

# YOUR INTRODUCTION TO PLAYGROUND SAFETY



Exceeding Your Expectations. Enhancing Your Earnings.

# INTRODUCTION

Each year, more than **200,000 kids** are treated in hospital ERs for playground-related injuries. When it comes to a playground, it is important to be **educated** with the safety precautions that should be taken when installing and maintaining a play area. By following the recommended guidelines, you and your community can create a **safer playground** environment for all children and contribute to the reduction of playground-related **deaths** and **injuries**. This guide presents the safety information recommended to promote greater safety awareness among those who purchase, install, and maintain playground equipment.

The information stated in this guide should be used as a guideline to minimize injuries associated with playground equipment. However, it is believed that these recommendations, along with the technical information in the **ASTM Standards for Public Playground**, will contribute to greater **playground safety**.

## INFORMATION IN THIS GUIDE:

### What is a Public Playground?

A public playground refers to one intended to be used by children ages 6 months through 12 years in Commercial child care facilities, institutions, multiple family dwellings, parks, restaurants, resorts and schools.

- Terms and definitions associated with playground safety, maintenance and installation
- General playground safety considerations
- Playground materials and surfacing
- Identifying specific playground hazards and how to prevent them
- Proper steps needed to maintain a playground and its' equipment
- The use of platforms, guardrails and protective barriers to minimize accidental falls
- Additional playground safety resources



# GLOSSARY OF TERMS

**Barrier/ Protective Barrier:** An enclosing device around an elevated platform that is intended to prevent inadvertent falls from the elevated surface.

**Composite Structure:** Two or more play structures attached or functionally linked to create one integral unit that provides more than one play activity.

**Critical Height:** The fall height below which a life-threatening head injury would not be expected to occur.

**Designated Play Surface:** Any elevated surface for standing, walking, crawling, sitting or climbing, or a flat surface greater than 2" x 2" having an angle less than 30 degrees.

**Embankment Slide:** A slide that follows the contour of the ground and at no point is the bottom of the chute greater than 12" above the surrounding ground.

**Entanglement:** A condition in which the user's clothes or something around the user's neck becomes caught or entwined on a component of playground equipment.

**Entrapment:** A condition that impedes withdrawal of a body or body part that has penetrated an opening.

**Fall Height:** The vertical distance between the highest designated play surface on a piece of equipment and the protective surface beneath it.

**Footing:** A means of anchoring playground equipment to the ground.

**Full Bucket Seat Swing:** A swing generally appropriate for children under 4 years of age that provides support on all sides and between the legs of the occupant and cannot be entered or exited without adult assistance.

**Geotextile (filter) Cloth:** A fabric that retains its relative structure during handling, placement, and long-term service to enhance water movement, retard soil movement, and to add reinforcement and separation between the soil and the surfacing and/or sub-base.

**Guardrail:** An enclosing device around an elevated platform that is intended to prevent both inadvertent and deliberate attempts to pass through the device.

**Infill:** Material(s) used in a protective barrier or between decks to prevent a user from passing through the barrier.

**Loose-Fill Surfacing Material:** A material used for protective surfacing in the use zone that consists of loose particles such as sand, gravel, engineered wood fibers, or shredded rubber.

**Preschool-Age Children:** Children aged 2-5 years.



# GLOSSARY OF TERMS

**Projection:** Anything that extends outward from a surface of the playground equipment and must be tested to determine whether it is a protrusion or entanglement hazard, or both.

**Protective Surfacing:** Shock absorbing surfacing material in the use zone that conforms to the recommendations of the [Public Playground Safety Handbook](#).

**Protrusion:** A projection which, when tested, is found to be a hazard having a potential to cause bodily injury to a user who impacts it.

**Roller Slide:** A slide that has a chute consisting of a series of individual rollers over which the user travels.

**School-Aged Children:** Children between 5-12 years of age.

**Slide Chute:** The inclined sliding surfacing of a slide.

**Stationary Play Equipment:** Any play structure that has a fixed base and does not move.

**Supervisor:** Any person tasked with watching children on a playground.

**Toddlers:** Children 6 months through 23 months of age.

**Tube Slide:** A slide in which the chute consists of a totally enclosed tube or tunnel.

**Unitary Surfacing Material:** A manufactured material used for protective surfacing in the use zone that may be rubber tiles, mats, or a combination of energy absorbing materials held in place by a binder that may be poured in place at the playground site and cures to form a unitary shock absorbing surface.

**Upper Body Equipment:** Equipment designed to support a child by the hands only.

**Use Zone:** The surface under and around a piece of equipment onto which a child falling from or exiting from the equipment would be expected to land. These areas are also designated for unrestricted circulation around the equipment.





# GENERAL PLAYGROUND SAFETY CONSIDERATIONS

There are 7 key factors you should keep in mind when laying out your playground:

- **Accessibility:** The surface material needs to allow access to the equipment for children with disabilities.
- **Age Separation:** Areas for different age groups should be separated by a buffer zone. This zone will reduce the chance of injury by children of varying activity levels running into each other.
- **Age Group:** Different playgrounds are structured for different age groups. The safety requirements differ with each age group. Be mindful of the age group that will be using the playground and purchase accordingly.
- **Conflicting Activities:** The playground should be organized into sections to prevent injury from overlapping activities. Be sure to place swings and merry-go-rounds toward a corner, side or edge of a play area. Slides should not be placed in a congested area.
- **Sight Lines:** Visual barriers should be minimized so that caregivers, parents or supervisors can keep track of children using the playground. Benches placed around the outside of the structure allow onlookers a place to sit while they watch the children.
- **Signage and/ or Labeling:** Signs should be provided to give the users guidance as to the age appropriateness of the equipment, as well as how to properly use the equipment.
- **Supervision:** Make sure the supervisor is aware of the basic safety guidelines of the equipment.

When choosing a site for a playground, there are a few factors that are important to take into consideration:

- **Travel patterns to and from the playground:** Are there any hazards in the way? If so, clear the hazards.
- **Nearby accessibility hazards (traffic, bodies of water, steep hills, etc.):** Could a child inadvertently or intentionally run into a nearby hazard? If so, provide a method to contain children within the playground (fence, hedge). Be aware that the fence or hedge should still allow observation by supervisors.
- **Sun exposure:** Is the sun heat sufficient enough to heat metal parts, slides, platforms, steps or surfacing enough to burn children? Will users be exposed to the sun during the most intense part of the day? If so, consider positioning it so the bare metal is shaded. Provide warnings that the equipment will be hot in the sunlight. Consider shading the playground with one of [these structures](#).
- **Slope and drainage:** Will loose fill material wash away in the rain? If so, consider proper drainage to prevent wash outs.



# PLAYGROUND MATERIALS

When installing a playground, use equipment and hardware approved by the manufacturer. Follow the instructions **EXTREMELY** carefully or hire a **playground installer**. Remember to keep all materials from the manufacturer and start a meticulous record of all inspections and maintenance. Thoroughly inspect the equipment before the first use, including the hardware.

## Wood

- Creosote-treated wood (railroad ties, telephone poles, etc) and coatings that contain pesticides should not be used.
- Chromated copper arsenate (CCA) was an old chemical that was used to treat wood, including wooden playgrounds. Since 2001, this treatment is no longer safe it is known to corrode certain materials faster than others.



## Metal

Avoid using bare metal for platforms, slides, or steps. In direct sunlight, bare metal can become extremely hot and cause contact burn injuries. Use plastic coated metal, plastic or wood. Covering the playground with a **shelter** is always the best option. When coating existing bare metal or using plastic coated metal, consider:

- Manufacturer should ensure that the users cannot ingest, inhale or absorb potentially hazardous amounts of preservative chemicals as a result of contact.
- All paints should meet the CPSC (**Consumer Product Safety Commission**) regulation for lead paint.
- Painted surfaces should be maintained regularly to prevent rust and corrosion.

## Hardware

Things to check regarding hardware:

- All fasteners, connectors and coverings should not be removable without the use of tools.
- All exposed hardware should be smooth to the user to prevent lacerations, penetrations, or cloth entanglement hazards.
- Hardware in moving joints should be secured against unintentional or unauthorized loosening.
- All hardware should be corrosive resistant.
- Bearings or bushings used in moving joints should be self-lubricating or easy to lubricate.
- All S-hooks and C-hooks should be closed (no gap or space greater than 0.04”).



# SAFE SURFACING MATERIALS

A proper playground surface is one of the most important factors in reducing injuries that occur when kids fall from equipment. The surface under the playground equipment should be soft enough and thick enough to soften the impact of a child's fall. Grass and dirt are not recommended for surfacing material because of water and natural weathering which can occur at a drastic rate. There are two kinds of surfacing material: unitary and loose-fill.

Unitary materials are generally ASTM tested rubber mats or a pour-in-place energy absorbing material. These kinds of surfacing options are great for toddlers and handicap accessible playgrounds and are usually more expensive than loose-fill materials.

CCA Treated wood mulch, gravel or dirt are not acceptable forms of loose-fill material. Below are various recommended loose-fill materials and the protected fall height of each.

MINIMUM COMPRESSED LOOSE-FILL SURFACING DEPTHS	
Inches of Loose-Fill Material	Protects Up To Fall Height (Feet)
6" of shredded/ recycled rubber*	10'
9" of sand	4'
9" pea gravel	5'
9" of wood mulch (non-CCA)	7'
9" wood chips	10'

\* Shredded/ recycled rubber surfacing does not compress in the same manner as other loose-fill materials. Care should be taken to maintain a constant depth as displacement may still occur.

Loose-fill materials will compress at least 25% over time due to use and weathering so it is a good idea to fill the use zone with more than the recommended fill level. For example, if the playground will require 9 inches of wood chips then the initial fill level should be 12 inches.

## Appropriate Surfacing:

- Any material tested to ASTM F1292, including unitary surfaces, engineered wood fiber, etc.
- Pea gravel
- Sand
- Shredded/ recycled rubber mulch
- Wood Mulch (not CCA-treated)
- Wood chips



## Inappropriate Surfacing:

- Asphalt
- Carpet
- Concrete
- Dirt
- Grass
- CCA-treated wood



# AGE APPROPRIATE EQUIPMENT

When choosing playground equipment, it is important that you keep in mind what the intended age group will be. Children of different ages and stages of development have different needs and abilities. Playgrounds are designed to encourage a child's imagination while developing new skills. If you are selecting a playground for a school or a public park, you should check your state's guidelines on integrating handicap accessible play structures in the playground.

Some equipment is not recommended for public playgrounds including: trampolines, swinging gates, giant strides, climbing ropes that are not secured at both ends, rope swings or heavy metal swings.

Below is a chart to aid you in choosing age appropriate equipment. For a complete list and additional information, call **877-777-3700**.

Equipment such as platforms, stepped platforms, guardrails and barriers, handrails, and means to access and egress from play equipment have different guidelines for the different age groups (toddlers, preschool, and school age). It is important to understand that guardrails are not intended for toddlers as it is easy for them to crawl through.

It is easier for a child to climb up than it is for them to climb down. Remember to provide various methods to access and egress from the play structure so different skill levels will feel comfortable using the equipment.

Below is a chart showing different methods of access and egress.

Method of Access	Challenge Level	Appropriate For
Ramps	Easiest	Toddlers +
Straight Stairways	Easy	Toddlers +
Spiral Stairway	Moderate	Toddlers* +
Step Ladders	Moderate	15 Months*+
Rung Ladders	Moderate	Preschool*+
Arch Climbers	Difficult	Preschool*+
Flexible Climbers (nets, trees)	Difficult	Preschool*+

\* only if an easy egress method is also provided



## Toddler – Ages 6-23 months

- Climbing equipment under 32" high
- Ramps
- Single file step ladders
- Slides
- Spiral slides less than 360°
- Spring rockers
- Stairways
- Swings with full bucket seats



## Preschool – Ages 2-5 years

- Certain climbers
- Horizontal ladders less than or equal to 60" high for ages 4 and 5
- Merry-go-rounds
- Ramps
- Rung ladders
- Single file step ladders
- Slides
- Spiral slides up to 360°
- Spring rockers
- Stairways
- Swings – belt, full bucket seats (2-4 years) & rotating tire



## Grade School – Ages 5-12 years

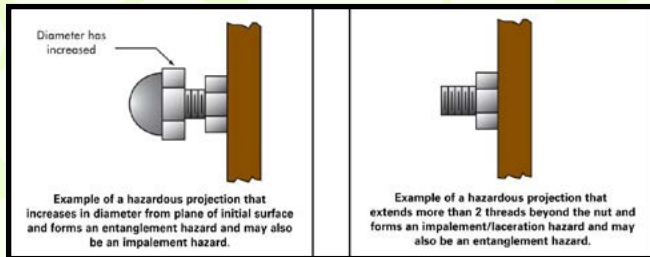
- Arch climbers
- Chain or cable walks
- Free standing climbing events with flexible parts
- Fulcrum seesaws
- Ladders – Horizontal, Rung, & Step
- Overhead rings
- Merry-go-rounds
- Ramps
- Ring treks
- Slides<sup>ll</sup>
- Spiral slides more than one 360° turn
- Stairways
- Swings – belt & rotating tire
- Track rides
- Vertical sliding poles



# PLAYGROUND HAZARDS

There are 6 main categories of playground hazards:

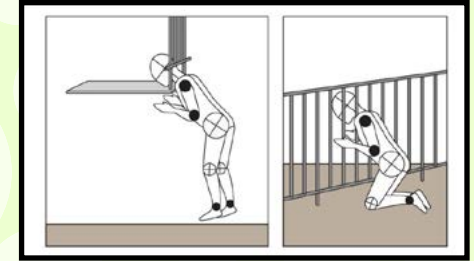
- **Crush & Shear Points:** Crush and shear points can be caused by parts moving relative to each other, or to a fixed part, during a normal use cycle, such as with a seesaw. To determine if there is a possible crush or shear point, consider: the likelihood a child could get a body part inside the point and the closing force around the point.
- **Entanglement & Impalement:** Drawstrings on hoods of jackets, sweatshirts, and other upper body clothing can become entangled in playground equipment, and can cause death by strangulation. To avoid this, remove any ropes, dog leashes, or similar objects attached to playground equipment and avoid equipment with ropes that are not secured at both ends. Projections on playground equipment should not be able to entangle children's clothing nor should they be large enough to impale. To avoid this risk: (1) The diameter of a projection should not increase in the direction away from the surrounding surface toward the exposed end. (2) Bolts should not expose more than 2 threads beyond the end of the nut. (3) All hooks should be closed.



- **Entrapment:** Head entrapment can occur feet first or head first. Openings can present an entrapment hazard if the distance between any interior opposing surfaces is greater than 3.5 inches and less than 9 inches.

Children can become entrapped by partially bound openings, such as those formed by two or more playground parts.

To minimize entrapment hazards of stepped platforms, infill should be used to reduce the space between stepped platforms. If the space exceeds 9 inches, and the highest of the lower platform above the protective surfacing below exceeds 30 inches (for preschool children), infill should be used to reduce the space to less than 3.5 inches.



- **Sharp Points, Corners & Edges:** Any sharp edge or point can cause serious lacerations. To avoid the risk of injury make sure that wood parts are smooth and not splintering, all corners are rounded and all metal edges are rolled or have rounded capping.
- **Suspended Hazards:** Suspended components should be placed away from high traffic areas, brightly colored and should not loop back on themselves.
- **Tripping:** Playgrounds should be free from any tripping hazards such as rapid changes in elevation, anchoring devices and containment walls for loose-fill surfacing.



# MAINTAINING A PLAYGROUND

All playground areas should be inspected for excessive wear, deterioration and any potential hazards. For each piece of equipment, the frequency of thorough inspections will depend on the type and age of equipment, the amount of use and the local climate.

To help ensure your loose-fill surfacing level stays sufficient and is not displaced, it should be checked frequently and raked back into its proper place if necessary. When inspecting loose-fill surfacing materials, pay particular attention to areas under swings and at slide exits, pooling water on mulch surfacing and areas of frozen surfacing.

Records of the following should always be retained:

1. Maintenance inspections
2. Repairs
3. Accidents or injuries

To the right is a check list of things to look for when inspecting a playground. Any repairs should be made immediately.

## Routine inspection & maintenance issues

- Broken equipment such as loose bolts, missing end caps, cracks, etc.
- Broken glass & other trash
- Cracks in plastics
- Loose anchoring
- Hazardous or dangerous debris
- Insect damage
- Problems with surfacing
- Displaced loose-fill surfacing (see Section 4.3)
- Holes, flakes, and/or buckling of unitary surfacing
- User modifications (such as ropes tied to parts or equipment rearranged)
- Vandalism
- Worn, loose, damaged, or missing parts
- Wood splitting
- Rusted or corroded metals
- Rot

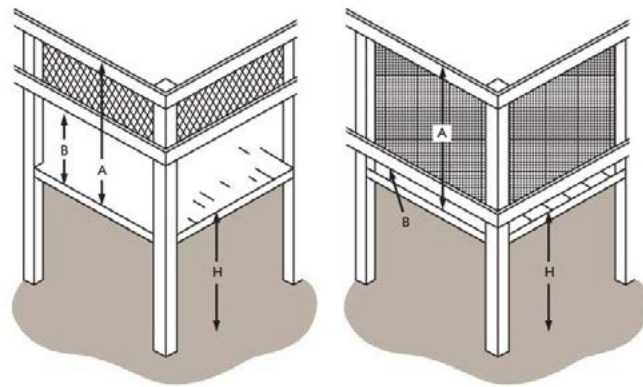




# PLATFORMS, GUARDRAILS & PROTECTIVE BARRIERS

Platforms should be generally flat with openings that allow for drainage. A stepped platform must have an access component if the difference between platforms is 12" for toddlers or 18" for school-age users. Access to platforms over 6 feet high (except for free standing slides) should provide an intermediate standing surface so that the child can pause and make a decision to keep going or find another way down.

Guardrails and protective barriers are used to minimize the likelihood of accidental falls from elevated platforms, however; protective barriers provide greater protection for children. Guardrails should be tall enough to protect the tallest child from falling over the top and low enough that the smallest child cannot walk under it. Barriers are not needed if it will interfere with the intended use of the equipment, such as climbing equipment.



Guardrails or protective barriers should be provided on the following:

1. Elevated platforms
2. Walkways
3. Landings
4. Stairways
5. Transitional surfaces



	Guardrail	Barrier
Protects against accidental falls from platform	Yes	Yes
Discourages climbing over	No	Yes
Protects against climbing through	No	Yes
<b>Toddlers</b>		
A Top edge distance from platform	Not recommended	A = 24" or higher
B Bottom edge distance from platform	Not recommended	B < 3"
H Recommended when platform fall height is:	Not recommended	H = 18" or higher
<b>Preschool-age</b>		
A Top edge distance from platform	A = 29" or higher	A = 29" or higher
B Bottom edge distance from platform	9" < B ≤ 23"	B < 3.5"
H Recommended when platform fall height is:	20" < H ≤ 30"	H > 30"
<b>School-age</b>		
A Top edge distance from platform	A = 38" or higher	A = 38" or higher
B Bottom edge distance from platform	9" < B ≤ 28"	B < 3.5"
H Recommended when platform fall height is:	30" < H ≤ 48"	H > 48"

# CONCLUSION AND RELATED RESOURCES

There are several factors to consider when choosing the perfect playground for any outdoor area. The above information are the basic safety regulations to help children travel to and from the playground, to identify any potential hazards near your play area and what barriers on the unit will interrupt the line of sight of those supervising the children at play.

For additional information concerning the safety of specific equipment please contact **ParknPool** at **877.777.3700**. We have made sure our units have what children want, and parents need. When it comes to kids, safety and fun have to play nice with each other.

## Related Links:

<http://www.astm.org/Standards/F1487.htm>

<http://www.cpsc.gov/cpsc/pub/pubs/325.pdf>

<http://www.prweb.com/releases/2011/10/prweb8875056.htm>

<http://www.prweb.com/releases/2011/11/prweb9004405.htm>

<http://www.prweb.com/releases/2012/1/prweb9156448.htm>

<http://www.prweb.com/releases/2012/1/prweb9156695.htm>

<http://www.parknpool.com/playgrounds/playgrounds.php>

<http://parknpool.net/blog/2012/02/08/life-must-be-lived-as-play-plato/>

