



Inclusive Play and Surfacing

Montgomery County Commission on People With Disabilities
April 11, 2018



THE MARYLAND-NATIONAL CAPITAL PARK AND PLANNING COMMISSION
Montgomery County Department of Parks



Agenda

- Overview of Inclusive Play
- Playground Surfacing
 - Purpose and requirements
 - Types of surfacing
 - Lifecycle costs
 - Accessibility
 - Health and environmental concerns
 - Criteria for selecting surfacing
- Pending State Legislation
- Discussion/Guidance from CPWD





Inclusive Play





Inclusive play includes access, but it also considers a much wider range of needs beyond physical disability. The idea is to create a space that allows every child to play together, and to participate fully in a variety of activities in a mutually beneficial way.

An inclusive play space should be a multigenerational environment that allows people of all ages and abilities to play and recreate with friends and families.





Free play has been scientifically proven to have a variety of physical, mental, emotional, and cognitive benefits for children and parents of all ages, and can be an important activity to promote family interaction and relationship-building.

By making a public playground accessible to all, including parents, grandparents, and caregivers with different physical conditions, helps ensures that it is a healthy community gathering spot.





Playground Surfacing





Injuries: Consumer Product Safety Commission

- Over 200,000 playground related injuries annually.
- Falls are the second most common cause of injury on public playgrounds (17%)
- Most injuries from falls are due to falls onto insufficient surfacing.
- Playground surfacing is one of the most important factors in reducing the likelihood of life-threatening head injuries.





Impact Attenuation

- Impact attenuation is the ability of a surface to reduce and dissipate the energy of a falling body.
- Impact attenuating surfacing absorbs impacts to minimize the likelihood of a life threatening head injury.
- American Society for Testing & Materials: ASTM F 1292 Test method establishes an impact attenuation performance criterion for playground surfacing material.





Impact Attenuating Playground Surfacing that Complies with ASTM F 1292

- Will reduce the likelihood of serious head injury
- Will reduce the number and severity of injuries
- Will not prevent all injuries





Accessibility Considerations for Surfacing

- Provide safe approach routes in the playground to all accessible elements
- Provide safe means to enter and exit play structure
- Provide access to a variety of play events





Factors to Consider When Selecting Surfacing

- Fall Height of Equipment
- Frequency of Use
- Accessibility – compliance with 2010 Americans with Disabilities Act
- Site limitations (slopes, etc.)
- Environmental Conditions
- Maintenance
- Cost – initial vs. long term





Types of Surfacing





Types of Protective Surfacing Systems

A surface system includes all the materials that contribute to the impact absorption to minimize the likelihood of a life-threatening head injury.

- **Loose Fill System**

- Consists of small, independent, moveable particles

- **Unitary System**

- Consists of one or more components bound together

- **Composite System**

- Includes both loose-fill and unitary components





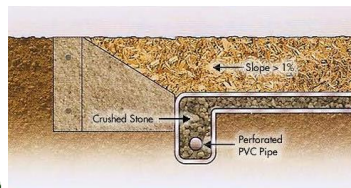
Engineered Wood Fiber

ADVANTAGES:

- Low initial cost
- Attractive appearance, stays cooler than other surfaces in hot weather
- Ease of installation and maintenance of equipment footings over time
- Can be composted or used as landscape mulch at end of useful life
- 15 year warranty (to continue to meet ASTM impact attenuation requirements)

DISADVANTAGES:

- Requires intensive maintenance to ensure compliance with ADA and to maintain proper depths for safety
- Loose fill material is less accessible than other surfaces
- Subject to weed growth and mold
- Holds moisture, decomposes over time
- Can harbor foreign objects, e.g., sharp objects, broken glass, debris
- Spreads easily outside contained area, washes out in floods





Engineered Wood Fiber





Rubber Tiles

ADVANTAGES:

- Longest warranty of rubber materials, 10-15 years for product failure & impact attenuation
- Easily accessible
- Wears well over time and remains consistent even in high-traffic areas
- Low maintenance and easy to clean and remove debris
- Relatively easy to repair play equipment by replacing individual tiles
- Some products can be recycled at end of life cycle

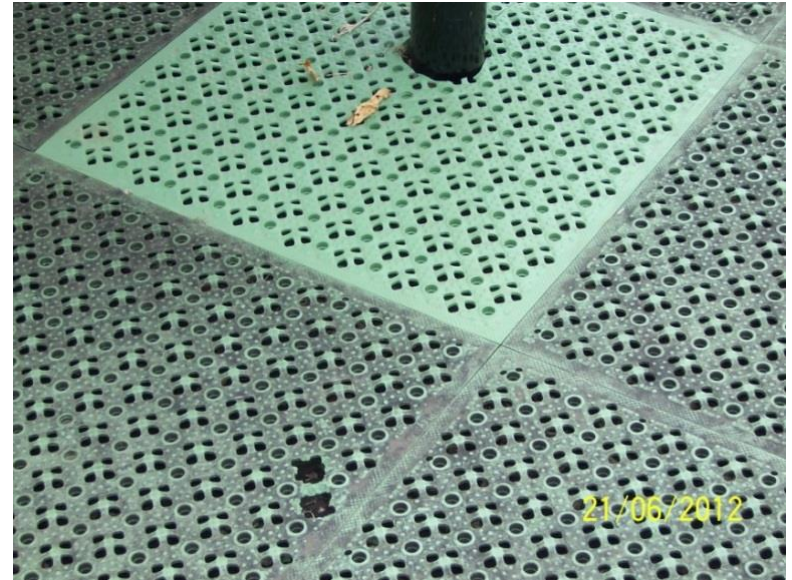
DISADVANTAGES:

- Requires stringent base preparation and initial professional installation
- Generates surface heat
- Some limitation in free-flowing graphic design potential
- Rubber tiles may curl and cause tripping if not installed properly





Rubber Tiles





Poured in Place Rubber

ADVANTAGES:

- Easily accessible, can be used on slopes
- Offers wide range of customized design opportunities
- Relatively low maintenance, easy to clean and remove debris
- Warranty of 5, 7 or 10 years depending on system specified and binder used on surface

DISADVANTAGES:

- High initial cost, high cost to replace
- Subject to vandalism by burning or peeling
- Generates surface heat
- More difficult to repair and maintain play equipment footings than other surfacing, patched colors would not match
- Requires stringent base preparation and initial professional installation under specific environmental conditions
- Products with binder materials cannot be recycled at end of life cycle





Poured in Place Rubber





Bonded Rubber (single depth pour)

ADVANTAGES:

- One thickness pour
- Permeable surface lets water run right through
- Variety of options possible for the base material (compacted subgrade, stone, concrete, etc.)
- Useful installed above grade in locations with mature trees and roots



DISADVANTAGES:

- High initial cost, 3-10 yr. warranty depending on product and type of binder
- Durability has not proven to be good in high use park sites, flakes and is easily vandalized
- Generates surface heat in sunny conditions
- Requires installation under specific environmental conditions
- Not recyclable at end of life cycle
- Maintenance of play equipment and footings requires removal and patching of surfacing





Bonded Rubber





Synthetic Turf and Carpet Systems

ADVANTAGES:

- Easily accessible
- Variety of options possible for the base material (compacted subgrade, stone, concrete, etc.)



DISADVANTAGES:

- Generates surface heat
- Requires professional installation to prevent curling and tripping hazards
- High initial cost, high cost to replace
- Subject to vandalism by burning
- More difficult to repair and maintain play equipment footings, patched colors would not match
- Manufacturers provide minimal information on warranties and maintenance, typical 1-2 years for carpet, 8-10 years for UV stability, and 5 years for base





Synthetic Turf and Carpet Systems





Materials not Acceptable for Surfacing

Non-compliant for impact attenuation and/or accessibility:

- Concrete
- Asphalt
- Packed Earth
- Grass
- Loose Recycled Rubber Mulch





Playground Surfacing in Montgomery Parks

Inventory – 275 Playgrounds

- Engineered Wood Fiber – 252 (92%)
- Combination (Fiber with Rubber Access Areas) – 6 (2%)
- Rubber – 17 (6%)
 - Poured-in-Place Rubber – 8
 - Bonded Rubber – 4
 - Rubber Tile - 5





Lifecycle Costs of Surfacing Types

System	Initial Installed Cost	Annual Maintenance Cost	Life Cycle	Can Surface be Recycled	Total 15 Year Cost
Wood Fiber	\$44,591	\$8,261	15 Years	Yes	\$290,293
Rubber Tiles	\$121,553	\$1,448	15 Years	Yes	\$368,009
Poured in Place Rubber	\$125,806	\$2,275	7 Years	No	\$475,276
Bonded Rubber	\$83,844	\$2,195	5 Years	No	\$499,481
Carpet or Turf	\$116,580	\$3,042	2 Years	Partial	\$721,661

Note: Initial installed costs and maintenance costs in summary table are costs estimated at Year 0; annual maintenance costs include standard annual maintenance tasks only.

The difference in manhours to maintain wood fiber versus rubber surfaces is 130-180 manhours/playground/year





Accessibility





ADA Study: National Center on Accessibility

October 23, 2013 Report on Playground Surfacing:

- National Center on Accessibility at Indiana University initiated a study of playground surfaces located in public parks with research funding by the U.S. Access Board.
- Documented deficiencies in accessibility and impact attenuation that arise upon initial installation and maintenance of different playground surface types after 3-5 years of use.
- Studied 35 new public park playgrounds from 16 knowledgeable municipalities between October 2008 and September 2012.
- <http://www.ncaonline.org/resources/articles/playground-surfacestudy-finalreport.shtml>





ADA Study: National Center on Accessibility

Findings:

- **There is no perfect playground surface. Within 12 months of installation, each type had performance issues.**
- **Engineered Wood Fiber:** within 12 months had the greatest number of deficiencies for slope and accessibility, but maintained its impact attenuation best over time. Is least firm and stable of all surfaces.
- **Synthetic Grass Systems:** after 12 months carpet shrunk and separated at the seams causing inaccessible surfaces, grass was flattened in traffic areas, and there were static electricity charges when touching metal play equipment. Impact attenuation was reduced between 2 and 5 years after installation.
- **Poured In Place Rubber:** remained accessible for first 12 months of installation; deficiencies with slopes, level and openings appear after 2-3 years due to wear, cracking and flaking of granular surface. Deficiencies noted within first year for impact attenuation in heavy use areas (under swings).
- **Rubber Tiles:** remained accessible during early years following installation. Recurring instances of puncture holes and shifting, cracking and buckling of tiles occurred after 3-5 years. Some drainage problems with sub-base materials noted, causing silt to come up through tiles.





Local ADA Legal Challenges – May 2017

District of Columbia Department of Parks & Recreation

A resident complaint, bolstered by an opinion by the D.C. Office of Disability Rights and a separate legal challenge by an independent disability rights organization is resulting in replacement of engineered wood fiber surfacing in two D.C. playgrounds and two elementary school playgrounds.

District pledges to address ADA issues at two playgrounds

By **Brady Holt** - May 10, 2017



City officials pledged to replace the wood-chip play surface at Lafayette Park this spring after more than a year of complaints that it didn't meet ADA requirements. (Brian Kapur/The Current/April 2017)

The D.C. government is preparing to replace the playground surfaces in Lafayette and Kalorama playgrounds following months of complaints that the wood chip play areas don't meet Americans With Disabilities Act standards for wheelchair accessibility.

In Chevy Chase, the D.C. Department of General Services will soon replace Lafayette Park's "engineered wood fiber" surface with artificial turf, agency spokesperson Jackie Stanley told The Current. Work at Kalorama Park, 1875 Columbia Road NW, will begin after further community engagement, Stanley said.





Health Concerns





Health Concerns with Recycled Tire Materials

- Chemical Exposure
 - Ingestion
 - Inhalation
 - Dermal Exposure
 - Environmental Exposure (water supply)
- Latex Allergy
- Heat Stress





Health Concerns with Recycled Tire Materials

PUBLIC STATEMENTS / STUDIES

- Washington State Department of Health, April 2017
- Dutch National Institute for Public Health & the Environment, March 2017
- European Union Chemicals Agency, February 2017
- Commonwealth of Massachusetts Department of Public Health, March 2015
- State of Connecticut Department of Public Health, January 2015
- Kansas Department of Health and Environment, June 2013
- New Jersey Department of Environmental Protection, October 2011
- California Office of Environmental Health Hazard Assessment, 2010, 2007
- U.S. Environmental Protection Agency, November 2009
- State of New York State Department of Health, August 2008
- French National Institute for Industrial Environment and Risks, 2007
- Connecticut Agricultural Experiment Station, August 2007





Health Concerns with Recycled Tire Materials

PUBLIC HEALTH FINDINGS

- Tire crumb has been found to contain chemicals including semi-volatile organic compounds (including PAHs), volatile organic compounds (VOCs), and metals.
- Metals and PAHs of concern with tire crumb are also often found in surface soil in the US.
- Studies evaluating potential exposure conducted by federal agencies and four states concluded that ingestion, dermal and inhalation exposures to chemicals in or released from recycled rubber do not pose a significant health concern.
- Surface temperatures can reach levels of discomfort and may contribute to heat stress.
- Skin sensitization tests of tire derived surfacing and synthetic rubber EPDM suggest that this material is not likely to cause allergic reaction or rashes.





Health Concerns with Recycled Tire Materials

ONGOING COMPREHENSIVE PUBLIC HEALTH STUDIES

- **California Office of Environmental Health Hazard Assessment, 2015:** Comprehensive study is underway to fill existing research gaps and assess potential human health effects associated with the use of recycled waste tires in playgrounds and synthetic turf products and to provide a health risk assessment. Draft report with preliminary data and results of the study will be released in mid-2018 with the final report released in mid-2019.
- **U.S. Environmental Protection Agency, U.S. Centers for Disease Control and Prevention, and U.S. Consumer Product Safety Commission, 2016:** Multi-agency study to address key environmental health questions related to use of recycled tire crumb on playing fields and playgrounds. The first part of the study to analyze gaps in current data and characterize the chemical composition of tire crumb has been completed. The second and third parts of the study to determine the human exposure potential and collection and analysis of biological samples from participants is expected to be completed in 2019.





Health Concerns with Recycled Tire Materials

HEAT STRESS/THERMAL BURNS ON PLAYGROUNDS

CPSC Injuries Associated with Playgrounds, October 2009:

- CPSC received inquiries regarding thermal burns on playgrounds and analyzed this data over 8 years from 2001-2008.
- 2,691 incidents of playground injuries were reported to the CPSC over this period.
 - **29 reported incidents of thermal burns on play equipment or surfacing (1%)**
 - **14 of those incidents involved playground surfacing (0.5%)**
 - Two incidents involved hospitalization for toddlers who burned their feet on rubber playground surfacing
- During this 8 year period, 1,786,008 total injuries associated with playground equipment were treated nationally in emergency departments. **CPSC indicated the number of injuries involving thermal burns is too small to report.**

CPSC did not analyze thermal burns in their 2009-2014 injury analysis.





Health Concerns with Recycled Tire Materials

Temperature Readings in Parks: July 14, 2017, Full Sun

	MLK Rec. Park 10:30 am, 91 F	Takoma-Piney 11:30 am, 93 F	White Oak RC 10:00 am, 90 F	Cedar-Beach 12:40 pm, 95 F
PIP Rubber Surfacing (varies with color)	154.8	166.1 – 170.4	N/A	N/A
Bonded Rubber	N/A	N/A	156.4	176.8
Engin. Wood Fiber	145.4	144.0	N/A	N/A
Boardwalk	N/A	158.1 (Trex)	N/A	173.9 (wood)
Asphalt Path	122.6	142.5	121.3	155.0
Slide (varies w/color)	160.5 (green)	149.2 (lt. grey)	171.1 (green)	147.7 (yellow)
Swing seat	148.2	154.9	N/A	163.4
Spinner seat or deck	N/A	167.9	N/A	169.3
Climbing rope	N/A	162.7	N/A	180.8
Climber	N/A	156.3	151.3	142.7
Metal deck or steps	143.3	149.3	141.8	154.4
Fitness Equipment	153.8	N/A	N/A	N/A
Bench	150.6 (wood)	132.5 (metal)	151.2 (plastic)	161.7 (wood)
Natural Turf Ballfield	(gates locked)	116.9	110.3	N/A





Health Concerns w/ Recycled Tire Materials

Temperature Readings: July 14, 2017, 12:40 pm, 95 F, Full Sun





Park Practices





Montgomery Parks Stakeholders - 2012

Discussion

- Each type of surface has advantages and disadvantages, and there is no single recommendation that works for all sites
- The required maintenance for engineered wood fiber is labor-intensive to sustain the proper levels of surfacing and exhausts operational resources
- It would be desirable to have more playgrounds in the park system with rubber surfacing





Current Criteria for Selection of Surfacing:

RUBBER/SYNTHETIC SURFACING:

- Project budget will allow (i.e. new park, community donation, small playground)
- The playground is heavily used (such as urban area)
- The playground or park is designed to serve special populations
- Playground is located in undesirable area that might sustain flooding, include slopes, retain moisture, and cannot be relocated to a more suitable site
- Maintenance access to playground location is limited

ENGINEERED WOOD FIBER:

- Playground is well drained and in level area where fiber will not wash away
- Playground is large, where rubber surfacing might be cost prohibitive
- The playground receives moderate or low levels of use
- Site has adequate maintenance access for replenishment of wood fiber





Summary

- The selection of an appropriate surfacing type depends on the project budget, location, size, level of use, and maintenance considerations.
- Accessibility concerns require consideration of alternative types of surfacing, such as rubber tiles or a combination of engineered wood fiber and rubber surfacing that provides access to various play elements.
- The progress and recommendations of ongoing health studies by public health and safety agencies should continue to be monitored.
- New surfacing products should be tested for durability and longevity, with knowledge shared among park staff.





Maryland House Bill 505

BY: Delegates A. Miller, Barkley, Carr, Dumais, Fraser-Hidalgo, Gutierrez, Kelly, Korman, Morhaim, Platt, Robinson, and Waldstreicher

For the purpose of establishing a preference for the use of certain natural surface materials in certain projects to construct playgrounds or athletic fields; prohibiting the use of State funds to finance any portion of a project to build a new, or replace an existing, playground or athletic field with a synthetic surface; defining a certain term; providing for the application of this Act; and generally relating to playground and athletic field surfaces.





Maryland Senate Bill 763

BY: Manno, Feldman, Lee, Madaleno, and Young

This bill prohibits the use of State funds to finance any portion of a project to build new or replace existing playgrounds or athletic fields with a synthetic surface. It also requires, to the maximum extent practicable, State or local governmental agencies to give consideration and preference to the use of state-of-the-art natural surface materials in any project to construct a playground or athletic field. The bill takes effect July 1, 2018 and applies only prospectively to any project for which funds have not been allocated before that date.





Discussion

