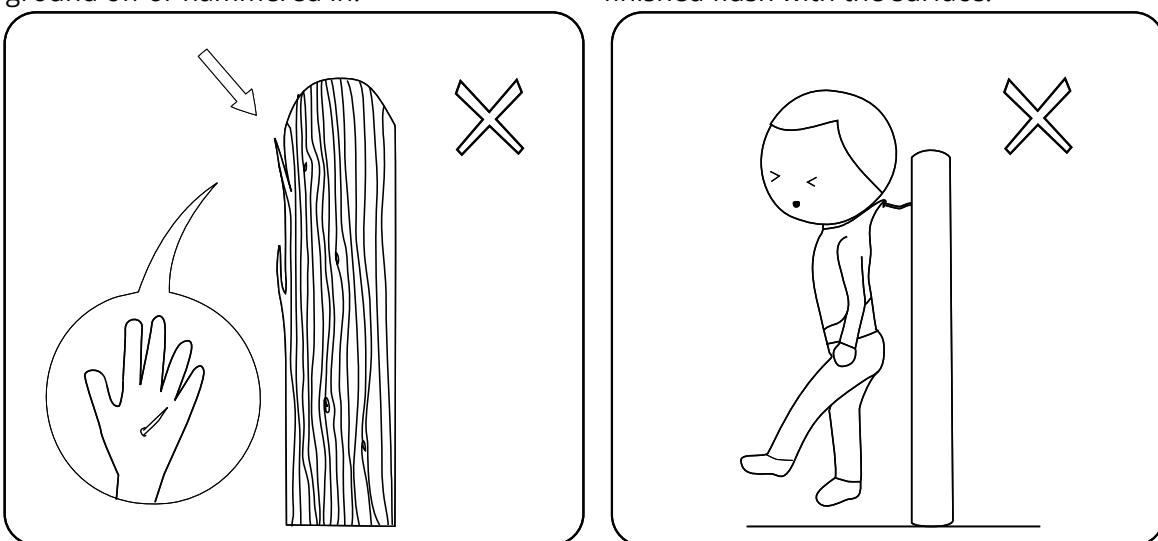
# Sharp Edges, Protrusions And Impalement Hazards

Narrow, small-diameter timbers, rods or other objects that children can collide with or fall onto can cause serious injury and should be avoided.



Sharp protrusions, such as nails, bolt ends, protruding steel reinforcement and splinters, can cause lacerations or hook hazards and should be sanded smooth, ground off or hammered in.

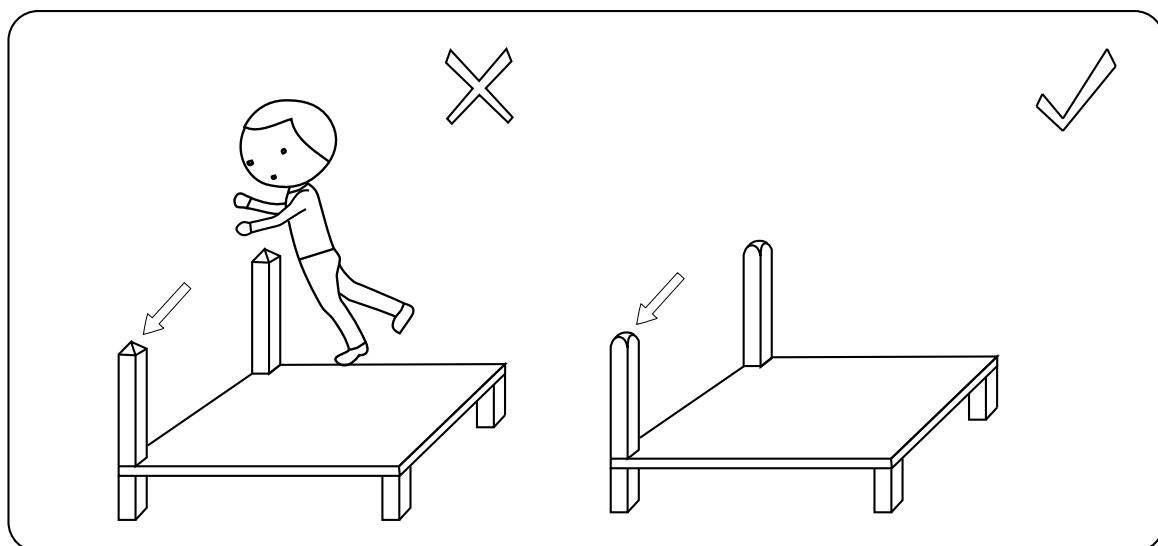
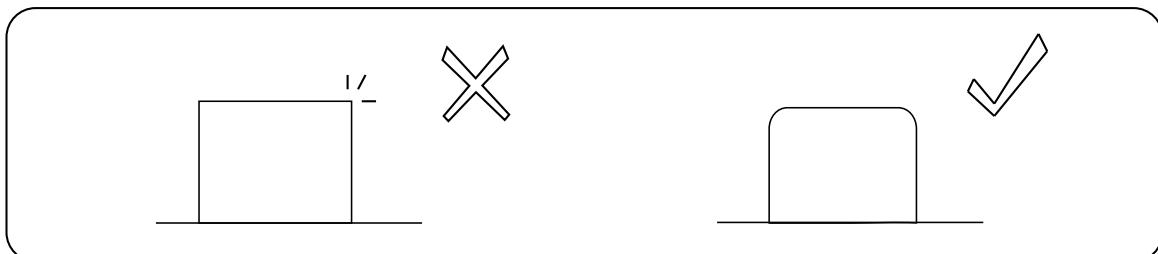
Nails should be avoided. Bolts are preferable and should be recessed, dome-headed and/or cut off less than two threads beyond the nut so they are finished flush with the surface.



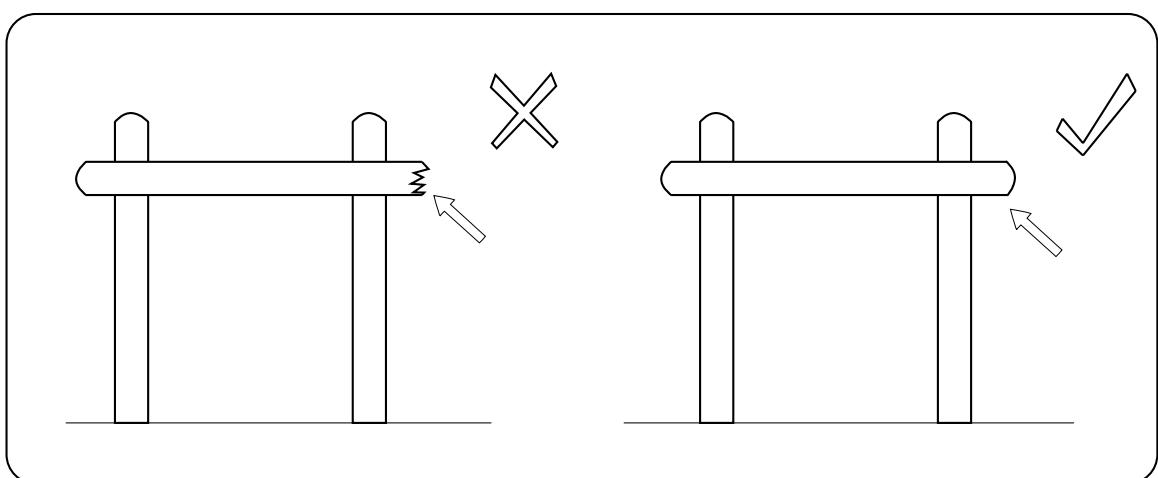


## Hazards

Sharp edges should be rounded (via grinding, cutting or sanding) to a broad smooth finish that cannot cut. You may also cover certain edges (we use motorbike tire tread pieces) to soften, add grip and prevent injury (e.g. a low entrance to a tunnel is a common place children hit their heads).



Protrusions can also cause penetration or impalement.



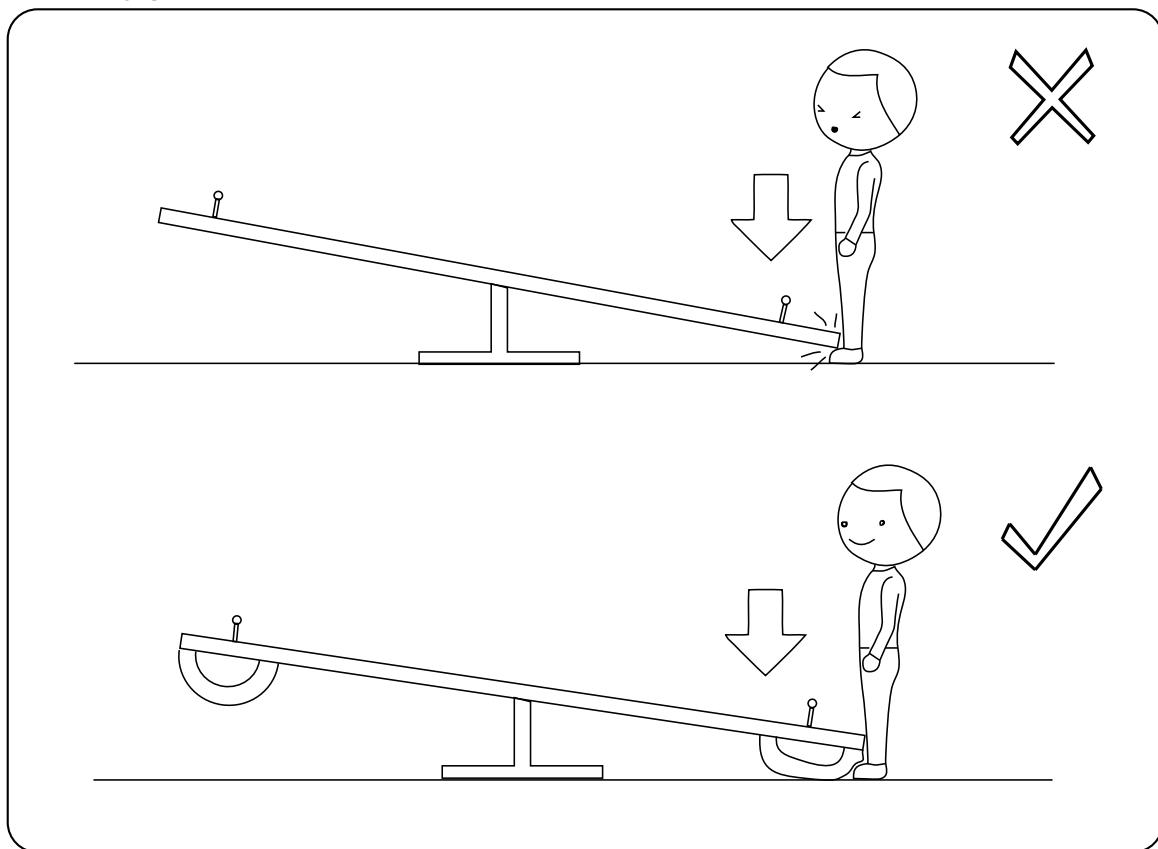
Note that these hazards can also result from broken and damaged equipment, so good, regular maintenance is essential. (See link about Maintenance below). Take special care under decks or in tunnels where it may be darker and protrusions at head height may not be easily seen.



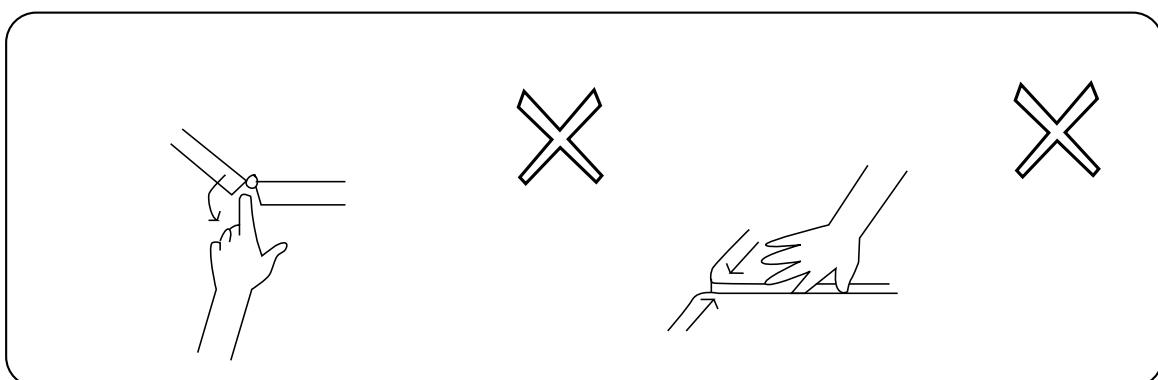
## Hazards

### Pinch, Crush And Shear Hazards

These occur when moving parts of equipment move against one another or against a stationary part, trapping and crushing body parts, such as with rocking elements, see-saws and merry-go-rounds.



Be especially aware of these hazards when they involve high amounts of force. For example, a child putting an arm through merry-go-round netting is a common shear hazard and the central hinge and ends of a see-saw can be a common crush point.



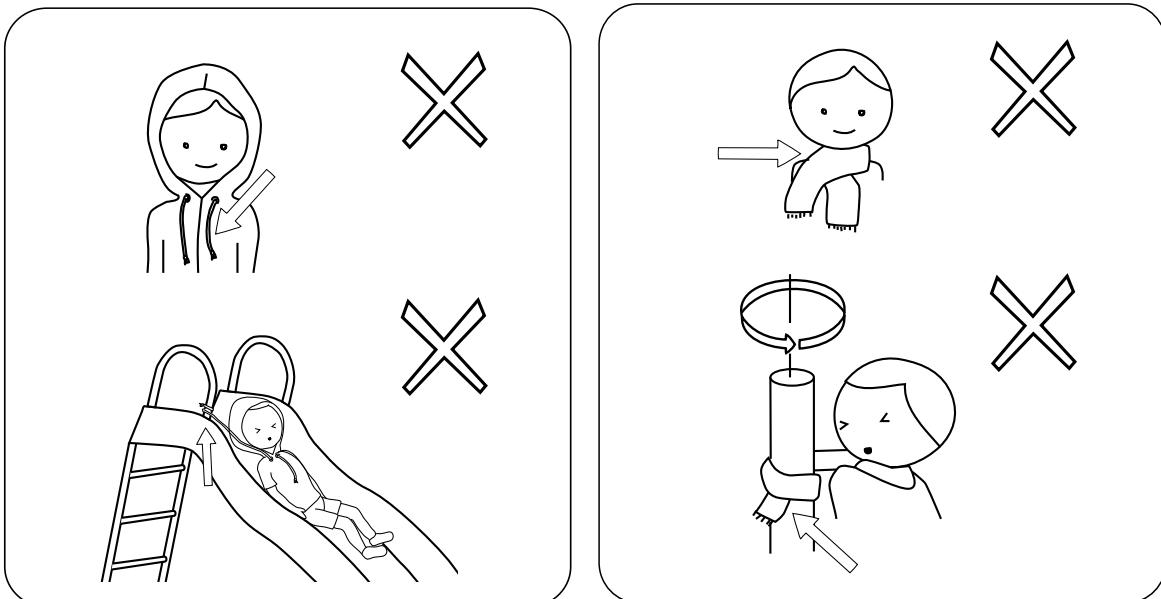
Other common crush points include between moving swing chains and their support posts, between moving swing seats and the ground surface, between springs, and in the spaces of moving "clatter" bridges, if the spaces are inadequate.



## Hazards

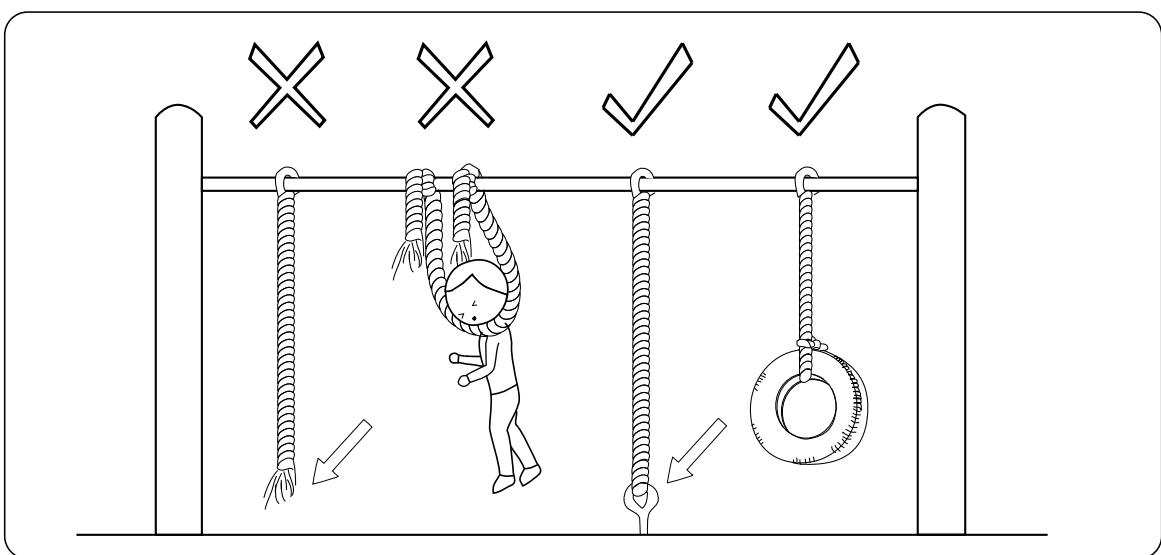
### Entanglement Hazards

Entanglement hazards are objects that can catch items of clothing or body parts and may cause strangulation as a result. For example, if a hood drawstring catches at the top of a slide that the child slides down, the drawstring may tighten around his neck. Adults should also encourage children not to wear drawstrings (especially around their necks) while on the playground.



These hazards are commonly caused by loose clothing (e.g. drawstrings and cords), skipping ropes and loose playground ropes attached at only one end. Tangling can also occur on spinning equipment with a static center pole, and if children tie loops in ropes.

To avoid entanglements, care needs to be taken with the playground design; to remove small gaps, "V" shaped openings or protrusions that can catch objects, hair or clothing especially where there is "forced movement", such as sliding and swinging. Loose ropes and chains should not be left unattended.



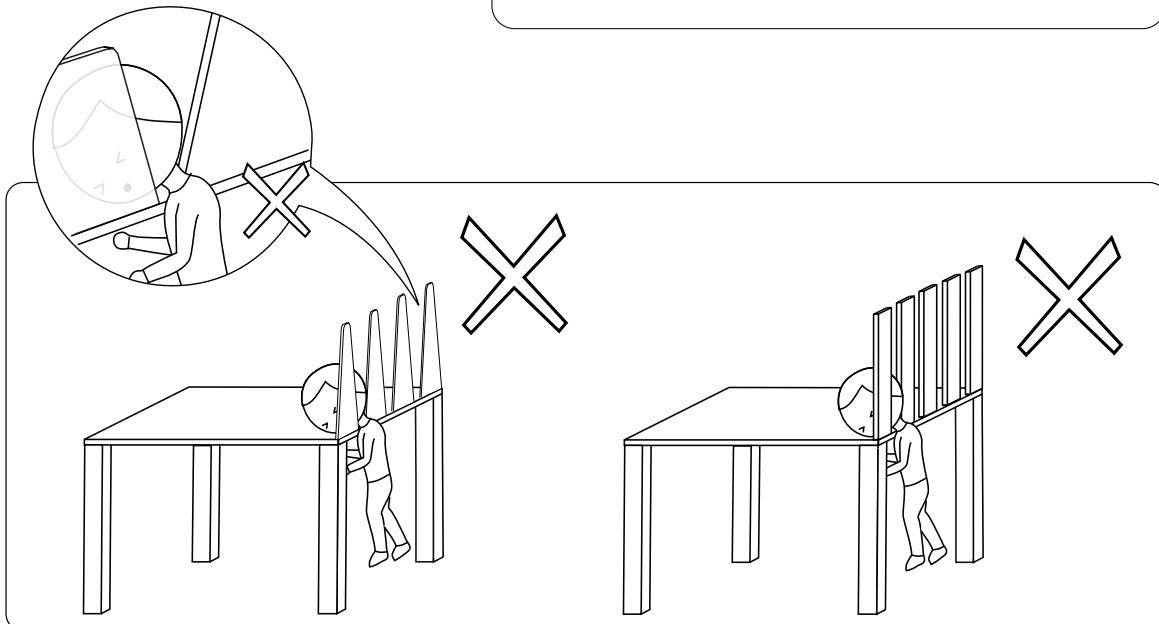
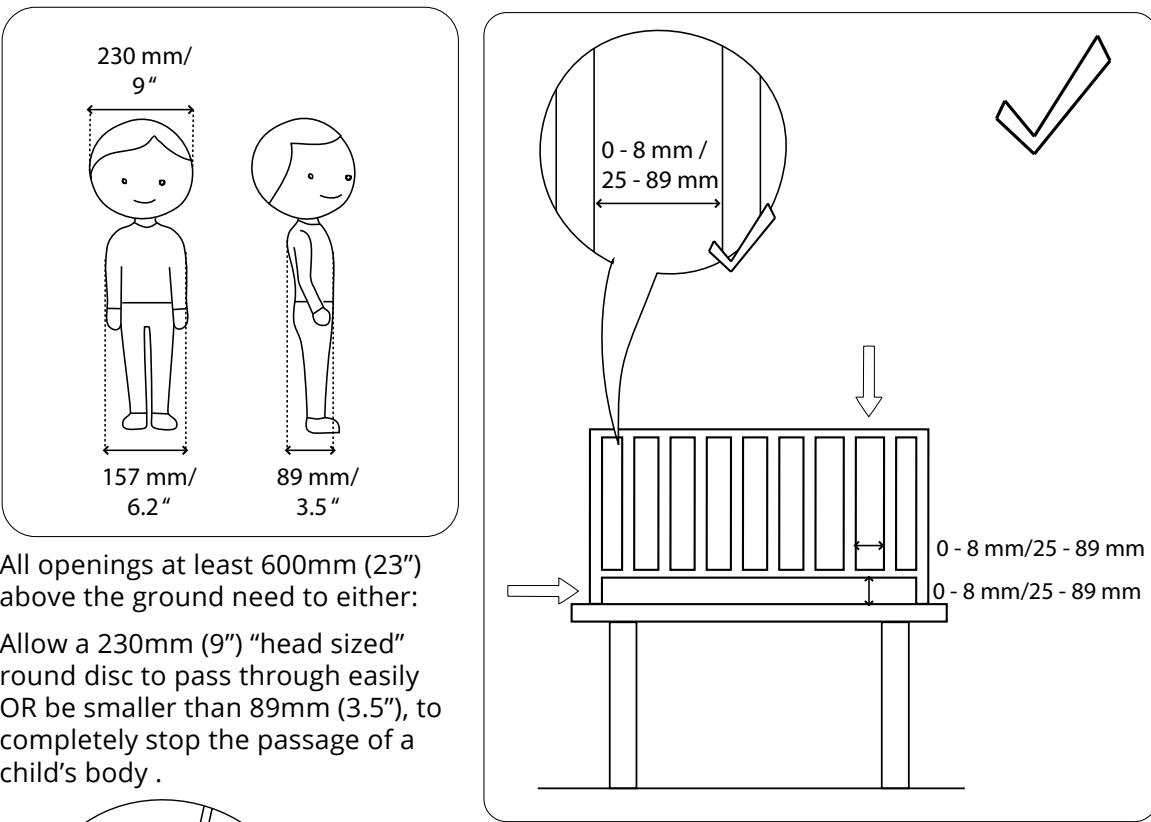


## Hazards

### Entrapment Hazards

Entrapment is caused when a child's body part (often the neck) gets caught in a space from which it cannot get out. This is only an issue with children because their heads are comparatively larger than their bodies. This type of hazard is the least obvious hazard in a playground, though it can have the most serious consequences.

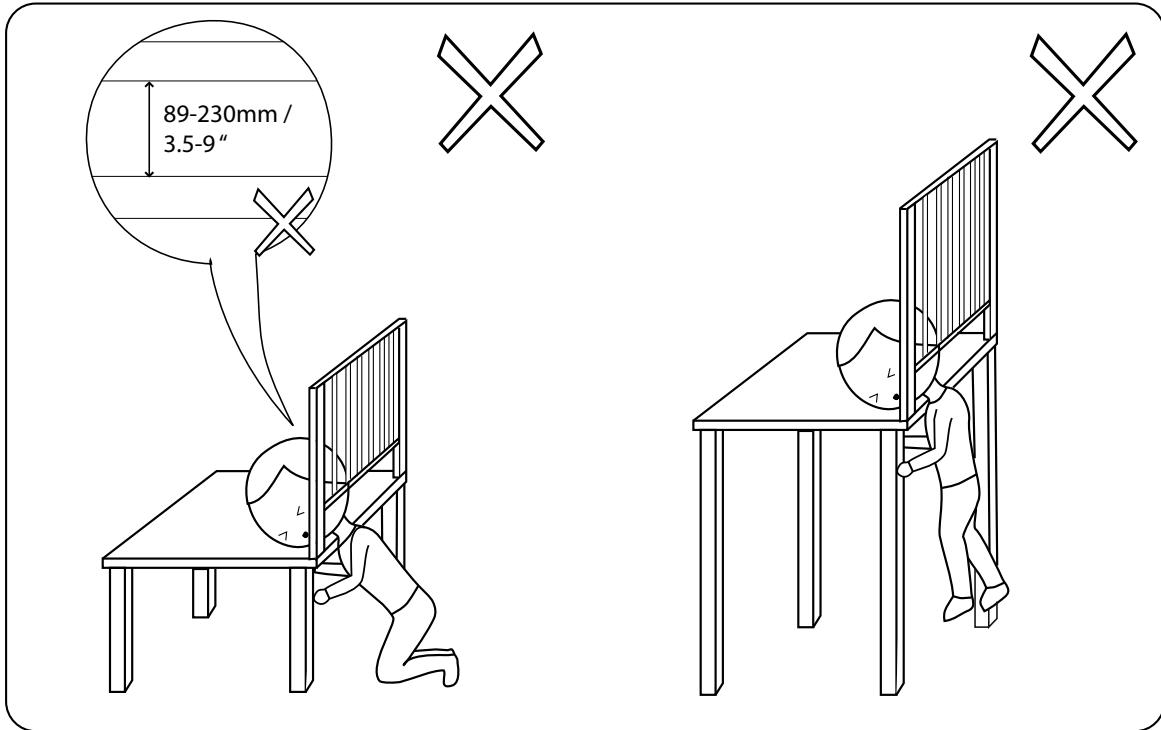
#### Head and Neck Entrapment



Avoid V-shaped openings more than 600mm (23") above ground level, such as between members along the top of a fence or guardrail, where the "V" points downward, because a child's neck or other body parts can get caught in these spaces.



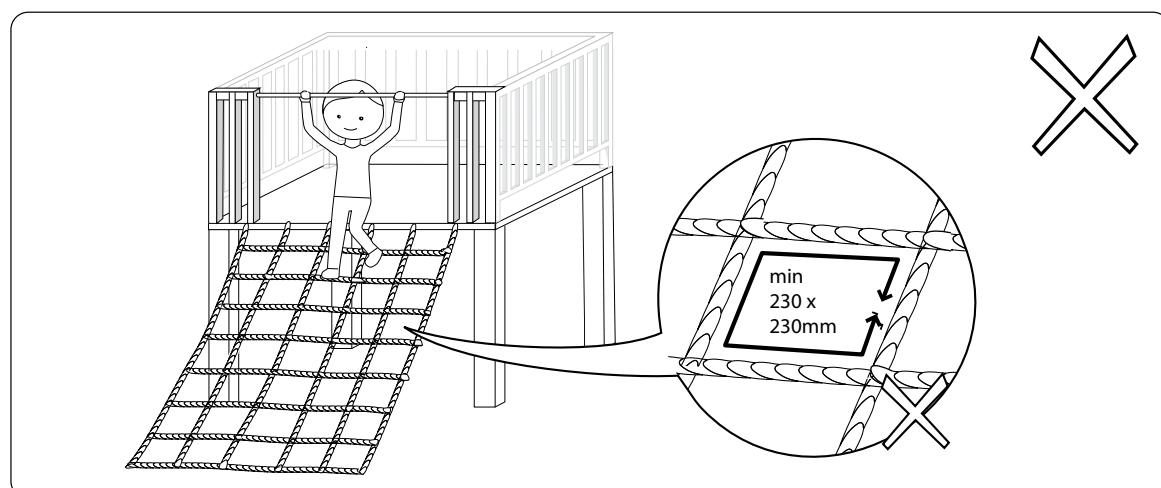
## Hazards



Entrapment is often caused in the following ways:

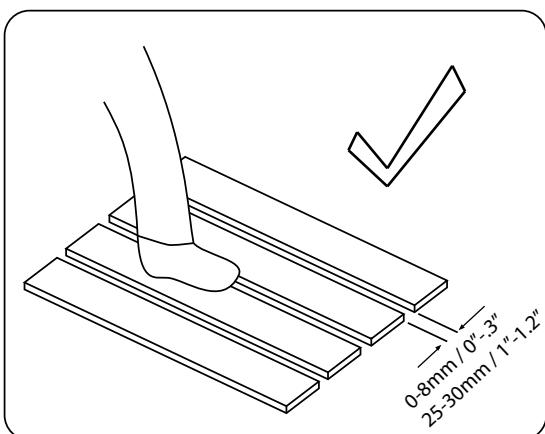
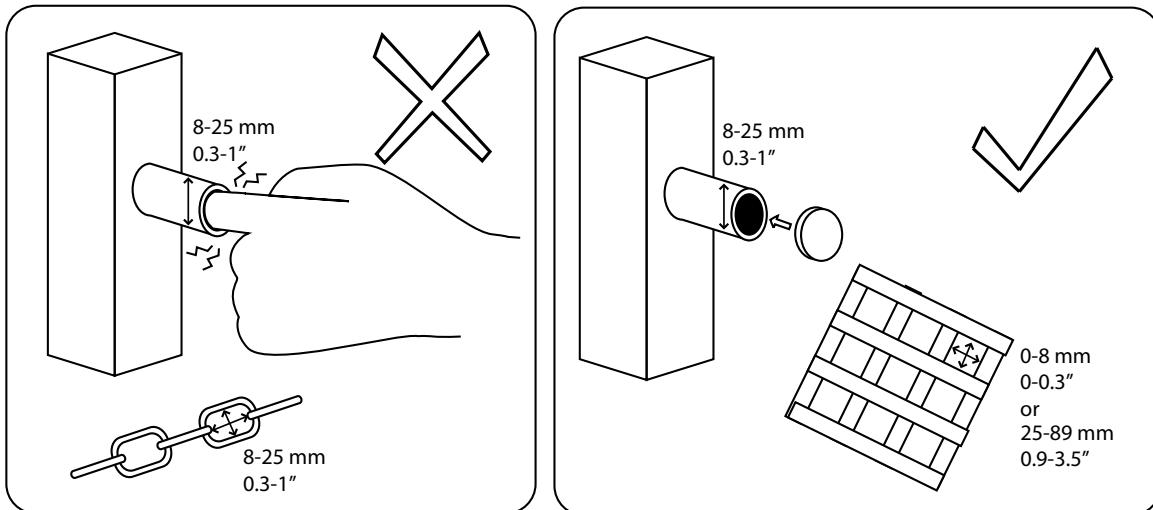
1. Head-First Entry - this "generally occurs when children place their heads through an opening in one orientation, turn their heads to a different orientation, then are unable to get themselves out."

2. Slip-Through Openings, or Feet-First Entry, involve children slipping through "an opening that is large enough to permit their [feet, legs or] bodies to go through but is not large enough to permit their heads to go through." (U.S. Consumer Product Safety Commission (2008) p 14, <http://www.cpsc.gov/cpscpub/pubs/325.pdf>)





## Hazards



### Note:

Any part of the body can become entrapped in openings, for example fingers, hands, feet arms and ankles as well as the neck and head. It is very difficult to eliminate openings completely, so care should be taken to consider the likely use of any item and take any necessary precautions. Head and neck entrapment obviously have the most potentially serious consequences.

### Entrapment of Fingers

To avoid finger entrapments, openings from 8-25mm (0.3-1") should be avoided. Steel pipes, wooden lattice and chain links in this size range should not be used, or they need to be capped or hammered shut. Swing chains need to be chosen with care to avoid these spaces; and any gaps in merry-go rounds or spinners; as finger entrapment is mainly a hazard when the child's body or the element is moving.

### Entrapment of Feet

Avoid foot and ankle entrapments in bridges and platforms by keeping spaces to 0-8mm or 25- 30mm

### Entrapment of Whole body.

Children's whole bodies may become trapped (particularly in tunnels) which can become a bigger issue when tunnels are too small for adults to get in and assist. (See tunnel dimensions

### Safe tunnel dimensions

Tunnels open BOTH ends				Tunnels open ONE end	
Length	MID*	length	MID*	length	MID
< 15° Inclination				No inclination allowed. (must be horizontal)	
<1000mm	>400mm	Any length	>750mm	<2000mm	750mm
<2000mm	>500mm	Must have provision for climbing		tunnels open one end should not be longer than 2000mm	
>2000mm	>750mm				

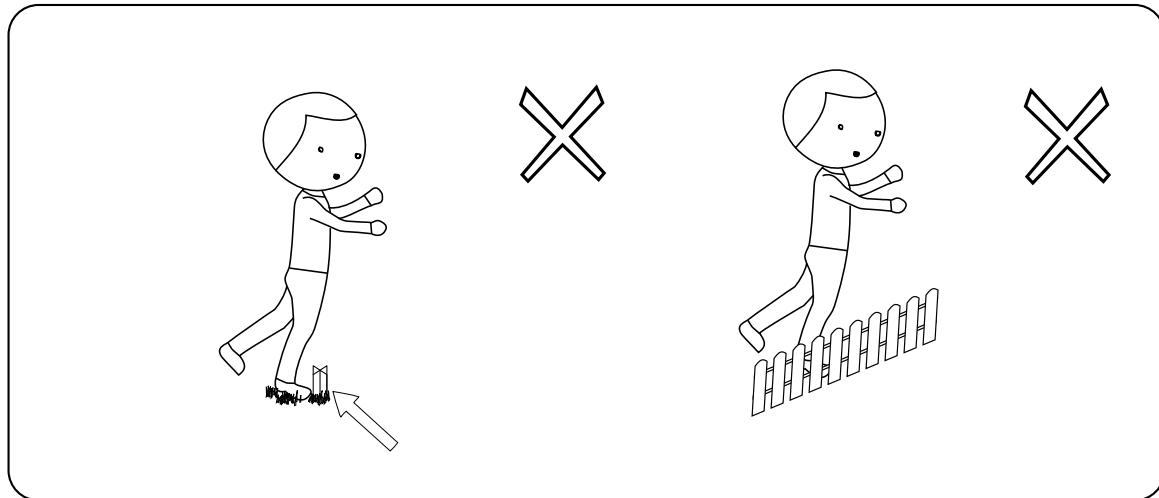
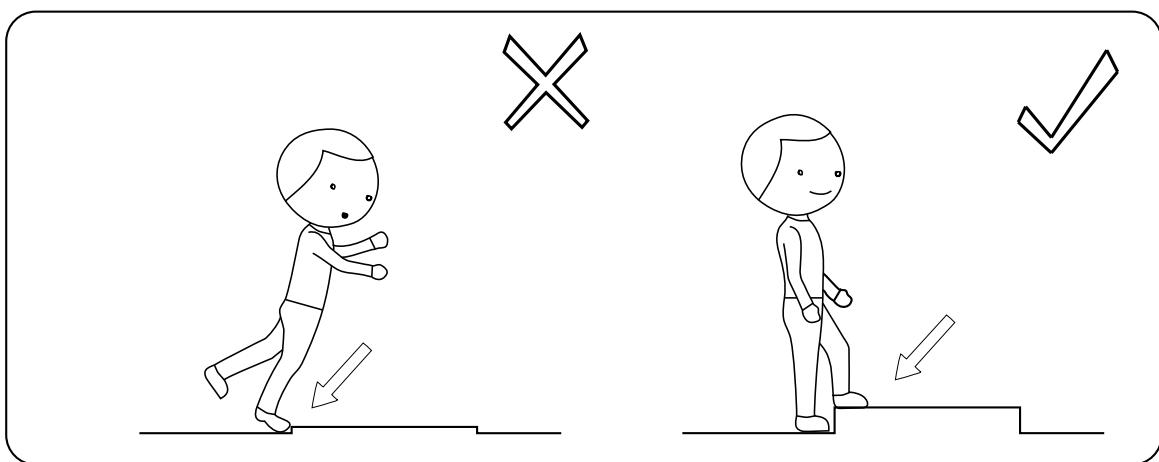
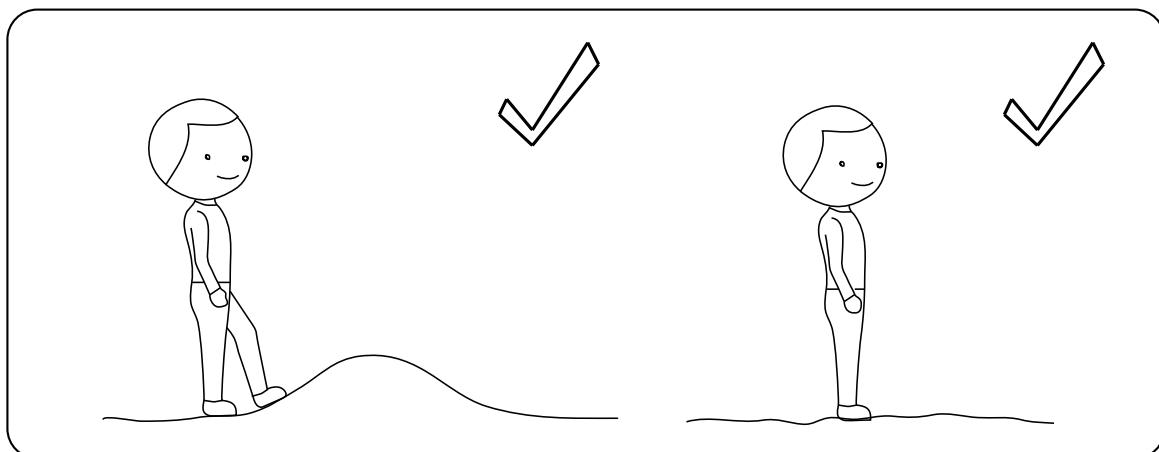
\*Minimum Internal Diameter (MID)



## Hazards

### Trip Hazards

Ensure the ground in the play space is free of unexpected tripping hazards like stakes, star pickets and hidden concrete footings. Learning to be agile and coordinated are important skills for a child to master, therefore, having different surfaces is appropriate, but sharp, low objects are hazardous.





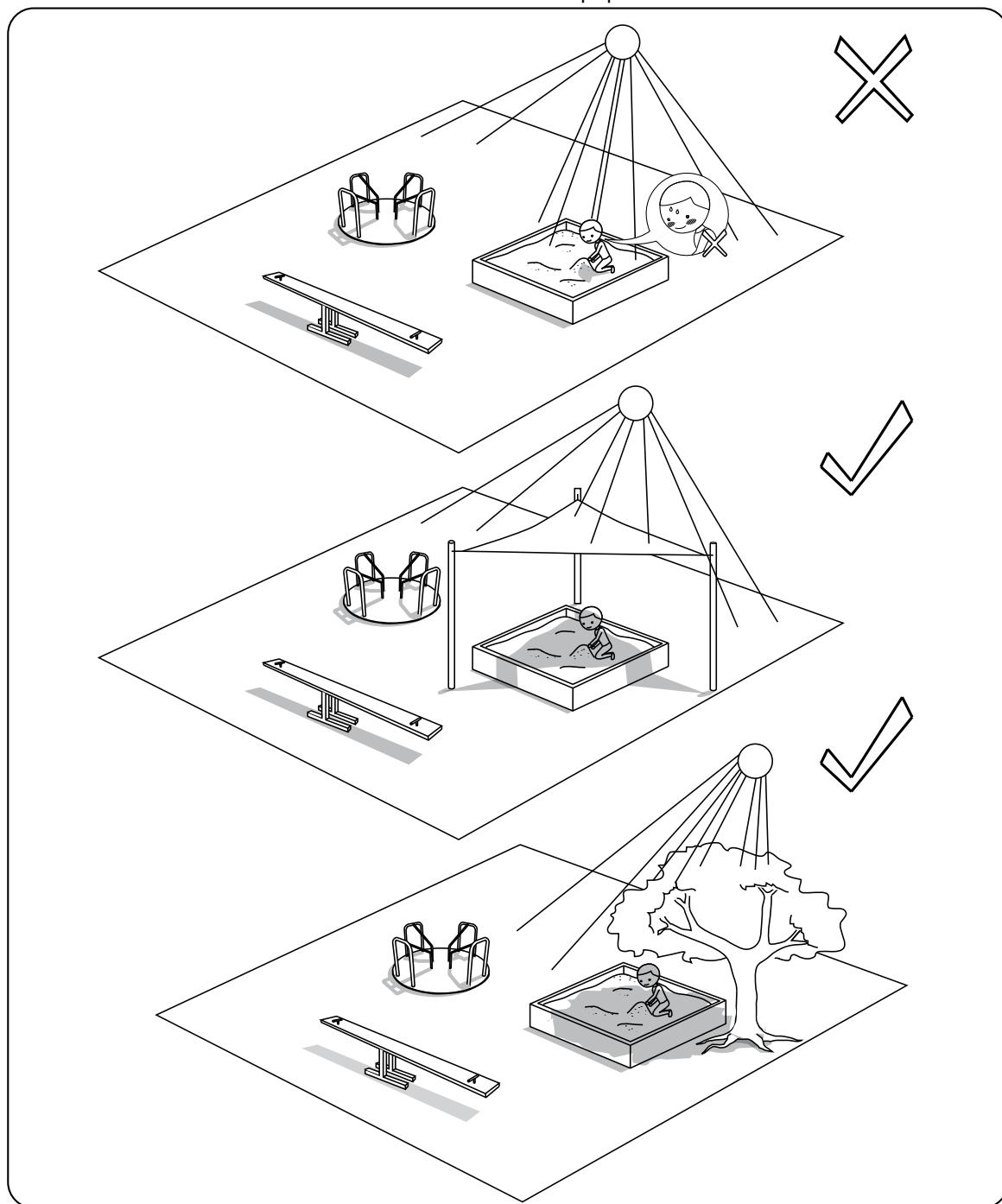
## Hazards

### Shade

Shading should be considered when designing playgrounds to protect children from harsh sunlight (e.g. trees). Designing play structures as a means for providing shading (e.g., elevated platforms with shaded space below), or creating more shade (e.g., shadecloth structure) are potential ways to design a playground to help protect children's skin from the sun.

### Drainage

Drainage is also an important consideration especially in regions that have high rainfall or a heavy rainy season. Pools of stagnant water can contain water-born diseases and be breeding grounds for mosquitos which is linked to malaria etc. Reducing water pooling by leveling ground, creating gutters and trenches for drainage will also limit rot and corrosion to prolong the life and strength of the equipment





## Hazards

## Notes on Materials

The following notes were taken from the European Playground Standards: EN1176-12008 on the 8th of June, 2011.

The notes are to supplement the existing materials information in the PlaygroundIDEAS Community Playground Manual.

### Flammability:

To avoid the risk of fire and associated hazards, materials known to produce surface flash shall not be used.

Particular attention should be given to newly developed products whose properties might not be fully known.

### Dangerous substances

Dangerous substances shall not be used in playground equipment in such a way that they can cause adverse health effects to the user of the equipment.



Prohibited materials include but are not limited to, asbestos, lead, formaldehyde, coal tar oils, carbolineums and polychlorinated biphenyls (PCBs). See the Dangerous Substances Directive 76/769/EEC and its successive modifications.

### Metals

Metal parts should be protected against atmospheric conditions and cathodic corrosion.

Metals that produce toxic oxides that scale or flake shall be protected by a non-toxic coating.

### Timber and associated products

Timber parts shall be designed in such a way that precipitation can drain off freely and water accumulation shall be avoided.

In cases of ground contact, one or more of the following methods shall be used:

- a) use of timber species with sufficient natural resistance to rot and moisture.
- b) construction methods, e.g. post shoe;
- c) use of timber treated with wood preservatives in accordance with EN 351-1:2007, Figure A.1 and in accordance with EN 335-2:2006, use class 4.

Consideration should also be given to other factors which can be unsuitable, such as splintering, poisoning etc.

All components made of timber and associated products, other than those species conforming to a), that affect the stability of the structure and are in constant contact with the ground shall be treated in accordance with c).

When selecting metal fastenings, consideration should be given to the species of timber and chemical treatments used as some will accelerate corrosion of metals if there is contact between them.

Plywood shall be in accordance with EN 636 and shall be weatherproof.



## Hazards

### Synthetics

If, during maintenance, it is difficult to determine at what point material becomes brittle, manufacturers shall give an indication of the time period after which the part or equipment should be replaced.

It should be possible for the operator of the playground to visually identify excessive wear of the gelcoat of GRP (glass-reinforced plastics) products intended for sliding before the user becomes exposed to the glass fibres.

This can be achieved for example by the use of different coloured layers in the sliding surface.

Consideration should also be given to degradation of structural components through ultraviolet influences.

### Water

Except when intended for water play, all parts of playground equipment should be designed so that they do not accumulate water.

### Loading

There are many specific requirements that relate to how much load and force the playground equipment should take which have not been covered in this book. Consult local builders and engineers about these standards and if they do not exist be sure to test equipment by overloading it with heavy sacks or adults (if safe) to ensure its strength for children. The equipment should be checked regularly.

### Playground Design

Playground design is paramount to safety and to a positive experience for children.

 See the design section of our community playground manual for more on good playground design. <http://playgroundideas.org/content/basic-page/playground-manual>

 For more information on design and maintenance. see 'design for play' by PlayEngland. <http://www.playengland.org.uk/media/70684/design-for-play.pdf>

 The US based, CPSC guidelines, section 2 has further information about the design of a playground. <http://www.cpsc.gov/cpscpub/pubs/325.pdf>

### Playground Maintenance

All playgrounds will be affected by 'wear and tear' over time, no matter what they are made of. Good maintenance is critical to ensure children are in an environment that is safe.

 For a Maintenance checklist. please see our community playground manual.

 <http://playgroundideas.org/content/basic-page/playground-manual>

 For The US Playground safety maintenance see Appendix A: "Suggested general maintenance checklists" and chapter 4: Maintenance. <http://www.cpsc.gov/cpscpub/pubs/325.pdf>



## Heights and fall zone

# Heights + Fall zone

The following section contains information about the correct materials and spacing required around and under playground equipment to reduce or prevent injuries from children falling. Not every piece of playground equipment is covered here but you will be able to work out the appropriate depths of soft fall material and the perimeter of the safe fall zone for most items. Please read carefully and if there is any confusion or more information required. refer to [www.playgroundideas.org](http://www.playgroundideas.org) where further resources are available.

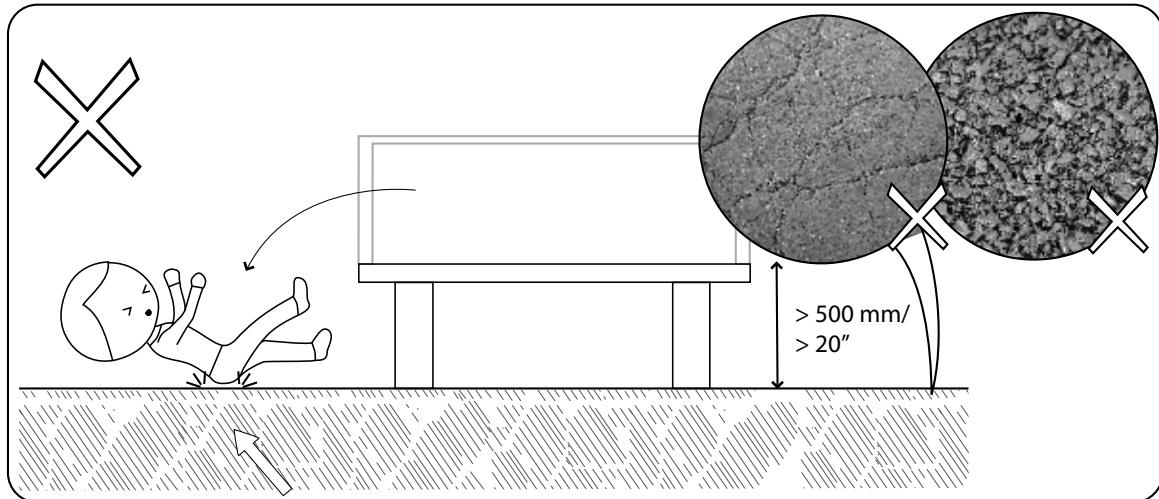
Preventing Falls: Soft Fall Material	24
Preventing Falls: Safe Fall Zones	25
Preventing Falls: Platform Heights and Guardrails	28



## Heights and fall zone

### Preventing Falls: Soft Fall Material

Soft fall material is the single most important safety factor in play spaces. It does not have an effect on the design or creativity of a playground, and it is essential in preventing head/spinal injuries and fractures.

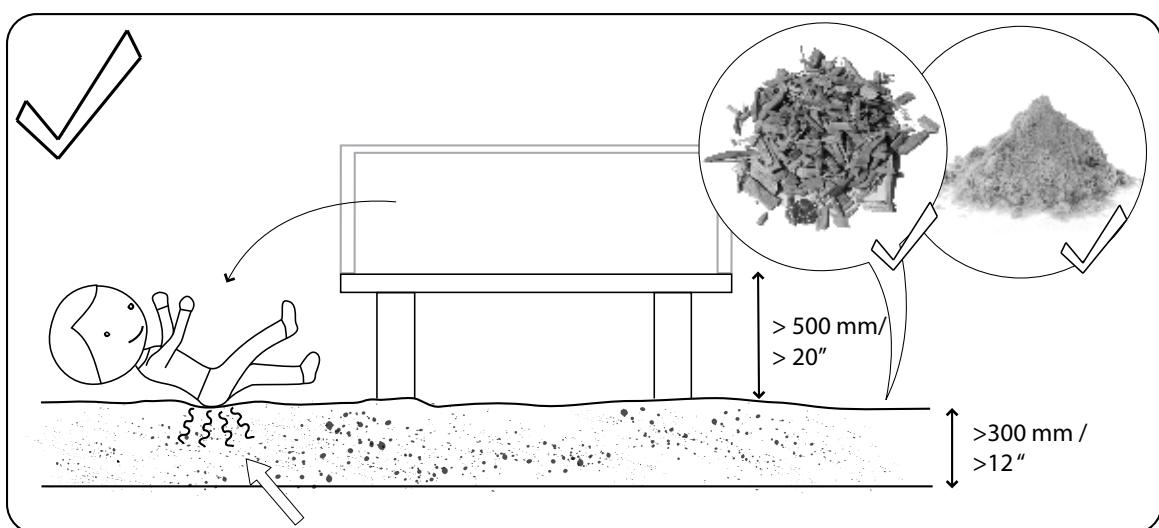


Various reports show that 44-80% of playground injuries result from falls from an element to a hard surface.

The most recent study of 2,691 playground equipment-related incidents reported to the CPSC from 2001-2008 indicated that falls are the most common hazard pattern (44% of injuries).

✓ (U.S. Consumer Product Safety Commission (2008), <http://www.cpsc.gov/cpscpub/pubs/325.pdf>)

(Monash University Accident Research Centre (2007) <http://www.monash.edu.au/muarc/VISU/hazard/haz65.pdf>).



Soft fall materials can take many forms; typically rubber matting or a variety of loose material like sand, mulch, woodchips, pea gravel or rubber granules are used.

#### Appropriate Surfacing

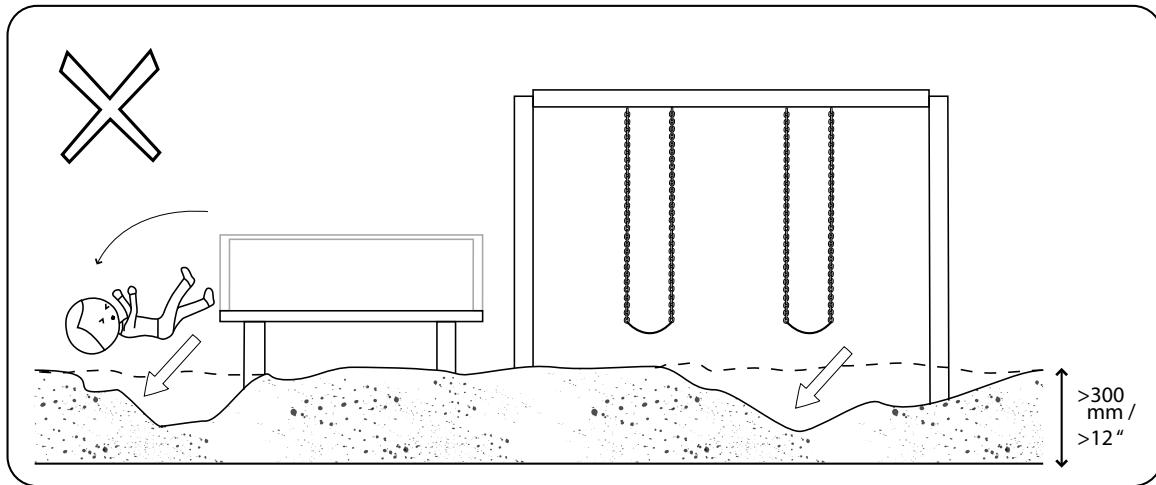
Any material tested to ASTM F1292, including unitary surfaces, engineered wood fiber, etc. (US standards)

Pea gravel, Sand, Shredded/recycled rubber mulch, Wood mulch (not CCA-treated), Wood chips. Other countries may have different softfall requirements.



## Heights and fall zone

Safe fall zones and soft fall materials are not required for activities where the child's feet stay in contact with the ground and the element is immobile, for example, seats and ground-level



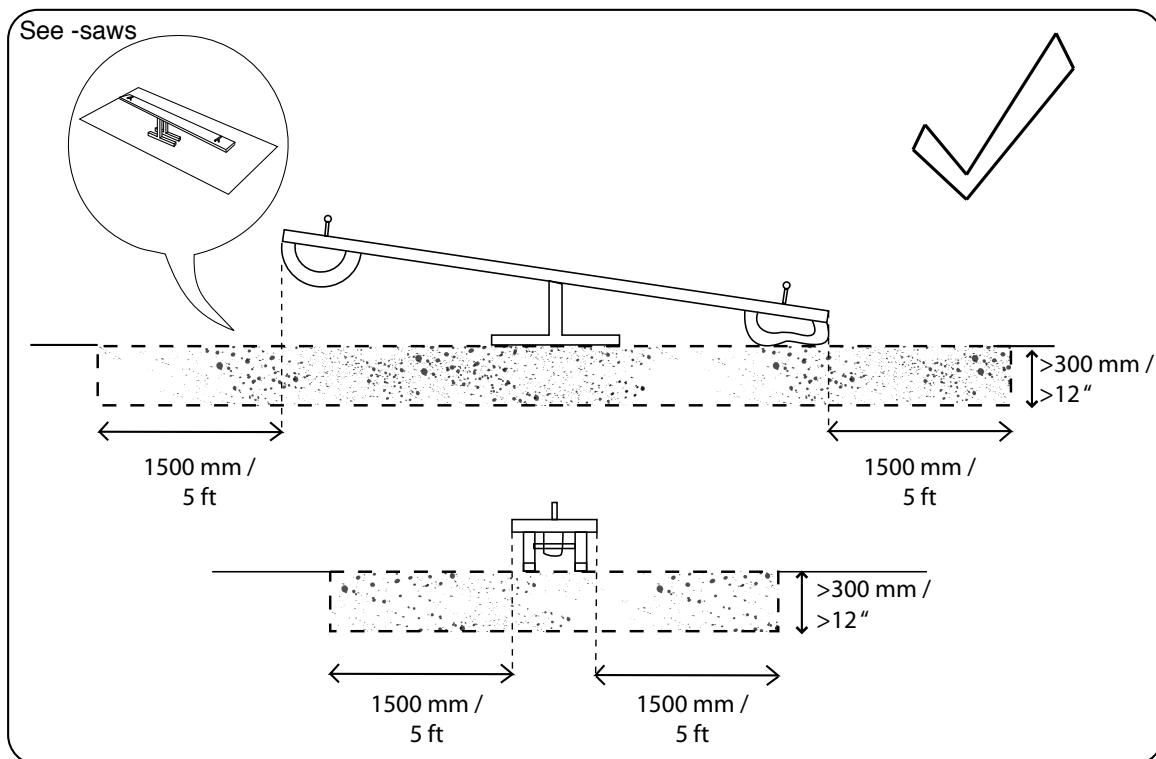
Generally, soft fall material needs to be maintained at a depth of over 200mm. As mulch or other light materials are loose they tend to settle and move over time. Maintaining a depth of 300mm will allow for settling to no less than 200mm.

Soft fall material should be raked or replaced every 3-6 months depending on use and condition. This is especially important in high use areas, such as under swings and slide exits.

## Preventing Falls: Safe Fall Zones

The soft fall material is placed within the safe fall zone, an area of clear, unobstructed space. When planning safe fall zones you need to know the following points:

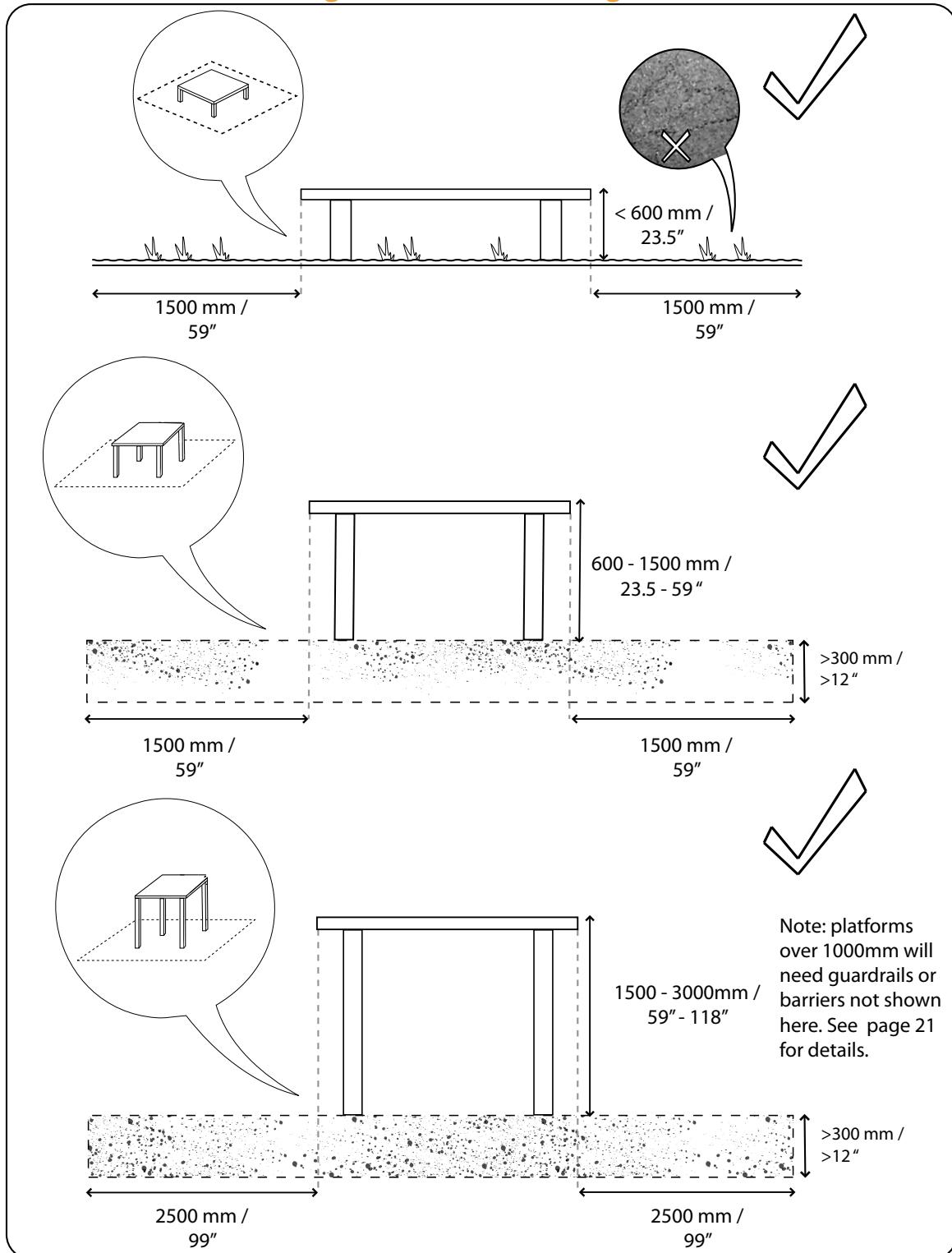
A safe fall zone includes the element's "footprint" and extends out horizontally for a set distance from the perimeter of the element. This distance changes based on the height and type of equipment.





## Heights and fall zone

### Platform safe fall zones (general safe fall zone guide)



### Soft fall areas for different heights of platforms

For all combined/joined elements (like 2 platforms joined by a bridge) the fall zone is simply required around the whole element.



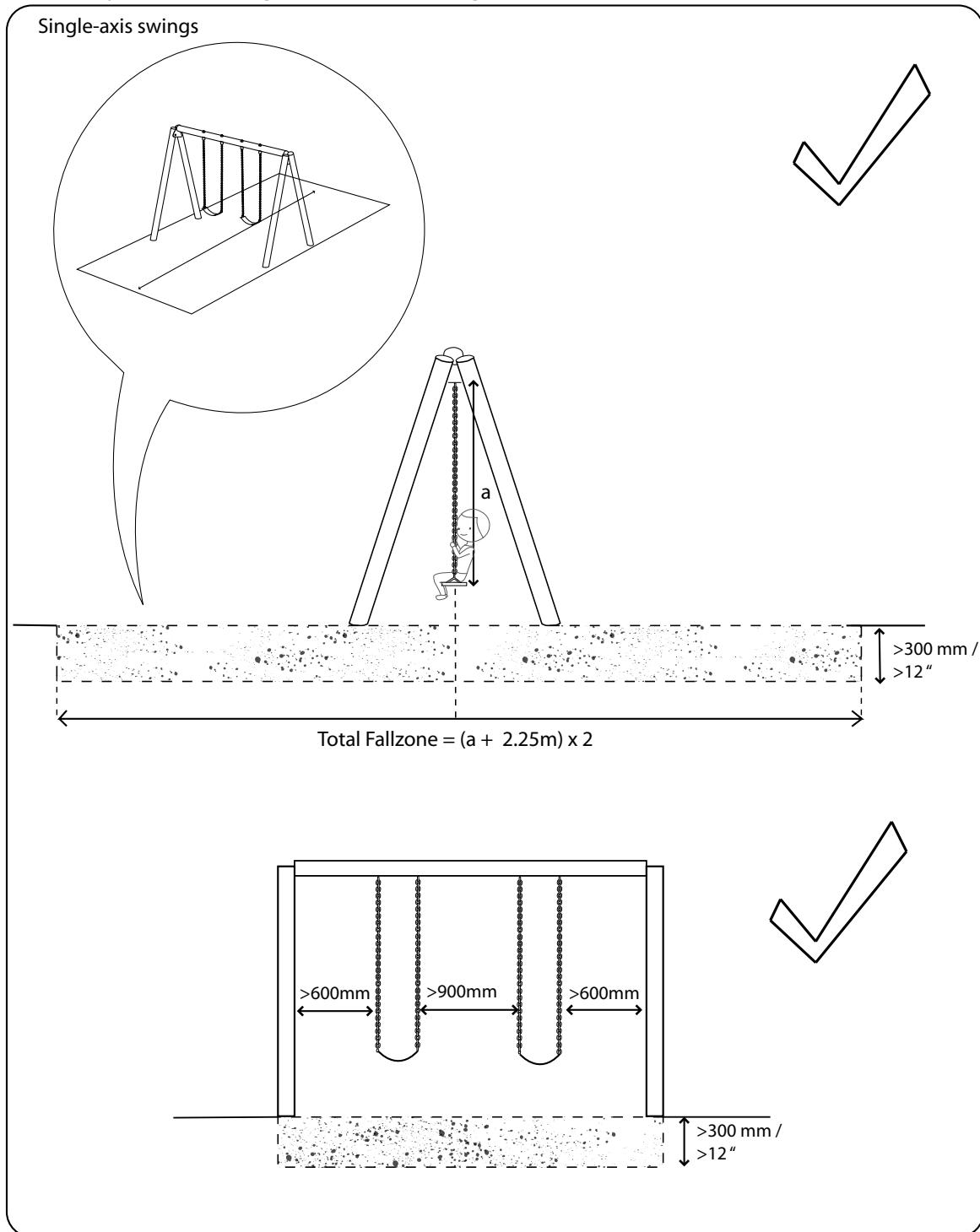
Research shows that "children who fell from heights greater than 1.5m were 2.4 times more likely to sustain arm fracture". (Monash University Accident Research Centre (2007) <http://www.monash.edu.au/muarc/VISU/hazard/>



## Heights and fall zone

### Swings safe fall zones

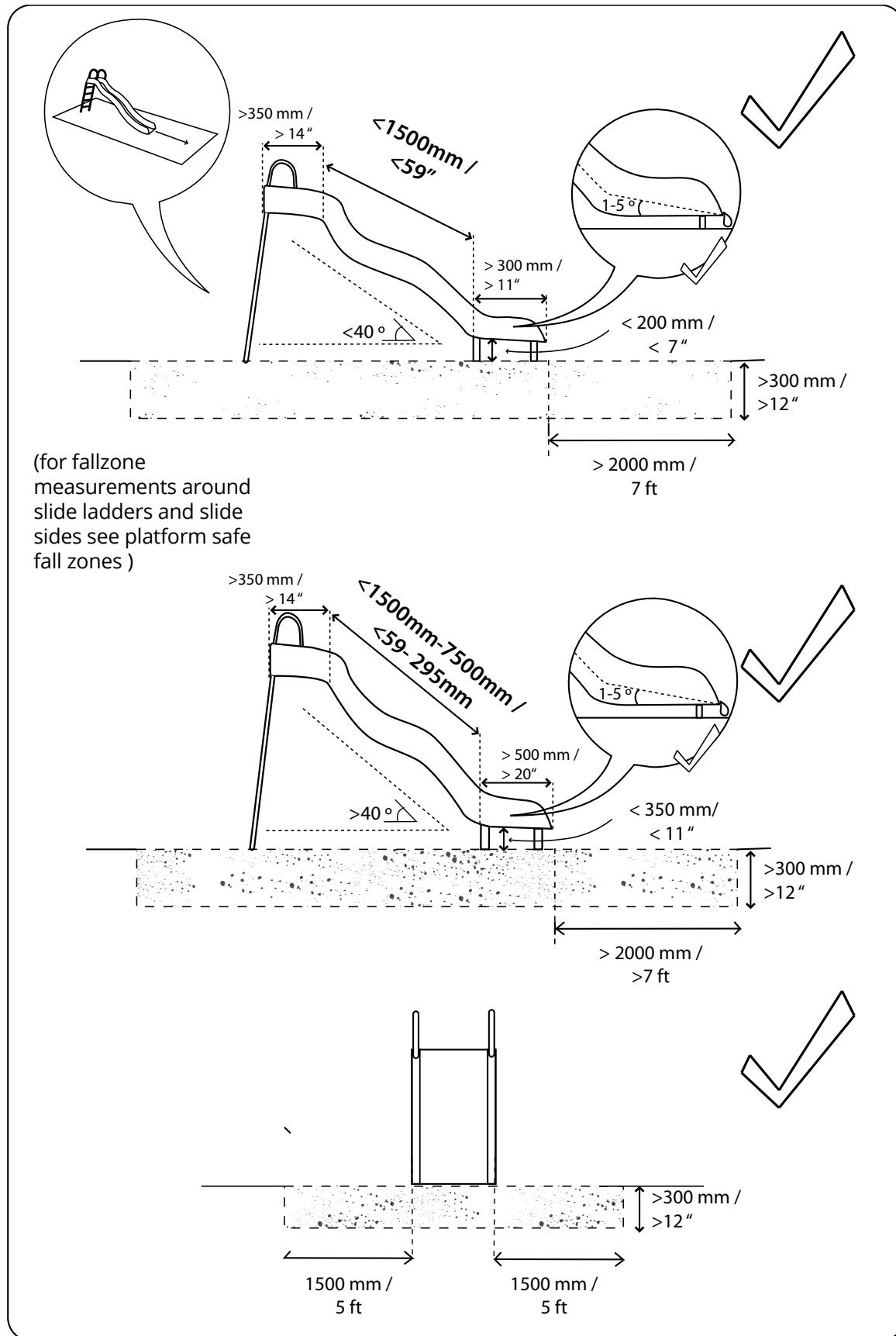
Safe fall zones for swings are a little complicated. The zone is as wide as the sides of the uprights but the length (the space in front and behind the seat) changes depending on the length of the swing chains. For the length, measure the length of the swing chain from the pivot point to the seat and ADD 2.25meters and then x2 for in front and behind the swings . For example, if the swing chains are 2m long its.  $2\text{m} + 2.25\text{m} = 4.25\text{m} \times 2 = 8.5\text{ m}$





## Heights and fall zone

### Slide safe fall zones

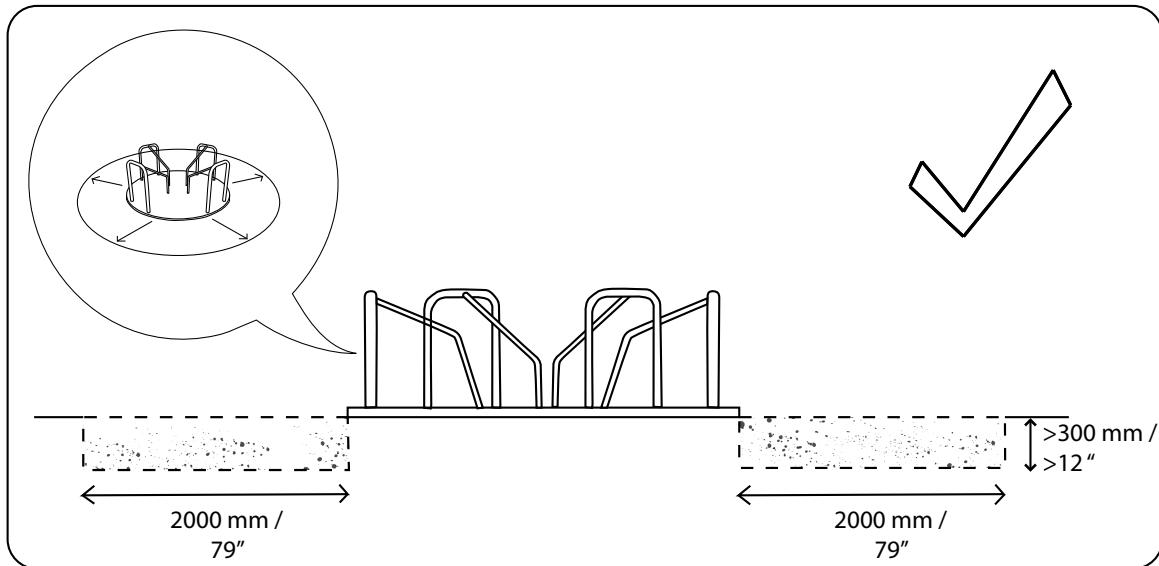




## Heights and fall zone

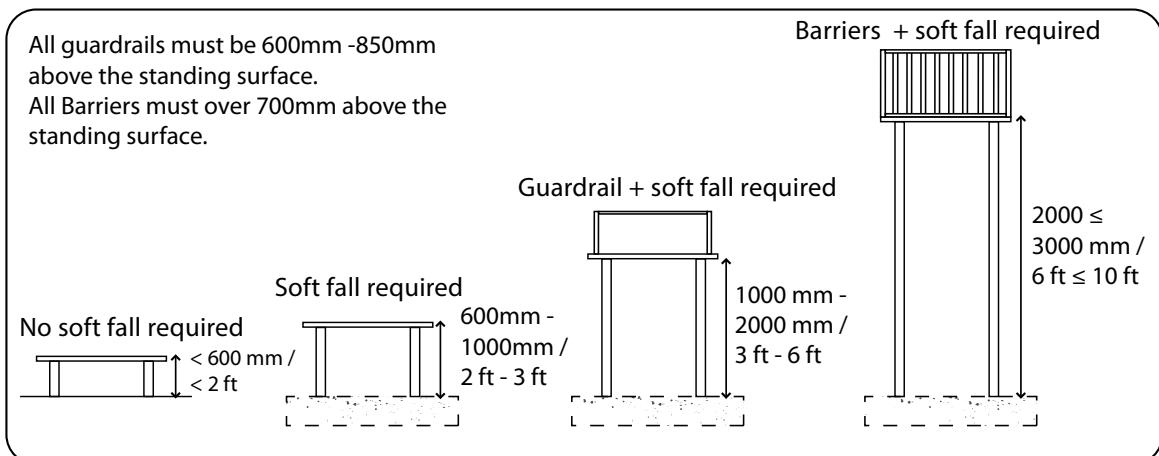
### Merry-go-rounds and spinners safe fall zones

Allow 2000mm (79") from the outermost edge of the merry-go-round or spinner. (Note: these elements cannot overlap with any other elements' safe fall zones.)



## Preventing Falls: Barriers and Guardrails

The higher the child is off the ground the more protection they require from falls. Guardrails are required over 1000mm and barriers are required above 2000mm Note: This section does not apply to elements designed solely for climbing (e.g. climbing frames where the child is holding on with hands as well) Nonetheless, it is not suggested that any element allow a child to be off the ground more than 1.5m for 3-4 year olds and 2.5m for school children aged 5+.

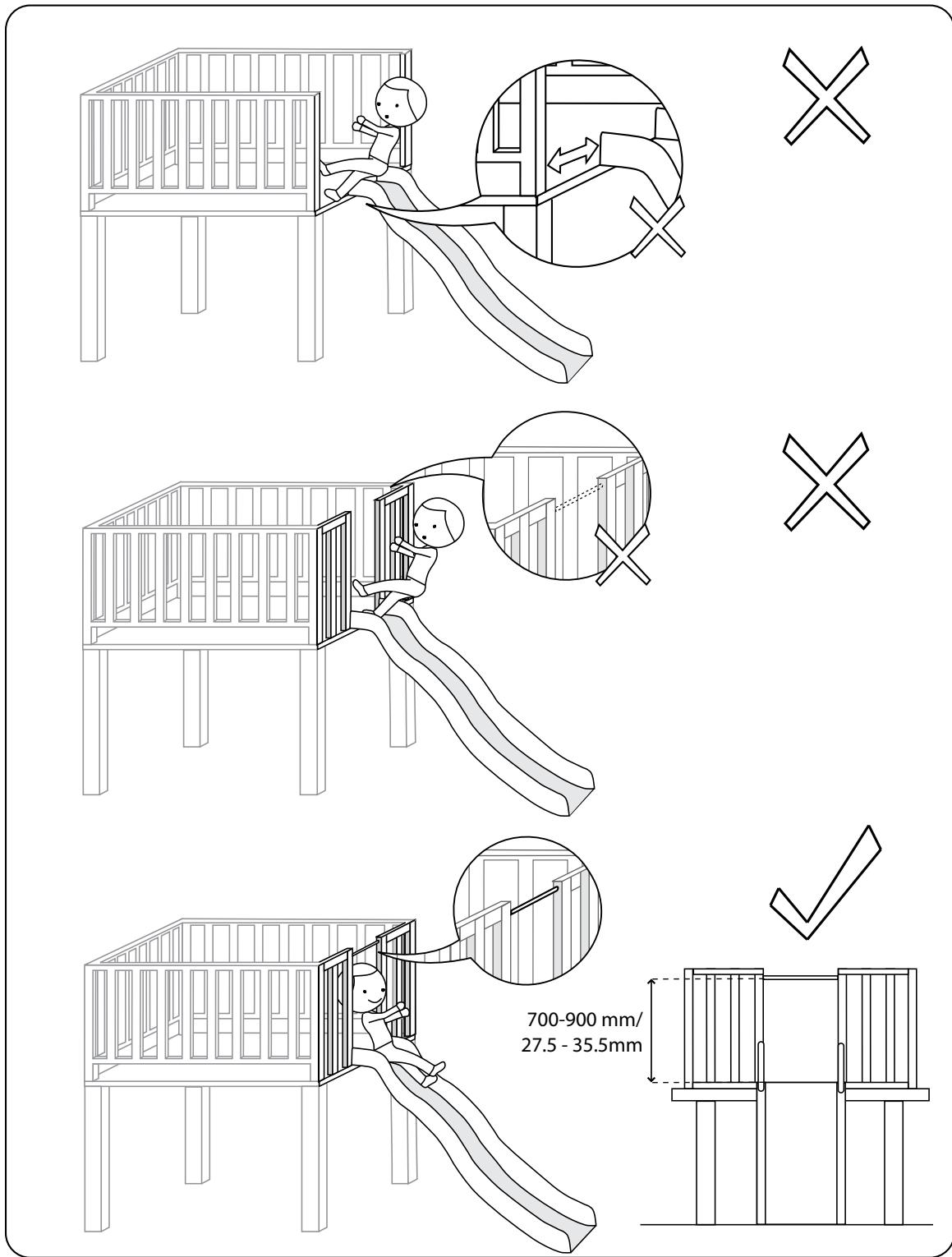


Note: In areas easily accessible to all ages (eg very young children) the standards suggests soft fall and barriers for all platforms above 600mm



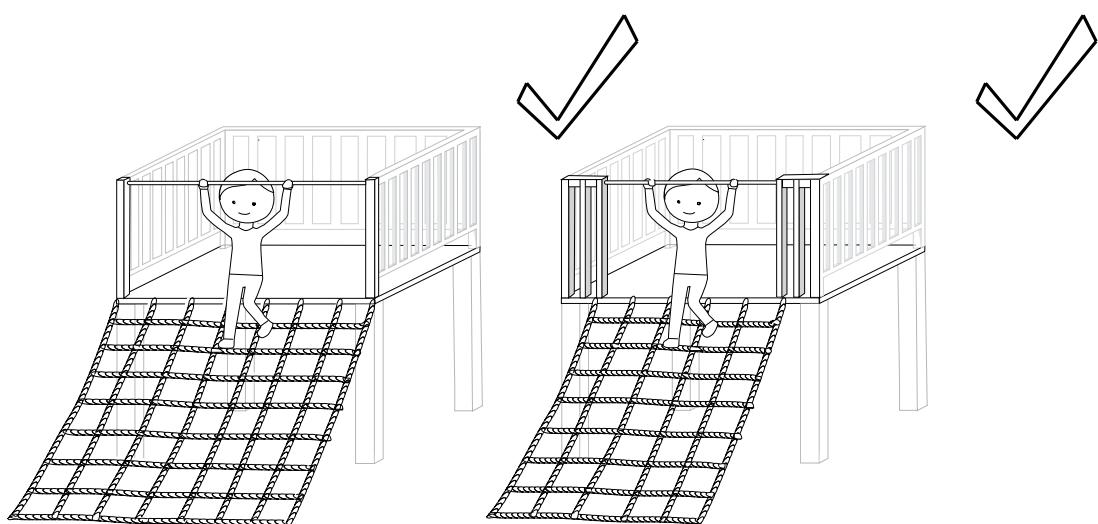
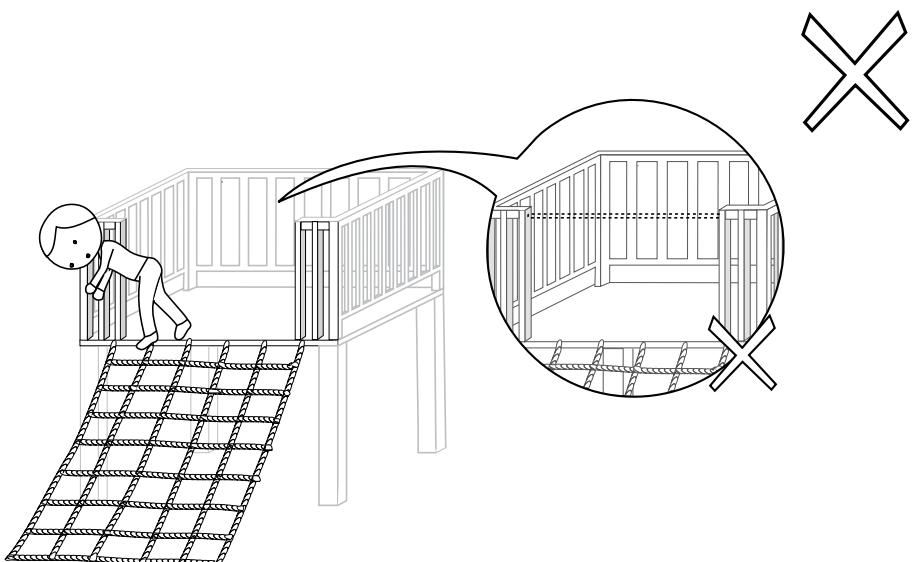
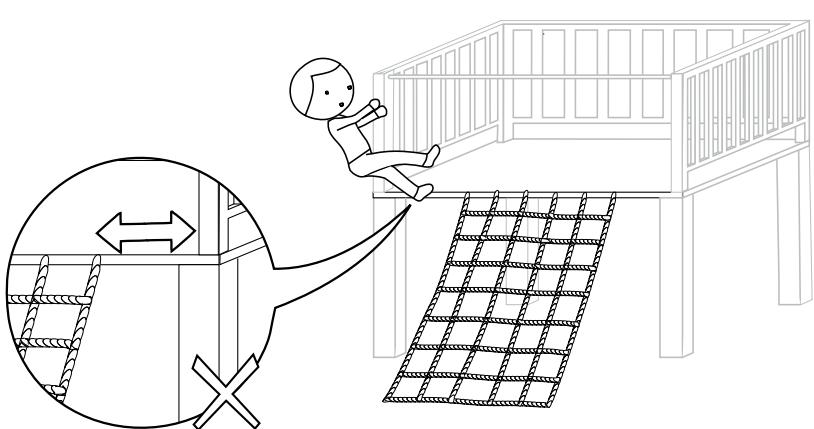
## Heights and fall zone

Platforms that require guardrails and barriers cannot have exits wider than 500mm without a horizontal guardrail to prevent the child falling out and to assist the child to transfer to the appropriate position to exit the platform. (Remember, no openings are allowed between 89mm – 230mm (3.5" – 9") as this is an entrapment hazard)





## Heights and fall zone

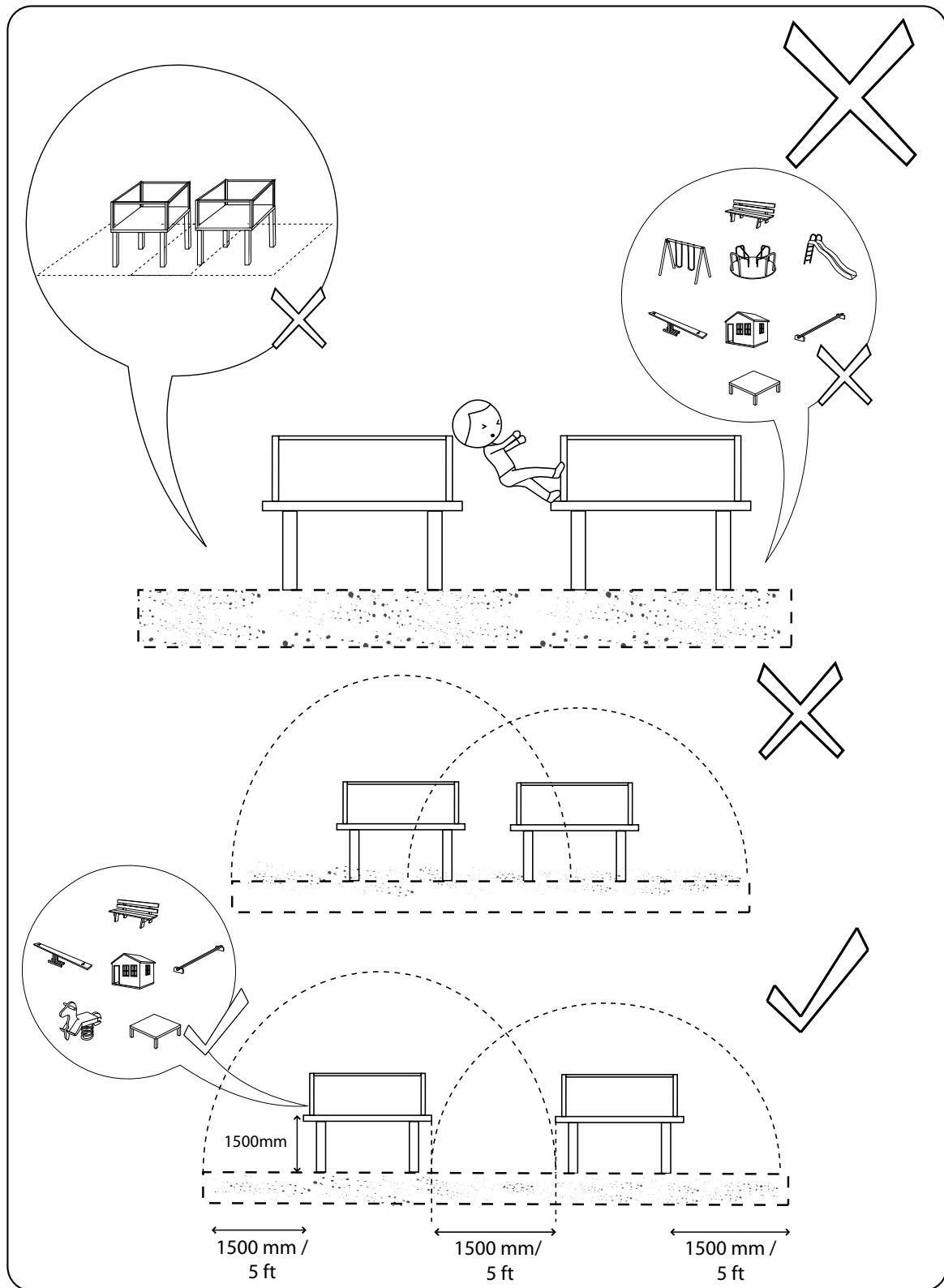




## Heights and fall zone

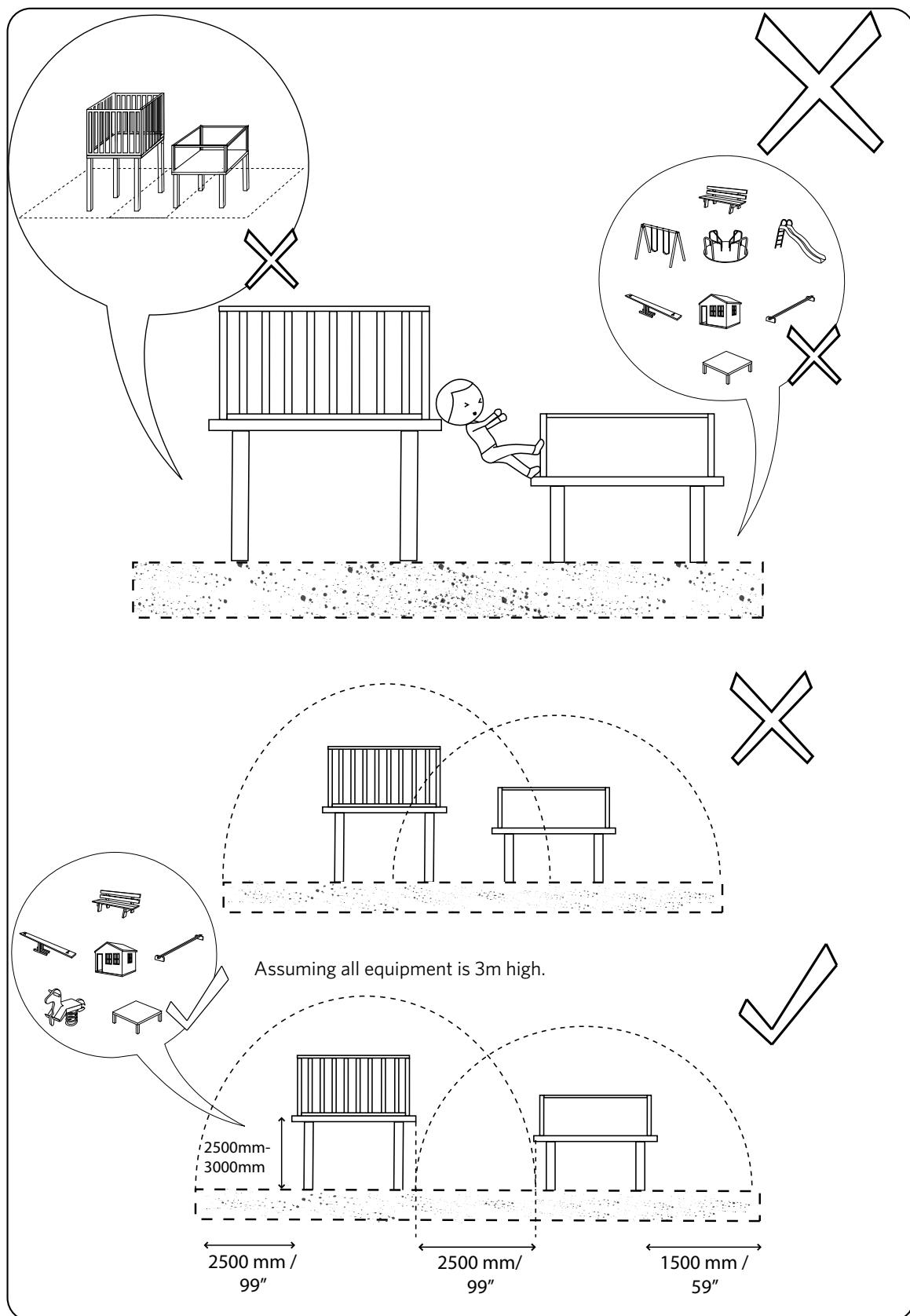
### Elements with Overlapping safe fall zones.

Unless connected, all elements need a safe fall space around them. This open fall zone space can overlap with another fall zone unless mentioned among the forced-movement elements below. Eg. two elements (that are allowed to have overlapping safe fall zones) are side by side. One needs a 1500mm zone and the other needs a 2500mm zone, the space between them needs to be 2500mm.





## Heights and fall zone

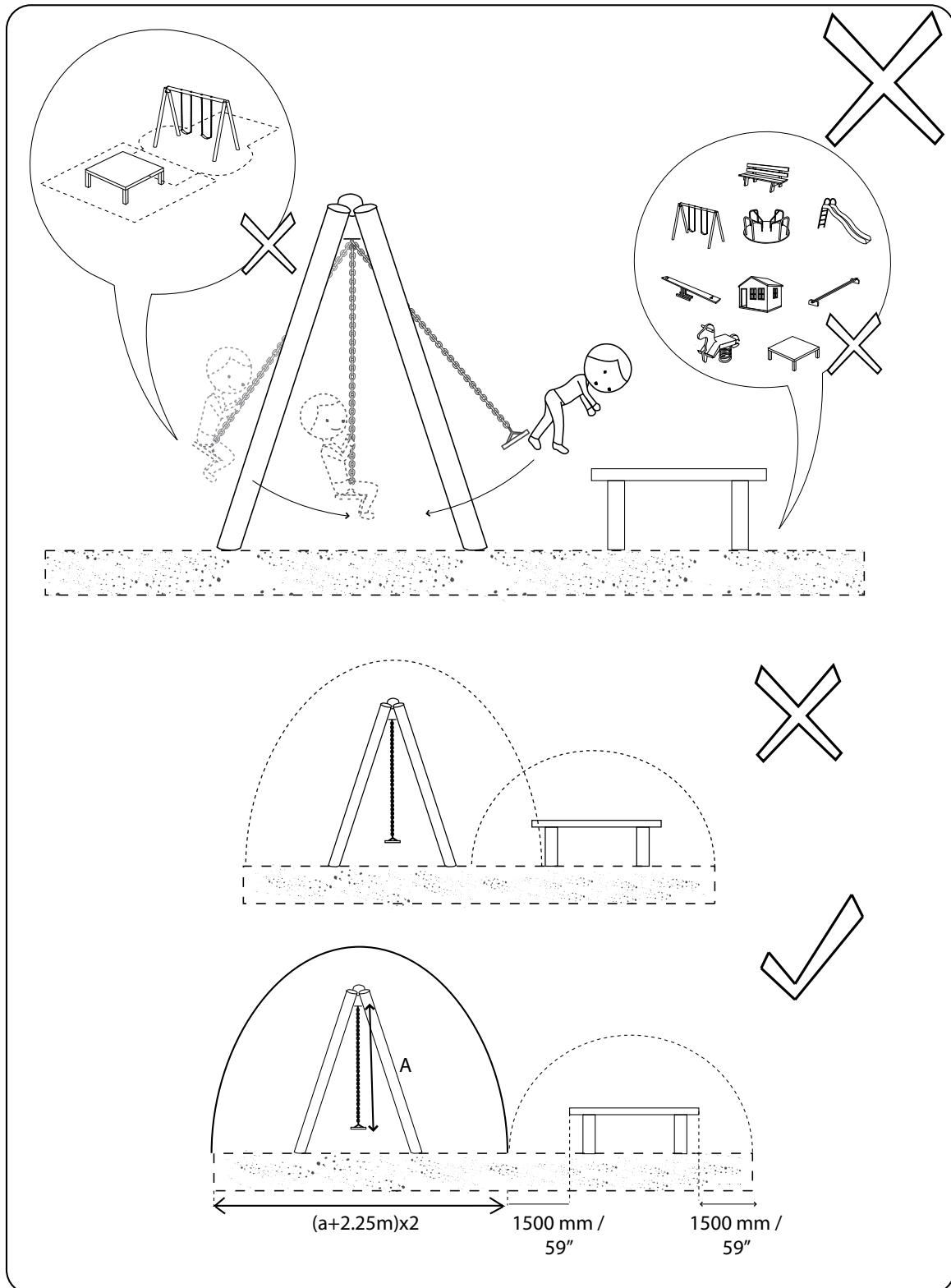




## Heights and fall zone

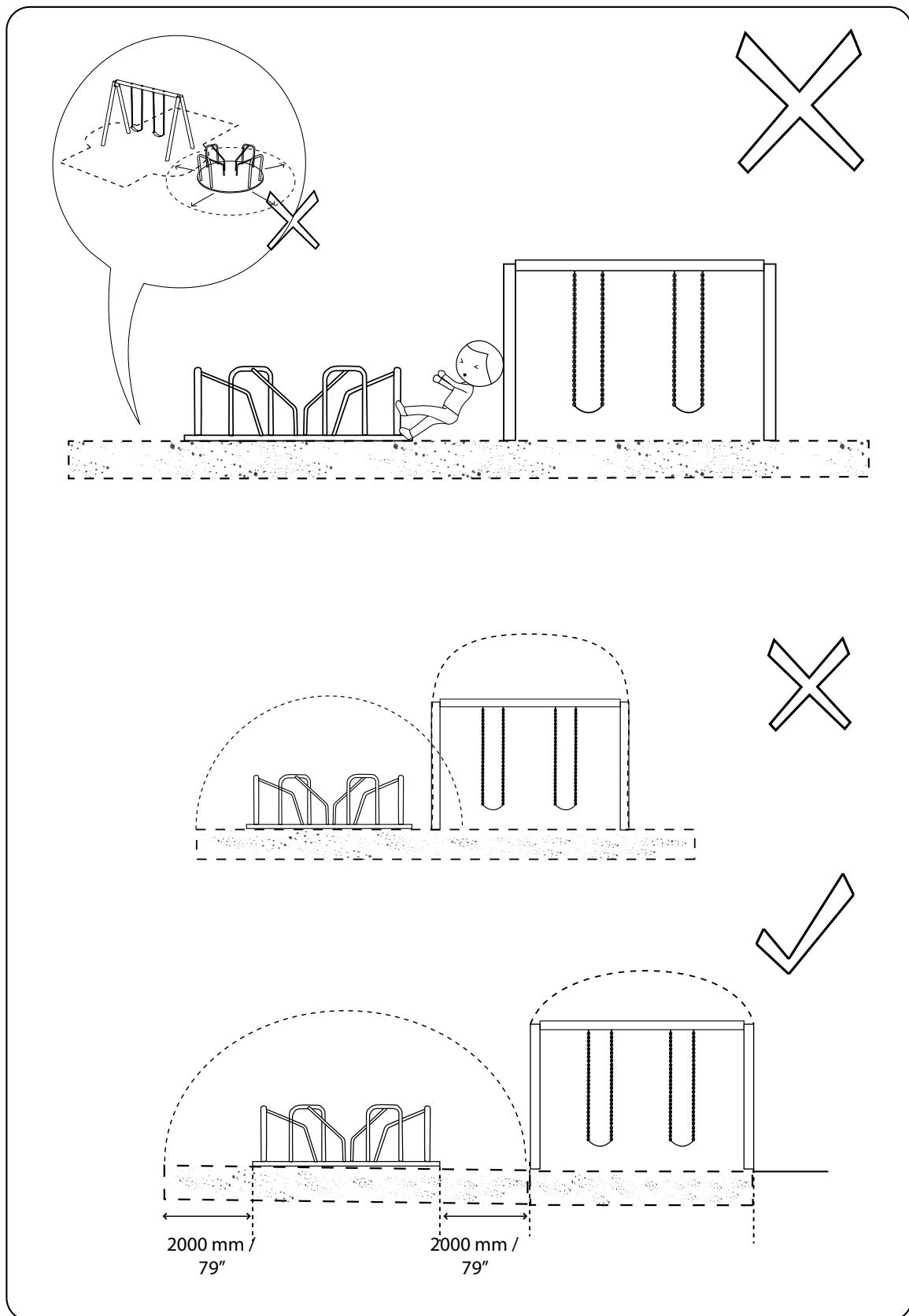
### Elements with NON-overlapping safe fall

Forced movement elements,(elements that cause a person to move) such as swings, merry-go-rounds, track rides (flying fox, zip line) and slide exits, cannot have overlapping safe fall zones and some need their safe fall zones to be extended further in the direction of the child's movement. Eg. two elements are side by side (one cannot have safe fall zones). One needs a 1500mm zone and the other needs a 3000mm zone, the space between them needs to be 1500mm + 3000mm.



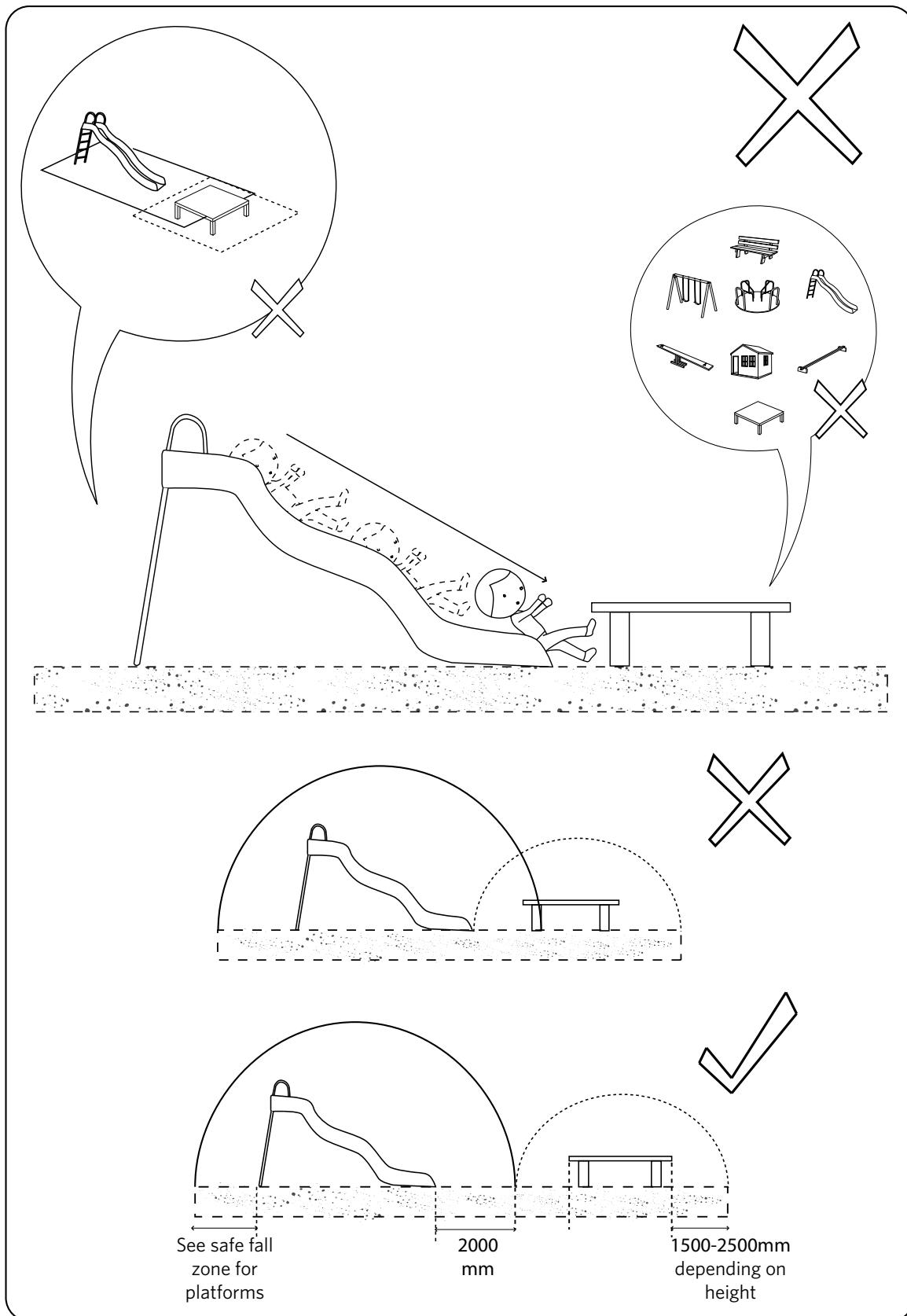


## Heights and fall zone



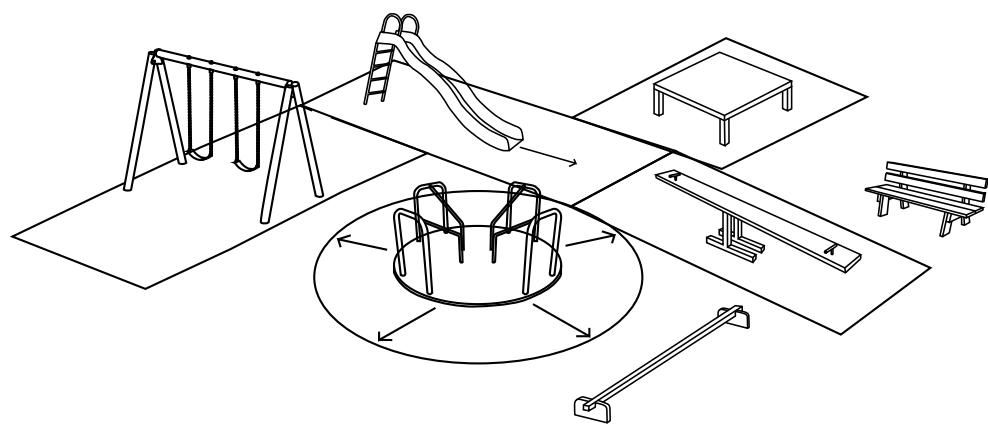
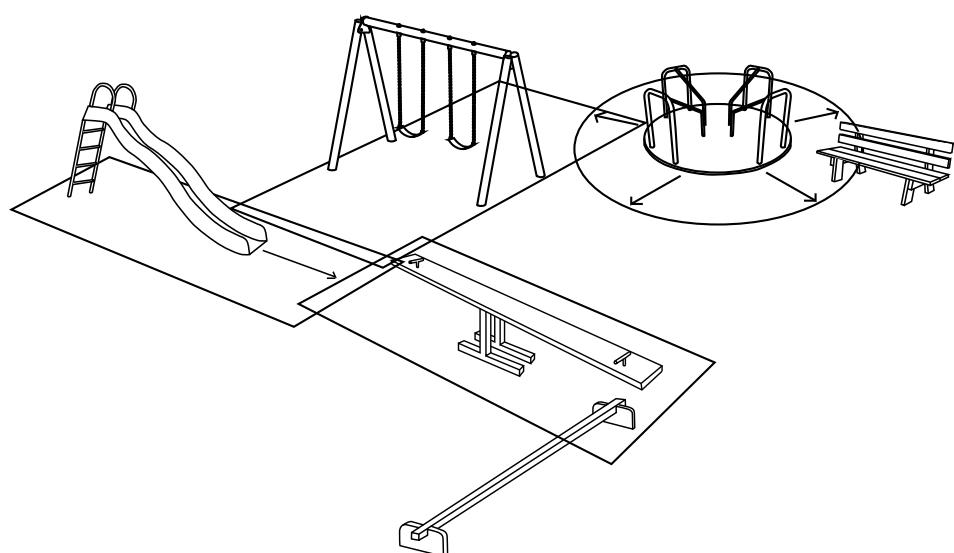


## Heights and fall zone





## Heights and fall zone



Founder, Playground Ideas

12 July 2011  
File Ref. D3001.202

Attention: Marcus Veerman

Dear Marcus

### **Playground Ideas Safety Manual Review**

Play DMC has reviewed the Playground Ideas Safety Manual and certifies that the information provided is generally in accordance with the relevant visually assessable "Safety Requirements" sections of the European Standards for Playground Equipment, EN1176<sup>1</sup>.

Note that the Introduction of EN1176.1 indicates, "Risk-taking is an essential feature of play provision and of all environments in which children legitimately spend time playing. Play provision aims to offer children the chance to encounter acceptable risks as part of a stimulating, challenging and controlled learning environment. Play provision should aim at managing the balance between the need to offer risk and the need to keep children safe from serious harm."

This document and the adoption of any of the recommendations listed is not a guarantee that an incident will not occur. Safety in play provision is not absolute and accidents do occur (as they do anywhere) regardless of design be it through misuse, skylarking, rough play, poor supervision, use by inappropriate age groups, misfortune, vandalism or poor maintenance, etc.

However when playgrounds are designed, potential injury risk situations should be assessed and if they are deemed moderate, high or extreme Level of Risk, changes may be required to ameliorate the risk, depending on the structure type and subject to benefits assessment. The matrix below could be used as the basis for risk assessment with the following taken into consideration:

- The likelihood of an accident occurring (ie. no chance to highly probable).
- The expected consequences of the accident (eg. minor to permanent injury).

Likelihood \ Injury Type	Little/None 1	Minor 2	Moderate 3	Serious 4	Permanent 5
Highly unlikely E (1)	Very Low (1)	Very Low (2)	Low (3)	Low (4)	Moderate (5)
Unlikely D (2)	Very Low (2)	Low (4)	Moderate (6)	Moderate (8)	High (10)
Possible C (3)	Low (3)	Moderate (6)	Moderate (9)	High (12)	High (15)
Likely B (4)	Low (4)	Moderate (8)	High (12)	High (16)	Extreme (20)
Very likely A (5)	Moderate (5)	High (10)	High (15)	Extreme (20)	Extreme (25)

Ultimately, it is the decision of the owner of the installation as to what Levels of Risk they deem acceptable taking into account the benefits and intended use of the item.

Yours sincerely



Alison Curtis  
BE (Materials), BSc (Physiology)

<sup>1</sup> EN1176 (set), 2008, *Playground equipment and surfacing, safety requirements and test methods*.

# Playground Safety manual

A summary of the most common playground

A good playground design is much more than just getting the safety right, but we hope you now have a good understanding of the basics of playground safety. For further reading about playground safety issues and links to international playground standards, please see the 'resources' tab at [www.playgroundideas.org](http://www.playgroundideas.org).

Whats next?

If you plan to build a playground we strongly suggest you add your project to the [www.playgroundideas.org](http://www.playgroundideas.org) website and share your plans with the wider community so we can continue the learning.

It is also suggested that you read our "5 step community playground manual" to familiarise your self with the process of building a great community playground. The manual is available free from the 'resources' tab on [www.playgroundideas.org](http://www.playgroundideas.org).

PlaygroundIDEAS is a non profit organisation, fully funded by people just like you. It is expensive to create quality resources and it is only generous donations that keep us going. If this manual has been useful to you please consider a donation to help us help others. Donations can be made in any currency from the website.

Thank you.

**[www.playgroundideas.org](http://www.playgroundideas.org)**