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FALL SURFACING GUIDELINES FOR PLAYGROUNDS

Many playground memories evoke a sense of accomplishment in taking our minds and bodies to new limits. How high did the swing go? How far did we climb? How many times did we cross the monkey bars without falling?

Most of us want those same challenges and memories for our children. However, parents and educators need to remember that pushing the body to limits also can create falls and injuries.

According to the United States Consumer Product Safety Commission (CPSC) statistics, nearly 200,000 playground injuries requiring emergency room visits occur each year. About 150,000 of those injuries occur on public playgrounds such as parks, schools, child care centers and restaurants.

Statistics indicate that nearly 70 percent of all playground injuries are related to falls to the surface. Recent studies also have found that about 80 percent of playgrounds have unsuitable surfaces.

Thus, an important aspect of reducing playground injuries is to provide cushioned surfaces beneath and around equipment at depths appropriate to equipment height. Surfaces such as asphalt, cement, dirt, grass and rocks are not acceptable surfaces.

The National Program for Playground Safety strongly recommends that parents and other adults become proactive regarding the provision of appropriate surfaces at adequate depths. Parents and other adults are not expected to become certified playground inspectors, but they can visually inspect the surfaces for any safety problems and be sure that children do not play on unsafe surfaces.

Why is cushioned surfacing needed on playgrounds?

Falls to the surface are the leading cause of injuries on playgrounds. Approximately 106,000 of all public playground injuries and several deaths each year are related to falls to surfaces*. However, shock absorbing surfaces can help disperse the momentum of a falling body or head, thus, reducing the risk of life threatening injuries.

The National Program for Playground Safety, the U.S. Consumer Product Safety Commission (CPSC) and other organizations highly recommend the use of various loose-fill materials such as pea gravel and wood fiber as well as synthetic surfaces that tend to be shock absorbing. Surfaces such as asphalt, cement, dirt, grass and rocks should not be used unless they are being utilized as the base for other appropriate shock absorbing surfaces.

CPSC has established recommendations for appropriate surfacing based on their own testing. One of CPSC's main points states, the more shock absorbing a surface can be made, the more likely it is to reduce injuries. "However, it should be recognized that all injuries due to falls cannot be prevented no matter what playground surfacing material is used."

What are appropriate surfaces for playgrounds?

There are no perfect playground surfaces. Playground safety experts highly recommend the use of various loose-fill or synthetic surface materials. The selection of cushioned surfacing varies from playground to playground. Purchasers need to ask the following questions. Does it meet American Society for Testing & Materials (ASTM) standards and CPSC guidelines? Does it have a proven track record in similar climates? Is it readily available? What are initial and maintenance costs? Will it meet the playground's needs as far as durability, drainage and accessibility?

Acceptable loose-fill materials include hardwood fiber chips or mulch, pea gravel, sand and shredded rubber. Recommended synthetic surfaces include rubber tiles, rubber mats or synthetic poured surfaces.

Loose-fill surfaces should be maintained to a depth proportionate to the height of the equipment. However, a 12-inch depth is a good guideline for equipment up to 8 feet in height.

Manufacturers should provide testing results to indicate appropriate depth of synthetic materials. Be sure to check CPSC guidelines and ASTM standard F1292-95 to make sure the manufacturers testing information is in compliance with recommendations.

Surfaces and surface depths are recommended based on critical height of surfacing materials. CPSC and ASTM testing indicates that consumers should look for surfacing that has a critical height with "peak deceleration of no more than 200 G's (acceleration due to gravity) and a HIC (head injury criteria) of no more than 1,000 when tested in accordance with the procedure described in ASTM F1292." Thus, keep in mind, to try to prevent concussions and more severe injuries surfacing should have no more than 200 G's and a HIC of no more than 1,000.

Where should cushioned surfacing be placed?

Cushioned surfaces should be placed in all playground fall zones. Fall zones are defined as the area under and around playground equipment where children may fall. The total surfacing space is dependent on the type of equipment at the playground. In general, the surface should extend a

minimum of 6 feet in all directions from the edge of stationary playground equipment. Because of the momentum of children playing on slides and swings, different calculations for those fall zones need to be made.

The fall zone for slides higher than 4' can be determined by adding 4' to the height of the slide. For example, a 6' slide should have 10' of surfacing extending beyond the exit of the slide. The maximum amount of surfacing for the end of any slide is 14'.

Fall zones for swings is twice the height of the pivot or swing hanger in front and in back of the swing seats. For example, if the hanger pivot height is 10 feet, the fall zone must be 20 feet in front and 20 feet in back of the stationary swing seat. Surfacing should also extend six feet to each side of the support structures.

What maintenance needs do surfacing materials have?

Maintenance costs and needs of surfacing materials vary. Loose-fill surfacing materials such as wood chips, sand, pea gravel and shredded rubber have a lower initial cost, but tend to have higher maintenance needs.

In high-use areas, loose materials may need to be raked daily or tilled periodically to loosen compaction and replace materials that have been pushed away. Loads of loose material may need to be trucked in on an annual or semi-annual basis to keep the surface at an appropriate depth.

Loose-fill materials also need to be inspected for protruding and sharp objects such as glass, can tops, sharp rocks or metal objects.

Synthetic materials such as rubber mats, tiles and pour-in-place also have maintenance needs. Repairs may need to be made to gouges, burns and loose areas. Synthetic materials also may need to be swept frequently to prevent sand, dirt, rocks or other loose materials from becoming a slipping hazard.

All surfacing material should provide good drainage. Drainage problems can cause inaccessibility and slipping hazards.

What are acceptable surfaces for playground access?

New surface materials are being developed daily to help meet accessibility needs for disabled persons. Currently, the most generally accepted surfaces for wheelchair accessibility are uniform wood chips, and synthetic products such as rubber mats or tiles and poured-in-place surfaces. Playground planners should note that the whole play area may not need accessible surfacing. However, an accessible path should be provided to the equipment and accessibility should be made so that play opportunities are given to all children.

Accessible paths should be 60" wide, slip resistant and have a slope no greater than 1:12. Transfer stations on playground equipment and parking areas for wheelchairs are good ideas to improve accessibility.

How to determine how much loose-fill surfacing is needed.

This information is based on CPSC critical height testing. The National Program for Playground Safety recommends that in general 12" of uncompressed loose-fill material be used for equipment up to 8' in height.

9" of compressed (material listed) will adequately provide safety for equipment with critical heights up to:

- wood mulch /10'
- double shredded bark/7'
- uniform wood chips/6'
- fine sand/5'
- coarse sand/4'
- fine(pea) gravel/6'
- medium gravel/5'

In other words, if you have equipment that has an 8' high slide, wood mulch would be the only loose fill material considered safe at a depth of 9" compressed. Although testing has been done on both compressed and uncompressed materials, please remember that all loose materials compact, especially in high-usage areas and in cold and wet weather. Thus, when installing loose-fill materials allow for compression. All this will help Keep America's Playgrounds SAFE.

*This information was compiled by the National Program for Playground Safety, University of Northern Iowa (1996, statistics submitted for publication). All statistics are based on data obtained from the U.S. Consumer Product Safety Commission's (CPSC) National Electronic Injury Surveillance System (NEISS). NEISS collects only playground product-related injuries that are recorded in more than 90 hospital emergency departments located throughout the U.S. Thus, only emergency room injuries are recorded, and the national statistics are estimates.

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